JMAP
REGENTS BY PERFORMANCE INDICATOR: TOPIC

NY Algebra 2/Trigonometry Regents Exam Questions from Fall 2009 to June 2013 Sorted by PI: Topic

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Dear Sir

I have to acknolege the reciept of your favor of May 14. in which you mention that you have finished the 6. first books of Euclid, plane trigonometry, surveying & algebra and ask whether I think a further pursuit of that branch of science would be useful to you. there are some propositions in the latter books of Euclid, & some of Archimedes, which are useful, & I have no doubt you have been made acquainted with them. trigonometry, so far as this, is most valuable to every man, there is scarcely a day in which he will not resort to it for some of the purposes of common life. the science of calculation also is indispensible as far as the extraction of the square & cube roots; Algebra as far as the quadratic equation & the use of logarithms are often of value in ordinary cases: but all beyond these is but a luxury; a delicious luxury indeed; but not to be indulged in by one who is to have a profession to follow for his subsistence. in this light I view the conic sections, curves of the higher orders, perhaps even spherical trigonometry, Algebraical operations beyond the 2d dimension, and fluxions.

Letter from Thomas Jefferson to William G. Munford, Monticello, June 18, 1799.

TABLE OF CONTENTS

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic

GRAPHS AND STATISTICS

A2.S.1-2: ANALYSIS OF DATA

1 Which task is *not* a component of an observational study?
   1 The researcher decides who will make up the sample.
   2 The researcher analyzes the data received from the sample.
   3 The researcher gathers data from the sample, using surveys or taking measurements.
   4 The researcher divides the sample into two groups, with one group acting as a control group.

2 A doctor wants to test the effectiveness of a new drug on her patients. She separates her sample of patients into two groups and administers the drug to only one of these groups. She then compares the results. Which type of study *best* describes this situation?
   1 census
   2 survey
   3 observation
   4 controlled experiment

3 A market research firm needs to collect data on viewer preferences for local news programming in Buffalo. Which method of data collection is most appropriate?
   1 census
   2 survey
   3 observation
   4 controlled experiment

4 Howard collected fish eggs from a pond behind his house so he could determine whether sunlight had an effect on how many of the eggs hatched. After he collected the eggs, he divided them into two tanks. He put both tanks outside near the pond, and he covered one of the tanks with a box to block out all sunlight. State whether Howard's investigation was an example of a controlled experiment, an observation, or a survey. Justify your response.

5 A survey completed at a large university asked 2,000 students to estimate the average number of hours they spend studying each week. Every tenth student entering the library was surveyed. The data showed that the mean number of hours that students spend studying was 15.7 per week. Which characteristic of the survey could create a bias in the results?
   1 the size of the sample
   2 the size of the population
   3 the method of analyzing the data
   4 the method of choosing the students who were surveyed

6 The yearbook staff has designed a survey to learn student opinions on how the yearbook could be improved for this year. If they want to distribute this survey to 100 students and obtain the most reliable data, they should survey
   1 every third student sent to the office
   2 every third student to enter the library
   3 every third student to enter the gym for the basketball game
   4 every third student arriving at school in the morning

A2.S.3: AVERAGE KNOWN WITH MISSING DATA

7 The number of minutes students took to complete a quiz is summarized in the table below.

Minutes	14	15	16	17	18	19	20
Number of Students	5	3	x	5	2	10	1

If the mean number of minutes was 17, which equation could be used to calculate the value of x?
   1 $17 = \frac{119 + x}{x}$
   2 $17 = \frac{119 + 16x}{x}$
   3 $17 = \frac{446 + x}{26 + x}$
   4 $17 = \frac{446 + 16x}{26 + x}$

8 The table below displays the results of a survey regarding the number of pets each student in a class has. The average number of pets per student in this class is 2.

Number of Pets	0	1	2	3	4	5
Number of Students	4	6	10	0	k	2

What is the value of k for this table?
1 9
2 2
3 8
4 4

A2.S.4: DISPERSION

9 The table below shows the first-quarter averages for Mr. Harper's statistics class.

Statistics Class Averages

Quarter Averages	Frequency
99	1
97	5
95	4
92	4
90	7
87	2
84	6
81	2
75	1
70	2
65	1

What is the population variance for this set of data?
1 8.2
2 8.3
3 67.3
4 69.3

10 The heights, in inches, of 10 high school varsity basketball players are 78, 79, 79, 72, 75, 71, 74, 74, 83, and 71. Find the interquartile range of this data set.

11 The scores of one class on the Unit 2 mathematics test are shown in the table below.

Unit 2 Mathematics Test

Test Score	Frequency
96	1
92	2
84	5
80	3
76	6
72	3
68	2

Find the population standard deviation of these scores, to the *nearest tenth*.

12 During a particular month, a local company surveyed all its employees to determine their travel times to work, in minutes. The data for all 15 employees are shown below.

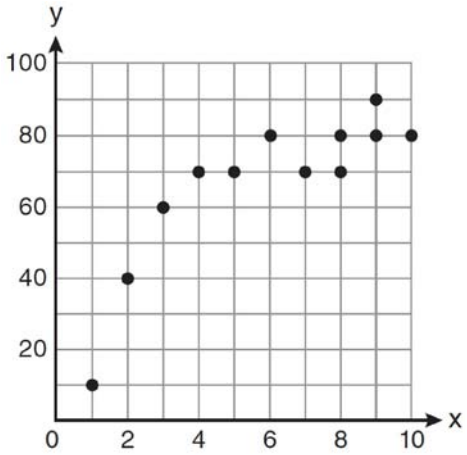
25 55 40 65 29
45 59 35 25 37
52 30 8 40 55

Determine the number of employees whose travel time is within one standard deviation of the mean.

13 Ten teams competed in a cheerleading competition at a local high school. Their scores were 29, 28, 39, 37, 45, 40, 41, 38, 37, and 48. How many scores are within one population standard deviation from the mean? For these data, what is the interquartile range?

A2.S.6-7: REGRESSION

14 Samantha constructs the scatter plot below from a set of data.



Based on her scatter plot, which regression model would be most appropriate?

1 exponential
2 linear
3 logarithmic
4 power

15 The table below shows the number of new stores in a coffee shop chain that opened during the years 1986 through 1994.

Year	Number of New Stores
1986	14
1987	27
1988	48
1989	80
1990	110
1991	153
1992	261
1993	403
1994	681

Using $x = 1$ to represent the year 1986 and y to represent the number of new stores, write the exponential regression equation for these data. Round all values to the *nearest thousandth.*

16 A cup of soup is left on a countertop to cool. The table below gives the temperatures, in degrees Fahrenheit, of the soup recorded over a 10-minute period.

Time in Minutes (x)	Temperature in ^{0}F (y)
0	180.2
2	165.8
4	146.3
6	135.4
8	127.7
10	110.5

Write an exponential regression equation for the data, rounding all values to the *nearest thousandth.*

17 A population of single-celled organisms was grown in a Petri dish over a period of 16 hours. The number of organisms at a given time is recorded in the table below.

Time, hrs (x)	Number of Organisms (y)
0	25
2	36
4	52
6	68
8	85
10	104
12	142
16	260

Determine the exponential regression equation model for these data, rounding all values to the *nearest ten-thousandth*. Using this equation, predict the number of single-celled organisms, to the *nearest whole number*, at the end of the 18th hour.

18 The data collected by a biologist showing the growth of a colony of bacteria at the end of each hour are displayed in the table below.

Time, hour, (x)	**Population** (y)
0	250
1	330
2	580
3	800
4	1650
5	3000

Write an exponential regression equation to model these data. Round all values to the *nearest thousandth*. Assuming this trend continues, use this equation to estimate, to the nearest *ten*, the number of bacteria in the colony at the end of 7 hours.

19 The table below shows the results of an experiment involving the growth of bacteria.

Time (x) (in minutes)	1	3	5	7	9	11
Number of Bacteria (y)	2	25	81	175	310	497

Write a power regression equation for this set of data, rounding all values to *three decimal places*. Using this equation, predict the bacteria's growth, to the *nearest integer*, after 15 minutes.

A2.S.8: CORRELATION COEFFICIENT

20 Which value of r represents data with a strong negative linear correlation between two variables?

1 −1.07
2 −0.89
3 −0.14
4 0.92

21 Which calculator output shows the strongest linear relationship between x and y?

1
Lin Reg
$y = a + bx$
$a = 59.026$
$b = 6.767$
$r = .8643$

2
Lin Reg
$y = a + bx$
$a = .7$
$b = 24.2$
$r = .8361$

3
Lin Reg
$y = a + bx$
$a = 2.45$
$b = .95$
$r = .6022$

4
Lin Reg
$y = a + bx$
$a = -2.9$
$b = 24.1$
$r = -.8924$

22 As shown in the table below, a person's target heart rate during exercise changes as the person gets older.

Age (years)	Target Heart Rate (beats per minute)
20	135
25	132
30	129
35	125
40	122
45	119
50	115

Which value represents the linear correlation coefficient, rounded to the *nearest thousandth*, between a person's age, in years, and that person's target heart rate, in beats per minute?
1 –0.999
2 –0.664
3 0.998
4 1.503

23 The relationship between t, a student's test scores, and d, the student's success in college, is modeled by the equation $d = 0.48t + 75.2$. Based on this linear regression model, the correlation coefficient could be
1 between –1 and 0
2 between 0 and 1
3 equal to –1
4 equal to 0

24 Which value of r represents data with a strong positive linear correlation between two variables?
1 0.89
2 0.34
3 1.04
4 0.01

A2.S.5: NORMAL DISTRIBUTIONS

25 The lengths of 100 pipes have a normal distribution with a mean of 102.4 inches and a standard deviation of 0.2 inch. If one of the pipes measures exactly 102.1 inches, its length lies
1 below the 16th percentile
2 between the 50th and 84th percentiles
3 between the 16th and 50th percentiles
4 above the 84th percentile

26 In a certain high school, a survey revealed the mean amount of bottled water consumed by students each day was 153 bottles with a standard deviation of 22 bottles. Assuming the survey represented a normal distribution, what is the range of the number of bottled waters that approximately 68.2% of the students drink?
1 131 – 164
2 131 – 175
3 142 – 164
4 142 – 175

27 An amateur bowler calculated his bowling average for the season. If the data are normally distributed, about how many of his 50 games were within one standard deviation of the mean?
1 14
2 17
3 34
4 48

28 If the amount of time students work in any given week is normally distributed with a mean of 10 hours per week and a standard deviation of 2 hours, what is the probability a student works between 8 and 11 hours per week?
1 34.1%
2 38.2%
3 53.2%
4 68.2%

29 Assume that the ages of first-year college students are normally distributed with a mean of 19 years and standard deviation of 1 year. To the *nearest integer*, find the percentage of first-year college students who are between the ages of 18 years and 20 years, inclusive. To the *nearest integer*, find the percentage of first-year college students who are 20 years old or older.

30 In a study of 82 video game players, the researchers found that the ages of these players were normally distributed, with a mean age of 17 years and a standard deviation of 3 years. Determine if there were 15 video game players in this study over the age of 20. Justify your answer.

PROBABILITY

A2.S.10: PERMUTATIONS

31 A four-digit serial number is to be created from the digits 0 through 9. How many of these serial numbers can be created if 0 can *not* be the first digit, no digit may be repeated, and the last digit must be 5?
1 448
2 504
3 2,240
4 2,520

32 How many different six-letter arrangements can be made using the letters of the word "TATTOO"?
1 60
2 90
3 120
4 720

33 Which formula can be used to determine the total number of different eight-letter arrangements that can be formed using the letters in the word *DEADLINE*?
1 $8!$
2 $\frac{8!}{4!}$
3 $\frac{8!}{2!+2!}$
4 $\frac{8!}{2!\cdot 2!}$

34 Find the total number of different twelve-letter arrangements that can be formed using the letters in the word *PENNSYLVANIA*.

35 Find the number of possible different 10-letter arrangements using the letters of the word "STATISTICS."

36 The letters of any word can be rearranged. Carol believes that the number of different 9-letter arrangements of the word "TENNESSEE" is greater than the number of different 7-letter arrangements of the word "VERMONT." Is she correct? Justify your answer.

A2.S.11: COMBINATIONS

37 The principal would like to assemble a committee of 8 students from the 15-member student council. How many different committees can be chosen?
1 120
2 6,435
3 32,432,400
4 259,459,200

38 Ms. Bell's mathematics class consists of 4 sophomores, 10 juniors, and 5 seniors. How many different ways can Ms. Bell create a four-member committee of juniors if each junior has an equal chance of being selected?
1 210
2 3,876
3 5,040
4 93,024

39 If order does *not* matter, which selection of students would produce the most possible committees?
1 5 out of 15
2 5 out of 25
3 20 out of 25
4 15 out of 25

40 A blood bank needs twenty people to help with a blood drive. Twenty-five people have volunteered. Find how many different groups of twenty can be formed from the twenty-five volunteers.

A2.S.9: DIFFERENTIATING BETWEEN PERMUTATIONS AND COMBINATIONS

41 Twenty different cameras will be assigned to several boxes. Three cameras will be randomly selected and assigned to box A. Which expression can be used to calculate the number of ways that three cameras can be assigned to box A?

1 $20!$

2 $\frac{20!}{3!}$

3 ${}_{20}C_3$

4 ${}_{20}P_3$

42 Three marbles are to be drawn at random, without replacement, from a bag containing 15 red marbles, 10 blue marbles, and 5 white marbles. Which expression can be used to calculate the probability of drawing 2 red marbles and 1 white marble from the bag?

1 $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}C_3}$

2 $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}C_3}$

3 $\frac{{}_{15}C_2 \cdot {}_5C_1}{{}_{30}P_3}$

4 $\frac{{}_{15}P_2 \cdot {}_5P_1}{{}_{30}P_3}$

43 There are eight people in a tennis club. Which expression can be used to find the number of different ways they can place first, second, and third in a tournament?

1 ${}_8P_3$

2 ${}_8C_3$

3 ${}_8P_5$

4 ${}_8C_5$

44 Which problem involves evaluating ${}_6P_4$?

1 How many different four-digit ID numbers can be formed using 1, 2, 3, 4, 5, and 6 without repetition?

2 How many different subcommittees of four can be chosen from a committee having six members?

3 How many different outfits can be made using six shirts and four pairs of pants?

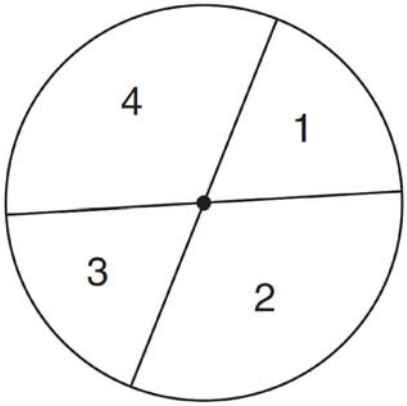
4 How many different ways can one boy and one girl be selected from a group of four boys and six girls?

A2.S.12: SAMPLE SPACE

45 A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

A2.S.13: GEOMETRIC PROBABILITY

46 A dartboard is shown in the diagram below. The two lines intersect at the center of the circle, and the central angle in sector 2 measures $\frac{2\pi}{3}$.



If darts thrown at this board are equally likely to land anywhere on the board, what is the probability that a dart that hits the board will land in either sector 1 or sector 3?

1 $\frac{1}{6}$

2 $\frac{1}{3}$

3 $\frac{1}{2}$

4 $\frac{2}{3}$

A2.S.15: BINOMIAL PROBABILITY

47 A spinner is divided into eight equal sections. Five sections are red and three are green. If the spinner is spun three times, what is the probability that it lands on red *exactly* twice?

1 $\frac{25}{64}$

2 $\frac{45}{512}$

3 $\frac{75}{512}$

4 $\frac{225}{512}$

48 A study finds that 80% of the local high school students text while doing homework. Ten students are selected at random from the local high school. Which expression would be part of the process used to determine the probability that, *at most*, 7 of the 10 students text while doing homework?

1 ${}_{10}C_6\left(\frac{4}{5}\right)^6\left(\frac{1}{5}\right)^4$

2 ${}_{10}C_7\left(\frac{4}{5}\right)^{10}\left(\frac{1}{5}\right)^7$

3 ${}_{10}C_8\left(\frac{7}{10}\right)^{10}\left(\frac{3}{10}\right)^2$

4 ${}_{10}C_9\left(\frac{7}{10}\right)^9\left(\frac{3}{10}\right)^1$

49 On a multiple-choice test, Abby randomly guesses on all seven questions. Each question has four choices. Find the probability, to the *nearest thousandth*, that Abby gets *exactly* three questions correct.

50 The probability that the Stormville Sluggers will win a baseball game is $\frac{2}{3}$. Determine the probability, to the *nearest thousandth*, that the Stormville Sluggers will win *at least* 6 of their next 8 games.

51 The probability that a professional baseball player will get a hit is $\frac{1}{3}$. Calculate the exact probability that he will get *at least* 3 hits in 5 attempts.

52 The members of a men's club have a choice of wearing black or red vests to their club meetings. A study done over a period of many years determined that the percentage of black vests worn is 60%. If there are 10 men at a club meeting on a given night, what is the probability, to the *nearest thousandth*, that *at least* 8 of the vests worn will be black?

53 A study shows that 35% of the fish caught in a local lake had high levels of mercury. Suppose that 10 fish were caught from this lake. Find, to the *nearest tenth of a percent,* the probability that *at least* 8 of the 10 fish caught did *not* contain high levels of mercury.

ABSOLUTE VALUE

A2.A.1: ABSOLUTE VALUE EQUATIONS AND INEQUALITIES

54 What is the solution set of the equation $|4a + 6| - 4a = -10$?

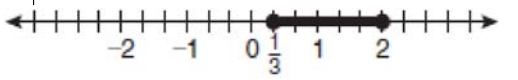
1 $\varnothing$

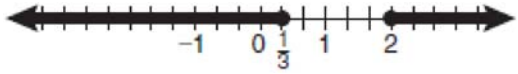
2 $\{0\}$

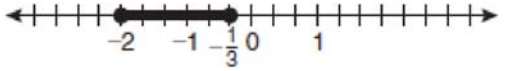
3 $\left\{\frac{1}{2}\right\}$

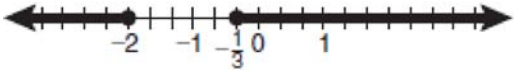
4 $\left\{0, \frac{1}{2}\right\}$

55 Which graph represents the solution set of $|6x - 7| \leq 5$?

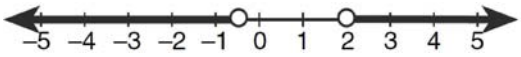
1 

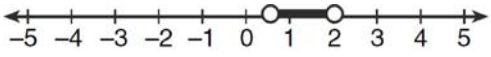
2 

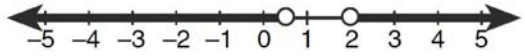
3 

4 

56 Which graph represents the solution set of $\left|\frac{4x - 5}{3}\right| > 1$?

1 

2 

3 

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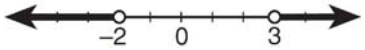
57 What is the graph of the solution set of $|2x - 1| > 5$?

1 

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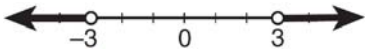
3 

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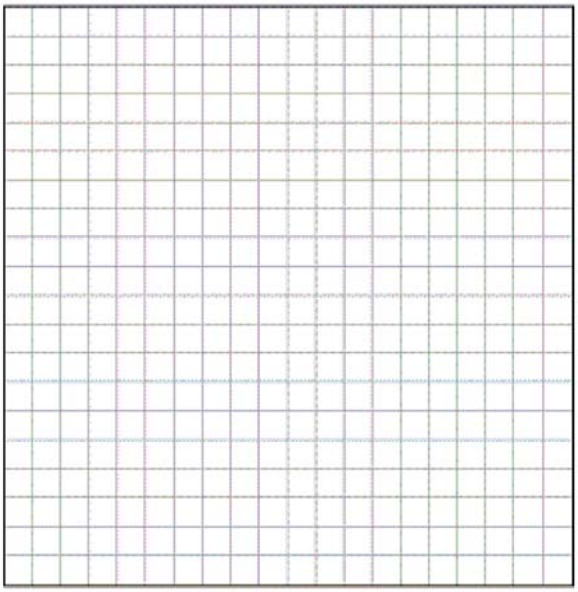
58 Graph the inequality $-3|6 - x| < -15$ for x. Graph the solution on the line below.

59 Determine the solution of the inequality $|3 - 2x| \geq 7$. [The use of the grid below is optional.]



QUADRATICS

A2.A.20-21: ROOTS OF QUADRATICS

60 What are the sum and product of the roots of the equation $6x^2 - 4x - 12 = 0$?

1 sum = $-\frac{2}{3}$; product = -2

2 sum = $\frac{2}{3}$; product = -2

3 sum = -2; product = $\frac{2}{3}$

4 sum = -2; product = $-\frac{2}{3}$

61 Find the sum and product of the roots of the equation $5x^2 + 11x - 3 = 0$.

62 Determine the sum and the product of the roots of $3x^2 = 11x - 6$.

63 Determine the sum and the product of the roots of the equation $12x^2 + x - 6 = 0$.

64 For which equation does the sum of the roots equal $\frac{3}{4}$ and the product of the roots equal -2?

1 $4x^2 - 8x + 3 = 0$

2 $4x^2 + 8x + 3 = 0$

3 $4x^2 - 3x - 8 = 0$

4 $4x^2 + 3x - 2 = 0$

65 For which equation does the sum of the roots equal -3 and the product of the roots equal 2?

1 $x^2 + 2x - 3 = 0$

2 $x^2 - 3x + 2 = 0$

3 $2x^2 + 6x + 4 = 0$

4 $2x^2 - 6x + 4 = 0$

66 Which equation has roots with the sum equal to $\frac{9}{4}$ and the product equal to $\frac{3}{4}$?

1 $4x^2 + 9x + 3 = 0$

2 $4x^2 + 9x - 3 = 0$

3 $4x^2 - 9x + 3 = 0$

4 $4x^2 - 9x - 3 = 0$

67 Write a quadratic equation such that the sum of its roots is 6 and the product of its roots is -27.

A2.A.7: FACTORING POLYNOMIALS

68 Factored completely, the expression $6x - x^3 - x^2$ is equivalent to

1 $x(x + 3)(x - 2)$

2 $x(x - 3)(x + 2)$

3 $-x(x - 3)(x + 2)$

4 $-x(x + 3)(x - 2)$

69 Factored completely, the expression $12x^4 + 10x^3 - 12x^2$ is equivalent to

1 $x^2(4x + 6)(3x - 2)$

2 $2(2x^2 + 3x)(3x^2 - 2x)$

3 $2x^2(2x - 3)(3x + 2)$

4 $2x^2(2x + 3)(3x - 2)$

70 Factor completely: $10ax^2 - 23ax - 5a$

A2.A.7: FACTORING THE DIFFERENCE OF PERFECT SQUARES

71 Factor the expression $12t^8 - 75t^4$ completely.

A2.A.7: FACTORING BY GROUPING

72 When factored completely, $x^3 + 3x^2 - 4x - 12$ equals

1 $(x + 2)(x - 2)(x - 3)$

2 $(x + 2)(x - 2)(x + 3)$

3 $(x^2 - 4)(x + 3)$

4 $(x^2 - 4)(x - 3)$

73 When factored completely, the expression $3x^3 - 5x^2 - 48x + 80$ is equivalent to
1 $(x^2 - 16)(3x - 5)$
2 $(x^2 + 16)(3x - 5)(3x + 5)$
3 $(x + 4)(x - 4)(3x - 5)$
4 $(x + 4)(x - 4)(3x - 5)(3x - 5)$

A2.A.25: QUADRATIC FORMULA

74 The roots of the equation $2x^2 + 7x - 3 = 0$ are
1 $-\frac{1}{2}$ and -3
2 $\frac{1}{2}$ and 3
3 $\frac{-7 \pm \sqrt{73}}{4}$
4 $\frac{7 \pm \sqrt{73}}{4}$

75 The solutions of the equation $y^2 - 3y = 9$ are
1 $\frac{3 \pm 3i\sqrt{3}}{2}$
2 $\frac{3 \pm 3i\sqrt{5}}{2}$
3 $\frac{-3 \pm 3\sqrt{5}}{2}$
4 $\frac{3 \pm 3\sqrt{5}}{2}$

76 Solve the equation $6x^2 - 2x - 3 = 0$ and express the answer in simplest radical form.

A2.A.2: USING THE DISCRIMINANT

77 The roots of the equation $9x^2 + 3x - 4 = 0$ are
1 imaginary
2 real, rational, and equal
3 real, rational, and unequal
4 real, irrational, and unequal

78 The roots of the equation $x^2 - 10x + 25 = 0$ are
1 imaginary
2 real and irrational
3 real, rational, and equal
4 real, rational, and unequal

79 The discriminant of a quadratic equation is 24. The roots are
1 imaginary
2 real, rational, and equal
3 real, rational, and unequal
4 real, irrational, and unequal

80 Use the discriminant to determine all values of k that would result in the equation $x^2 - kx + 4 = 0$ having equal roots.

A2.A.24: COMPLETING THE SQUARE

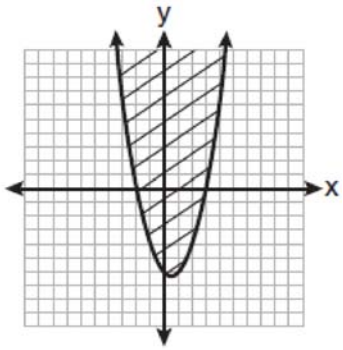
81 Brian correctly used a method of completing the square to solve the equation $x^2 + 7x - 11 = 0$. Brian's first step was to rewrite the equation as $x^2 + 7x = 11$. He then added a number to both sides of the equation. Which number did he add?
1 $\frac{7}{2}$
2 $\frac{49}{4}$
3 $\frac{49}{2}$
4 49

82 If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be
1 $(x + 3)^2 = 7$
2 $(x - 3)^2 = 7$
3 $(x - 3)^2 = 11$
4 $(x - 6)^2 = 34$

83 Solve $2x^2 - 12x + 4 = 0$ by completing the square, expressing the result in simplest radical form.

A2.A.4: QUADRATIC INEQUALITIES

84 Which graph best represents the inequality $y + 6 \geq x^2 - x$?

1


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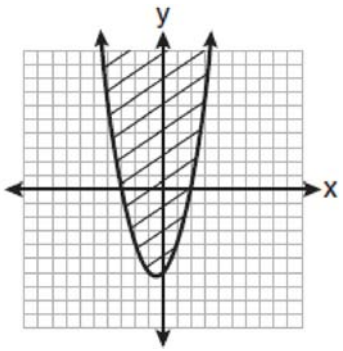

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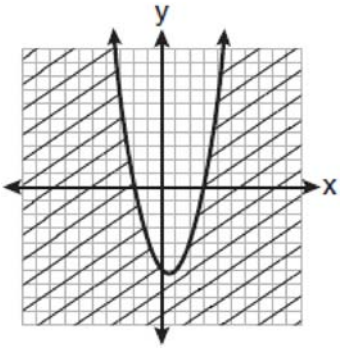
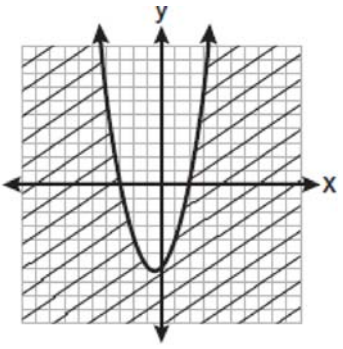


4


85 The solution set of the inequality $x^2 - 3x > 10$ is
1 $\{x | -2 < x < 5\}$
2 $\{x | 0 < x < 3\}$
3 $\{x | x < -2 \text{ or } x > 5\}$
4 $\{x | x < -5 \text{ or } x > 2\}$

86 Find the solution of the inequality $x^2 - 4x > 5$, algebraically.

SYSTEMS

A2.A.3: QUADRATIC-LINEAR SYSTEMS

87 Which values of x are in the solution set of the following system of equations?

$$y = 3x - 6$$

$$y = x^2 - x - 6$$

1 0, – 4
2 0, 4
3 6, – 2
4 –6, 2

88 Which ordered pair is in the solution set of the system of equations shown below?

$$y^2 - x^2 + 32 = 0$$

$$3y - x = 0$$

1 $(2, 6)$
2 $(3, 1)$
3 $(-1, -3)$
4 $(-6, -2)$

89 Which ordered pair is a solution of the system of equations shown below? $x + y = 5$

$$(x + 3)^2 + (y - 3)^2 = 53$$

1 $(2, 3)$
2 $(5, 0)$
3 $(-5, 10)$
4 $(-4, 9)$

90 Solve the following systems of equations algebraically: $5 = y - x$

$$4x^2 = -17x + y + 4$$

POWERS

A2.N.3: OPERATIONS WITH POLYNOMIALS

91 When $\frac{3}{2}x^2 - \frac{1}{4}x - 4$ is subtracted from $\frac{5}{2}x^2 - \frac{3}{4}x + 1$, the difference is

1 $-x^2 + \frac{1}{2}x - 5$

2 $x^2 - \frac{1}{2}x + 5$

3 $-x^2 - x - 3$

4 $x^2 - x - 3$

92 When $x^2 + 3x - 4$ is subtracted from $x^3 + 3x^2 - 2x$, the difference is

1 $x^3 + 2x^2 - 5x + 4$

2 $x^3 + 2x^2 + x - 4$

3 $-x^3 + 4x^2 + x - 4$

4 $-x^3 - 2x^2 + 5x + 4$

93 What is the product of $\left(\frac{x}{4} - \frac{1}{3}\right)$ and $\left(\frac{x}{4} + \frac{1}{3}\right)$?

1 $\frac{x^2}{8} - \frac{1}{9}$

2 $\frac{x^2}{16} - \frac{1}{9}$

3 $\frac{x^2}{8} - \frac{x}{6} - \frac{1}{9}$

4 $\frac{x^2}{16} - \frac{x}{6} - \frac{1}{9}$

94 What is the product of $\left(\frac{2}{5}x - \frac{3}{4}y^2\right)$ and $\left(\frac{2}{5}x + \frac{3}{4}y^2\right)$?

1 $\frac{4}{25}x^2 - \frac{9}{16}y^4$

2 $\frac{4}{25}x - \frac{9}{16}y^2$

3 $\frac{2}{5}x^2 - \frac{3}{4}y^4$

4 $\frac{4}{5}x$

95 Express $\left(\frac{2}{3}x - 1\right)^2$ as a trinomial.

96 Express the product of $\left(\frac{1}{2}y^2 - \frac{1}{3}y\right)$ and $\left(12y + \frac{3}{5}\right)$ as a trinomial.

A2.N.1, A.8-9: NEGATIVE AND FRACTIONAL EXPONENTS

97 If $a = 3$ and $b = -2$, what is the value of the expression $\frac{a^{-2}}{b^{-3}}$?

1 $-\frac{9}{8}$

2 -1

3 $-\frac{8}{9}$

4 $\frac{8}{9}$

98 If n is a negative integer, then which statement is always true?

1 $6n^{-2} < 4n^{-1}$

2 $\frac{n}{4} > -6n^{-1}$

3 $6n^{-1} < 4n^{-1}$

4 $4n^{-1} > (6n)^{-1}$

99 Which expression is equivalent to $\left(9x^2y^6\right)^{-\frac{1}{2}}$?

1 $\frac{1}{3xy^3}$

2 $3xy^3$

3 $\frac{3}{xy^3}$

4 $\frac{xy^3}{3}$

100 When simplified, the expression $\left(\frac{w^{-5}}{w^{-9}}\right)^{\frac{1}{2}}$ is equivalent to

1 w^{-7}
2 w^{2}
3 w^{7}
4 w^{14}

101 The expression $\frac{a^2b^{-3}}{a^{-4}b^2}$ is equivalent to

1 $\frac{a^6}{b^5}$
2 $\frac{b^5}{a^6}$
3 $\frac{a^2}{b}$
4 $a^{-2}b^{-1}$

102 Which expression is equivalent to $\frac{x^{-1}y^4}{3x^{-5}y^{-1}}$?

1 $\frac{x^4y^5}{3}$
2 $\frac{x^5y^4}{3}$
3 $3x^4y^5$
4 $\frac{y^4}{3x^5}$

103 Which expression is equivalent to $\frac{2x^{-2}y^{-2}}{4y^{-5}}$?

1 $\frac{y^3}{2x^2}$
2 $\frac{2y^3}{x^2}$
3 $\frac{2x^2}{y^3}$
4 $\frac{x^2}{2y^3}$

104 Simplify the expression $\frac{3x^{-4}y^5}{(2x^3y^{-7})^{-2}}$ and write the answer using only positive exponents.

105 When $x^{-1} - 1$ is divided by $x - 1$, the quotient is

1 -1
2 $-\frac{1}{x}$
3 $\frac{1}{x^2}$
4 $\frac{1}{(x-1)^2}$

106 When $x^{-1} + 1$ is divided by $x + 1$, the quotient equals

1 1
2 $\frac{1}{x}$
3 x
4 $-\frac{1}{x}$

A2.A.12: EVALUATING EXPONENTIAL EXPRESSIONS

107 Evaluate $e^{x \ln y}$ when $x = 3$ and $y = 2$.

108 Matt places $1,200 in an investment account earning an annual rate of 6.5%, compounded continuously. Using the formula $V = Pe^{rt}$, where V is the value of the account in t years, P is the principal initially invested, e is the base of a natural logarithm, and r is the rate of interest, determine the amount of money, to the *nearest cent*, that Matt will have in the account after 10 years.

109 The formula for continuously compounded interest is $A = Pe^{rt}$, where A is the amount of money in the account, P is the initial investment, r is the interest rate, and t is the time in years. Using the formula, determine, to the *nearest dollar*, the amount in the account after 8 years if $750 is invested at an annual rate of 3%.

A2.A.18: EVALUATING LOGARITHMIC EXPRESSIONS

110 The expression $\log_8 64$ is equivalent to

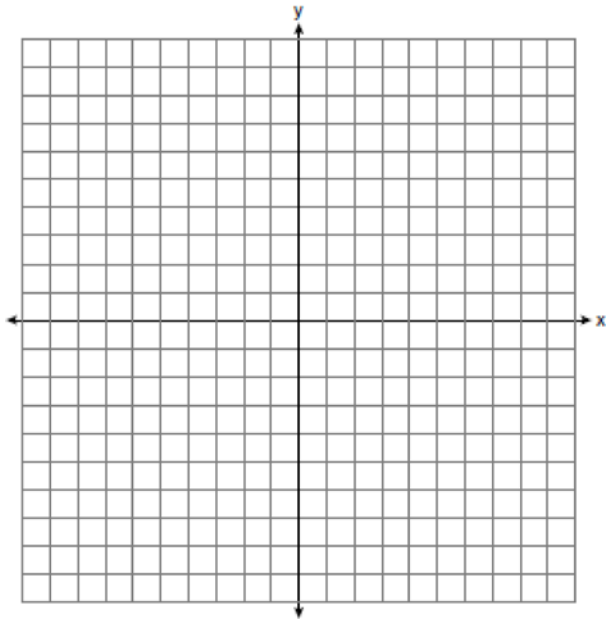
1 8
2 2
3 $\frac{1}{2}$
4 $\frac{1}{8}$

111 The expression $\log_5\left(\frac{1}{25}\right)$ is equivalent to

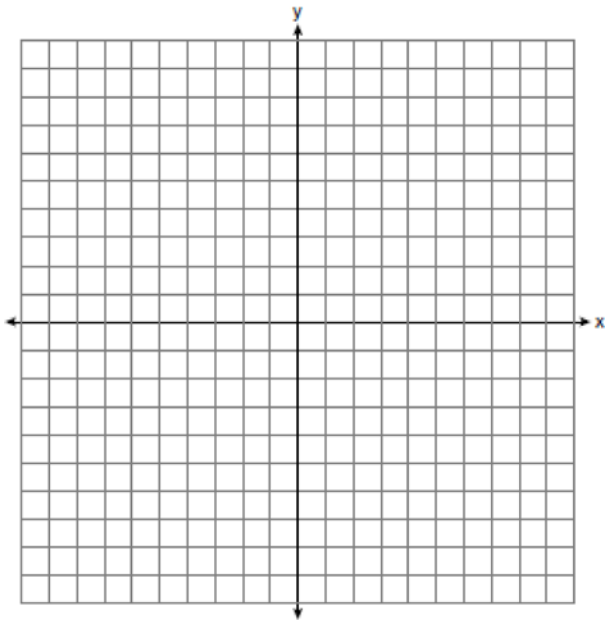
1 $\frac{1}{2}$
2 2
3 $-\frac{1}{2}$
4 -2

A2.A.53: GRAPHING EXPONENTIAL FUNCTIONS

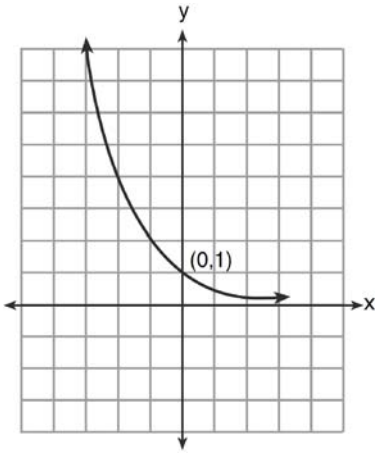
112 The graph of the equation $y = \left(\frac{1}{2}\right)^x$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^x$ and write the equation of this asymptote.



113 On the axes below, for $-2 \le x \le 2$, graph $y = 2^{x+1} - 3$.



114 What is the equation of the graph shown below?



1 $y = 2^x$

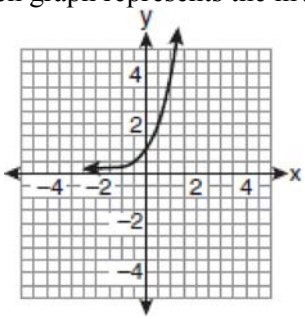
2 $y = 2^{-x}$

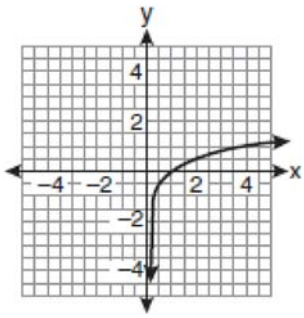
3 $x = 2^y$

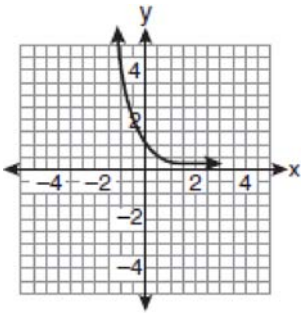
4 $x = 2^{-y}$

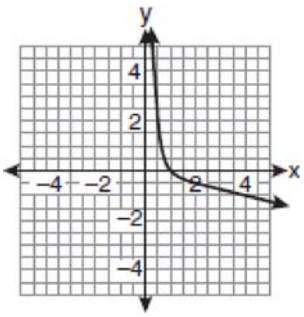
A2.A.54: GRAPHING LOGARITHMIC FUNCTIONS

115 If a function is defined by the equation $f(x) = 4^x$, which graph represents the inverse of this function?

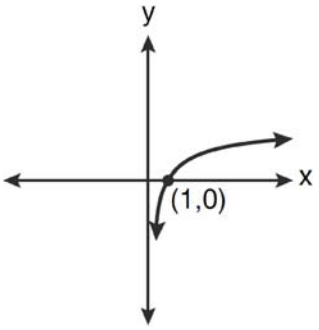
1 

2 

3 

4 

116 Which graph represents the function $\log_2 x = y$?

1


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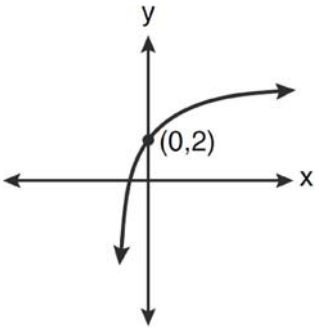

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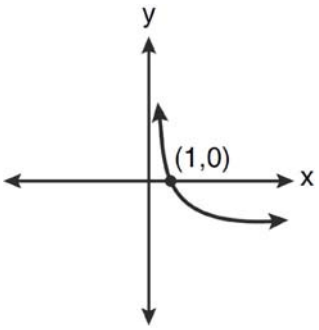

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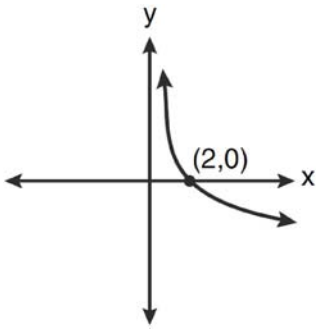


A2.A.19: PROPERTIES OF LOGARITHMS

117 The expression $\log 4m^2$ is equivalent to
1 $2(\log 4 + \log m)$
2 $2\log 4 + \log m$
3 $\log 4 + 2\log n$
4 $\log 16 + 2\log m$

118 If $r = \sqrt[3]{\frac{A^2B}{C}}$, then $\log r$ can be represented by
1 $\frac{1}{6}\log A + \frac{1}{3}\log B - \log C$
2 $3(\log A^2 + \log B - \log C)$
3 $\frac{1}{3}\log(A^2 + B) - C$
4 $\frac{2}{3}\log A + \frac{1}{3}\log B - \frac{1}{3}\log C$

119 If $\log x^2 - \log 2a = \log 3a$, then $\log x$ expressed in terms of $\log a$ is equivalent to
1 $\frac{1}{2}\log 5a$
2 $\frac{1}{2}\log 6 + \log a$
3 $\log 6 + \log a$
4 $\log 6 + 2\log a$

120 The expression $2\log x - (3\log y + \log z)$ is equivalent to
1 $\log\frac{x^2}{y^3z}$
2 $\log\frac{x^2z}{y^3}$
3 $\log\frac{2x}{3yz}$
4 $\log\frac{2xz}{3y}$

121 If $\log_b x = 3\log_b p - \left(2\log_b t + \frac{1}{2}\log_b r\right)$, then the value of x is
1 $\frac{p^3}{\sqrt{t^2r}}$
2 $p^3t^2r^{\frac{1}{2}}$
3 $\frac{p^3t^2}{\sqrt{r}}$
4 $\frac{p^3}{t^2\sqrt{r}}$

122 If $\log 2 = a$ and $\log 3 = b$, the expression $\log\frac{9}{20}$ is equivalent to
1 $2b - a + 1$
2 $2b - a - 1$
3 $b^2 - a + 10$
4 $\frac{2b}{a+1}$

A2.A.28: LOGARITHMIC EQUATIONS

123 What is the value of x in the equation $\log_5 x = 4$?
1 1.16
2 20
3 625
4 1,024

124 What is the solution of the equation $2\log_4(5x) = 3$?
1 6.4
2 2.56
3 $\frac{9}{5}$
4 $\frac{8}{5}$

125 If $\log_4 x = 2.5$ and $\log_y 125 = -\frac{3}{2}$, find the numerical value of $\frac{x}{y}$, in simplest form.

126 Solve algebraically for all values of x: $\log_{(x+4)}(17x - 4) = 2$

127 Solve algebraically for x: $\log_{x+3}\frac{x^3 + x - 2}{x} = 2$

128 Solve algebraically for x: $\log_{27}(2x - 1) = \frac{4}{3}$

129 The temperature, T, of a given cup of hot chocolate after it has been cooling for t minutes can best be modeled by the function below, where T_0 is the temperature of the room and k is a constant.

$$\ln(T - T_0) = -kt + 4.718$$

A cup of hot chocolate is placed in a room that has a temperature of 68°. After 3 minutes, the temperature of the hot chocolate is 150°. Compute the value of k to the nearest thousandth. [Only an algebraic solution can receive full credit.] Using this value of k, find the temperature, T, of this cup of hot chocolate if it has been sitting in this room for a total of 10 minutes. Express your answer to the *nearest degree*. [Only an algebraic solution can receive full credit.]

A2.A.6, 27: EXPONENTIAL EQUATIONS

130 A population of rabbits doubles every 60 days according to the formula $P = 10(2)^{\frac{t}{60}}$, where P is the population of rabbits on day t. What is the value of t when the population is 320?
1 240
2 300
3 660
4 960

131 Susie invests $500 in an account that is compounded continuously at an annual interest rate of 5%, according to the formula $A = Pe^{rt}$, where A is the amount accrued, P is the principal, r is the rate of interest, and t is the time, in years. Approximately how many years will it take for Susie's money to double?
1 1.4
2 6.0
3 13.9
4 14.7

132 The number of bacteria present in a Petri dish can be modeled by the function $N = 50e^{3t}$, where N is the number of bacteria present in the Petri dish after t hours. Using this model, determine, to the *nearest hundredth*, the number of hours it will take for N to reach 30,700.

133 Akeem invests $25,000 in an account that pays 4.75% annual interest compounded continuously. Using the formula $A = Pe^{rt}$, where A = the amount in the account after t years, P = principal invested, and r = the annual interest rate, how many years, to the *nearest tenth*, will it take for Akeem's investment to triple?
1 10.0
2 14.6
3 23.1
4 24.0

134 The solution set of $4^{x^2+4x} = 2^{-6}$ is
1 $\{1,3\}$
2 $\{-1,3\}$
3 $\{-1,-3\}$
4 $\{1,-3\}$

135 The value of x in the equation $4^{2x+5} = 8^{3x}$ is
1 1
2 2
3 5
4 -10

136 Which value of k satisfies the equation $8^{3k+4} = 4^{2k-1}$?
1 -1
2 $-\frac{9}{4}$
3 -2
4 $-\frac{14}{5}$

137 What is the value of x in the equation $9^{3x+1} = 27^{x+2}$?
1 1
2 $\frac{1}{3}$
3 $\frac{1}{2}$
4 $\frac{4}{3}$

138 Solve algebraically for all values of x:
$81^{x^3+2x^2} = 27^{\frac{5x}{3}}$

139 Solve algebraically for x: $16^{2x+3} = 64^{x+2}$

A2.A.36: BINOMIAL EXPANSIONS

140 What is the coefficient of the fourth term in the expansion of $(a-4b)^9$?
1 $-5,376$
2 -336
3 336
4 5,376

141 Which expression represents the third term in the expansion of $(2x^4 - y)^3$?
1 $-y^3$
2 $-6x^4y^2$
3 $6x^4y^2$
4 $2x^4y^2$

142 What is the fourth term in the expansion of $(3x-2)^5$?
1 $-720x^2$
2 $-240x$
3 $720x^2$
4 $1,080x^3$

143 What is the fourth term in the binomial expansion $(x-2)^8$?
1 $448x^5$
2 $448x^4$
3 $-448x^5$
4 $-448x^4$

144 What is the middle term in the expansion of $\left(\frac{x}{2} - 2y\right)^6$?
1 $20x^3y^3$
2 $-\frac{15}{4}x^4y^2$
3 $-20x^3y^3$
4 $\frac{15}{4}x^4y^2$

145 Write the binomial expansion of $(2x-1)^5$ as a polynomial in simplest form.

A2.A.26, 50: SOLVING POLYNOMIAL EQUATIONS

146 Which values of x are solutions of the equation $x^3+x^2-2x=0$?
1 $0, 1, 2$
2 $0, 1, -2$
3 $0, -1, 2$
4 $0, -1, -2$

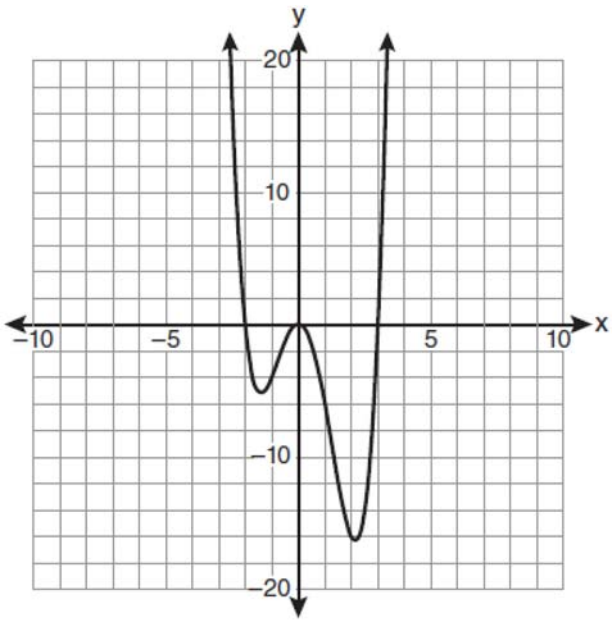
147 What is the solution set of the equation $3x^5-48x=0$?
1 $\{0, \pm 2\}$
2 $\{0, \pm 2, 3\}$
3 $\{0, \pm 2, \pm 2i\}$
4 $\{\pm 2, \pm 2i\}$

148 Solve algebraically for all values of x: $x^4+4x^3+4x^2=-16x$

149 Solve the equation $8x^3+4x^2-18x-9=0$ algebraically for all values of x.

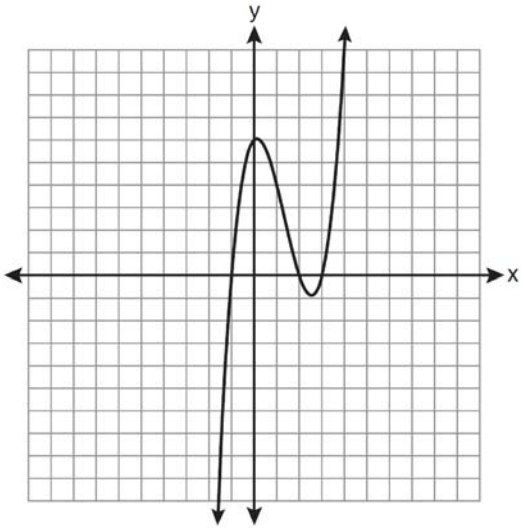
150 How many negative solutions to the equation $2x^3-4x^2+3x-1=0$ exist?
1 1
2 2
3 3
4 0

151 The graph of $y = f(x)$ is shown below.



Which set lists all the real solutions of $f(x) = 0$?
1 $\{-3, 2\}$
2 $\{-2, 3\}$
3 $\{-3, 0, 2\}$
4 $\{-2, 0, 3\}$

152 The graph of $y = x^3 - 4x^2 + x + 6$ is shown below.



What is the product of the roots of the equation $x^3 - 4x^2 + x + 6 = 0$?

1 -36
2 -6
3 6
4 4

RADICALS

A2.N.4: OPERATIONS WITH IRRATIONAL EXPRESSIONS

153 The product of $(3 + \sqrt{5})$ and $(3 - \sqrt{5})$ is

1 $4 - 6\sqrt{5}$
2 $14 - 6\sqrt{5}$
3 14
4 4

A2.A.13: SIMPLIFYING RADICALS

154 The expression $\sqrt[3]{64a^{16}}$ is equivalent to

1 $8a^4$
2 $8a^8$
3 $4a^5\sqrt[3]{a}$
4 $4a\sqrt[3]{a^5}$

155 Express in simplest form: $\sqrt[3]{\frac{a^6b^9}{-64}}$

A2.N.2, A.14: OPERATIONS WITH RADICALS

156 The sum of $\sqrt[3]{6a^4b^2}$ and $\sqrt[3]{162a^4b^2}$, expressed in simplest radical form, is

1 $\sqrt[6]{168a^8b^4}$
2 $2a^2b\sqrt[3]{21a^2b}$
3 $4a\sqrt[3]{6ab^2}$
4 $10a^2b\sqrt[3]{8}$

157 Express $5\sqrt{3x^3} - 2\sqrt{27x^3}$ in simplest radical form.

158 The expression $4ab\sqrt{2b} - 3a\sqrt{18b^3} + 7ab\sqrt{6b}$ is equivalent to

1 $2ab\sqrt{6b}$
2 $16ab\sqrt{2b}$
3 $-5ab + 7ab\sqrt{6b}$
4 $-5ab\sqrt{2b} + 7ab\sqrt{6b}$

159 Express $\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}}$ in simplest radical form.

A2.N.5, A.15: RATIONALIZING DENOMINATORS

160 Which expression is equivalent to $\frac{\sqrt{3}+5}{\sqrt{3}-5}$?

1 $-\frac{14+5\sqrt{3}}{11}$
2 $-\frac{17+5\sqrt{3}}{11}$
3 $\frac{14+5\sqrt{3}}{14}$
4 $\frac{17+5\sqrt{3}}{14}$

161 The expression $\frac{4}{5-\sqrt{13}}$ is equivalent to

1 $\frac{4\sqrt{13}}{5\sqrt{13}-13}$

2 $\frac{4(5-\sqrt{13})}{38}$

3 $\frac{5+\sqrt{13}}{3}$

4 $\frac{4(5+\sqrt{13})}{38}$

162 Express $\frac{5}{3-\sqrt{2}}$ with a rational denominator, in simplest radical form.

163 The fraction $\frac{3}{\sqrt{3a^2b}}$ is equivalent to

1 $\frac{1}{a\sqrt{b}}$

2 $\frac{\sqrt{b}}{ab}$

3 $\frac{\sqrt{3b}}{ab}$

4 $\frac{\sqrt{3}}{a}$

164 The expression $\frac{2x+4}{\sqrt{x+2}}$ is equivalent to

1 $\frac{(2x+4)\sqrt{x-2}}{x-2}$

2 $\frac{(2x+4)\sqrt{x-2}}{x-4}$

3 $2\sqrt{x-2}$

4 $2\sqrt{x+2}$

165 Expressed with a rational denominator and in simplest form, $\frac{x}{x-\sqrt{x}}$ is

1 $\frac{x^2+x\sqrt{x}}{x^2-x}$

2 $-\sqrt{x}$

3 $\frac{x+\sqrt{x}}{1-x}$

4 $\frac{x+\sqrt{x}}{x-1}$

A2.A.22: SOLVING RADICALS

166 The solution set of $\sqrt{3x+16}=x+2$ is

1 $\{-3,4\}$

2 $\{-4,3\}$

3 $\{3\}$

4 $\{-4\}$

167 What is the solution set for the equation $\sqrt{5x+29}=x+3$?

1 $\{4\}$

2 $\{-5\}$

3 $\{4,5\}$

4 $\{-5,4\}$

168 The solution set of the equation $\sqrt{x+3}=3-x$ is

1 $\{1\}$

2 $\{0\}$

3 $\{1,6\}$

4 $\{2,3\}$

169 Solve algebraically for x: $4-\sqrt{2x-5}=1$

170 Solve algebraically for x:
$\sqrt{x^2+x-1}+11x=7x+3$

A2.A.10-11: EXPONENTS AS RADICALS

171 The expression $x^{-\frac{2}{5}}$ is equivalent to
1 $-\sqrt[2]{x^5}$
2 $-\sqrt[5]{x^2}$
3 $\frac{1}{\sqrt[2]{x^5}}$
4 $\frac{1}{\sqrt[5]{x^2}}$

172 The expression $(x^2-1)^{-\frac{2}{3}}$ is equivalent to
1 $\sqrt[3]{(x^2-1)^2}$
2 $\frac{1}{\sqrt[3]{(x^2-1)^2}}$
3 $\sqrt{(x^2-1)^3}$
4 $\frac{1}{\sqrt{(x^2-1)^3}}$

173 The expression $\sqrt[4]{16x^2y^7}$ is equivalent to
1 $2x^{\frac{1}{2}}y^{\frac{7}{4}}$
2 $2x^8y^{28}$
3 $4x^{\frac{1}{2}}y^{\frac{7}{4}}$
4 $4x^8y^{28}$

A2.N.6: SQUARE ROOTS OF NEGATIVE NUMBERS

174 In simplest form, $\sqrt{-300}$ is equivalent to
1 $3i\sqrt{10}$
2 $5i\sqrt{12}$
3 $10i\sqrt{3}$
4 $12i\sqrt{5}$

A2.N.7: IMAGINARY NUMBERS

175 The product of i^7 and i^5 is equivalent to
1 1
2 -1
3 i
4 $-i$

176 The expression $2i^2+3i^3$ is equivalent to
1 $-2-3i$
2 $2-3i$
3 $-2+3i$
4 $2+3i$

177 Determine the value of n in simplest form:
$i^{13}+i^{18}+i^{31}+n=0$

A2.N.8: CONJUGATES OF COMPLEX NUMBERS

178 What is the conjugate of $-2+3i$?
1 $-3+2i$
2 $-2-3i$
3 $2-3i$
4 $3+2i$

179 The conjugate of $7-5i$ is
1 $-7-5i$
2 $-7+5i$
3 $7-5i$
4 $7+5i$

180 What is the conjugate of $\frac{1}{2}+\frac{3}{2}i$?
1 $-\frac{1}{2}+\frac{3}{2}i$
2 $\frac{1}{2}-\frac{3}{2}i$
3 $\frac{3}{2}+\frac{1}{2}i$
4 $-\frac{1}{2}-\frac{3}{2}i$

181 The conjugate of the complex expression $-5x+4i$ is
1 $5x-4i$
2 $5x+4i$
3 $-5x-4i$
4 $-5x+4i$

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic

A2.N.9: MULTIPLICATION AND DIVISION OF COMPLEX NUMBERS

182 The expression $(3-7i)^2$ is equivalent to
1 $-40+0i$
2 $-40-42i$
3 $58+0i$
4 $58-42i$

183 The expression $(x+i)^2-(x-i)^2$ is equivalent to
1 0
2 -2
3 $-2+4xi$
4 $4xi$

184 If $x=3i$, $y=2i$, and $z=m+i$, the expression xy^2z equals
1 $-12-12mi$
2 $-6-6mi$
3 $12-12mi$
4 $6-6mi$

RATIONALS

A2.A.16: MULTIPLICATION AND DIVISION OF RATIONALS

185 Perform the indicated operations and simplify completely:

$$\frac{x^3-3x^2+6x-18}{x^2-4x}\cdot\frac{2x-4}{x^4-3x^3}\div\frac{x^2+2x-8}{16-x^2}$$

186 Express in simplest form: $\dfrac{\dfrac{4-x^2}{x^2+7x+12}}{\dfrac{2x-4}{x+3}}$

A2.A.16: ADDITION AND SUBTRACTION OF RATIONALS

187 Expressed in simplest form, $\dfrac{3y}{2y-6}+\dfrac{9}{6-2y}$ is equivalent to
1 $\dfrac{-6y^2+36y-54}{(2y-6)(6-2y)}$
2 $\dfrac{3y-9}{2y-6}$
3 $\dfrac{3}{2}$
4 $-\dfrac{3}{2}$

A2.A.23: SOLVING RATIONALS

188 Solve for x: $\dfrac{4x}{x-3}=2+\dfrac{12}{x-3}$

189 Solve algebraically for x: $\dfrac{1}{x+3}-\dfrac{2}{3-x}=\dfrac{4}{x^2-9}$

190 Solve the equation below algebraically, and express the result in simplest radical form:

$$\frac{13}{x}=10-x$$

A2.A.17: COMPLEX FRACTIONS

191 Written in simplest form, the expression $\dfrac{\dfrac{x}{4}-\dfrac{1}{x}}{\dfrac{1}{2x}+\dfrac{1}{4}}$ is equivalent to
1 $x-1$
2 $x-2$
3 $\dfrac{x-2}{2}$
4 $\dfrac{x^2-4}{x+2}$

192 The simplest form of $\dfrac{1-\frac{4}{x}}{1-\frac{2}{x}-\frac{8}{x^2}}$ is

1 $\frac{1}{2}$

2 $\frac{x}{x+2}$

3 $\frac{x}{3}$

4 $-\frac{x}{x-2}$

193 Express in simplest form: $\dfrac{\frac{1}{2}-\frac{4}{d}}{\frac{1}{d}+\frac{3}{2d}}$

A2.A.5: INVERSE VARIATION

194 If p varies inversely as q, and $p = 10$ when $q = \frac{3}{2}$, what is the value of p when $q = \frac{3}{5}$?

1 25
2 15
3 9
4 4

195 The quantities p and q vary inversely. If $p = 20$ when $q = -2$, and $p = x$ when $q = -2x + 2$, then x equals

1 –4 and 5

2 $\frac{20}{19}$

3 –5 and 4

4 $-\frac{1}{4}$

196 The points $(2, 3)$, $\left(4, \frac{3}{4}\right)$, and $(6, d)$ lie on the graph of a function. If y is inversely proportional to the square of x, what is the value of d?

1 1

2 $\frac{1}{3}$

3 3

4 27

197 For a given set of rectangles, the length is inversely proportional to the width. In one of these rectangles, the length is 12 and the width is 6. For this set of rectangles, calculate the width of a rectangle whose length is 9.

FUNCTIONS

A2.A.40-41: FUNCTIONAL NOTATION

198 The equation $y - 2\sin\theta = 3$ may be rewritten as

1 $f(y) = 2\sin x + 3$
2 $f(y) = 2\sin\theta + 3$
3 $f(x) = 2\sin\theta + 3$
4 $f(\theta) = 2\sin\theta + 3$

199 If $f(x) = \dfrac{x}{x^2 - 16}$, what is the value of $f(-10)$?

1 $-\frac{5}{2}$

2 $-\frac{5}{42}$

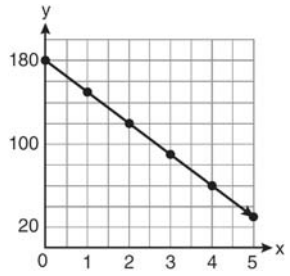
3 $\frac{5}{58}$

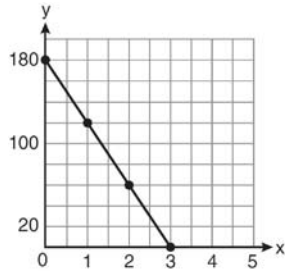
4 $\frac{5}{18}$

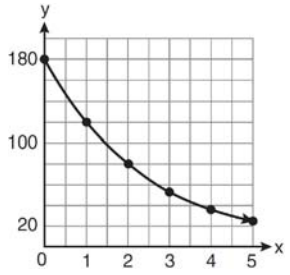
200 If $g(x) = \left(ax\sqrt{1-x}\right)^2$, express $g(10)$ in simplest form.

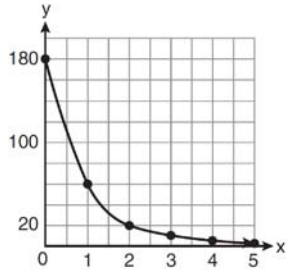
A2.A.52: FAMILIES OF FUNCTIONS

201 On January 1, a share of a certain stock cost $180. Each month thereafter, the cost of a share of this stock decreased by one-third. If x represents the time, in months, and y represents the cost of the stock, in dollars, which graph best represents the cost of a share over the following 5 months?

1 

2 

3 

4 

A2.A.52: PROPERTIES OF GRAPHS OF FUNCTIONS AND RELATIONS

202 Which statement about the graph of the equation $y = e^x$ is *not* true?

1 It is asymptotic to the x-axis.
2 The domain is the set of all real numbers.
3 It lies in Quadrants I and II.
4 It passes through the point $(e, 1)$.

A2.A.52: IDENTIFYING THE EQUATION OF A GRAPH

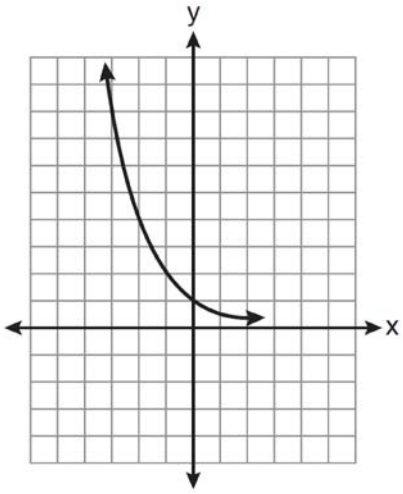
203 Four points on the graph of the function f(x) are shown below.

$$\{(0,1),(1,2),(2,4),(3,8)\}$$

Which equation represents f(x)?

1 $f(x) = 2^x$
2 $f(x) = 2x$
3 $f(x) = x + 1$
4 $f(x) = \log_2 x$

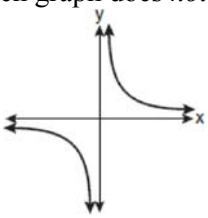
204 Which equation is represented by the graph below?

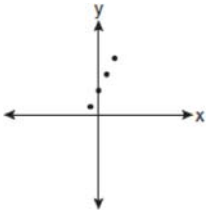


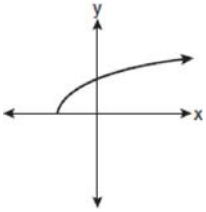
1 $y = 5^x$
2 $y = 0.5^x$
3 $y = 5^{-x}$
4 $y = 0.5^{-x}$

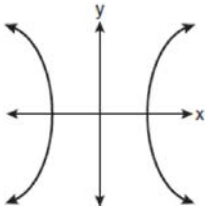
A2.A.38, 43: DEFINING FUNCTIONS

205 Which graph does *not* represent a function?

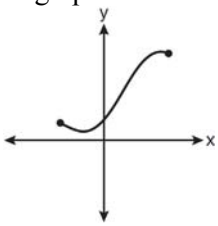
1 

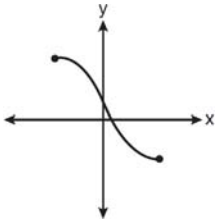
2 

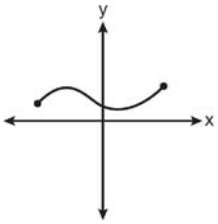
3 

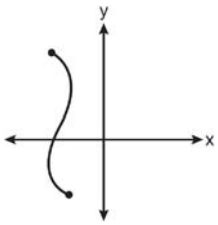
4 

206 Which graph does *not* represent a function?

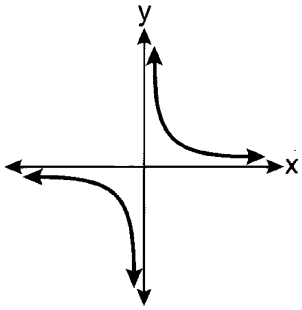
1 

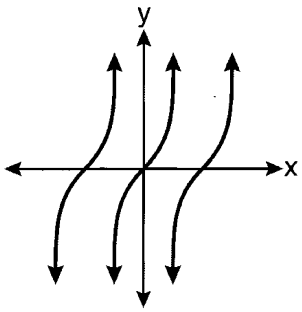
2 

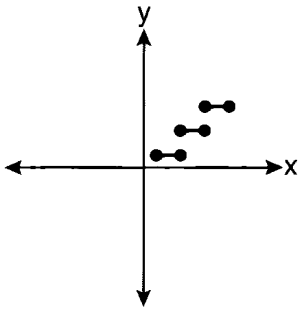
3 

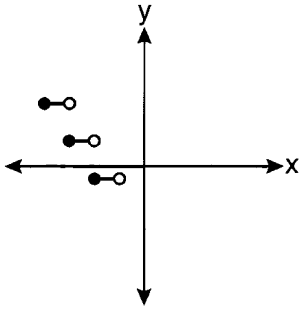
4 

207 Which graph represents a relation that is *not* a function?

1


2


3


4


208 Which relation is *not* a function?

1 $(x-2)^2+y^2=4$

2 $x^2+4x+y=4$

3 $x+y=4$

4 $xy=4$

209 Given the relation $\{(8,2),(3,6),(7,5),(k,4)\}$, which value of k will result in the relation *not* being a function?

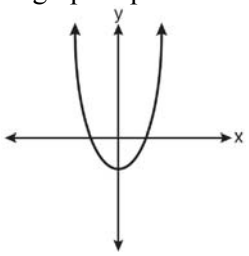
1 1

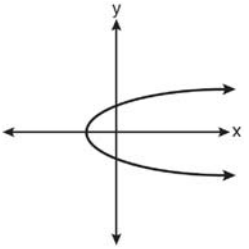
2 2

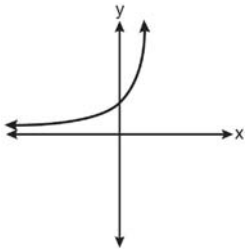
3 3

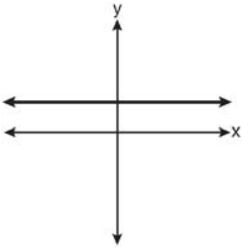
4 4

210 Which graph represents a one-to-one function?

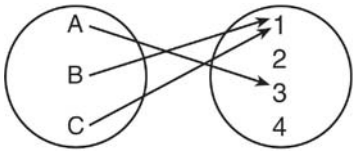
1


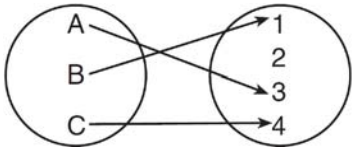
2


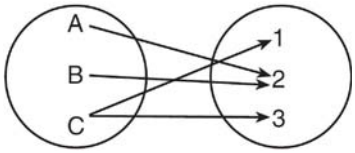
3


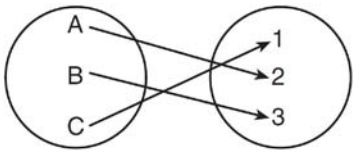
4


211 Which diagram represents a relation that is both one-to-one and onto?

1 

2 

3 

4 

212 Which function is one-to-one?
1 $f(x) = |x|$
2 $f(x) = 2^x$
3 $f(x) = x^2$
4 $f(x) = \sin x$

213 Which function is one-to-one?
1 $k(x) = x^2 + 2$
2 $g(x) = x^3 + 2$
3 $f(x) = |x| + 2$
4 $j(x) = x^4 + 2$

214 Which function is *not* one-to-one?
1 $\{(0,1),(1,2),(2,3),(3,4)\}$
2 $\{(0,0),(1,1),(2,2),(3,3)\}$
3 $\{(0,1),(1,0),(2,3),(3,2)\}$
4 $\{(0,1),(1,0),(2,0),(3,2)\}$

A2.A.39, 51: DOMAIN AND RANGE

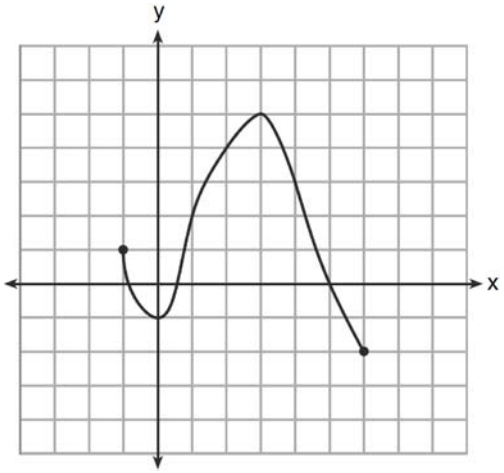
215 What is the domain of the function $f(x) = \sqrt{x-2} + 3$?
1 $(-\infty, \infty)$
2 $(2, \infty)$
3 $[2, \infty)$
4 $[3, \infty)$

216 What is the range of $f(x) = (x+4)^2 + 7$?
1 $y \geq -4$
2 $y \geq 4$
3 $y = 7$
4 $y \geq 7$

217 What is the range of $f(x) = |x-3| + 2$?
1 $\{x | x \geq 3\}$
2 $\{y | y \geq 2\}$
3 $\{x | x \in \text{real numbers}\}$
4 $\{y | y \in \text{real numbers}\}$

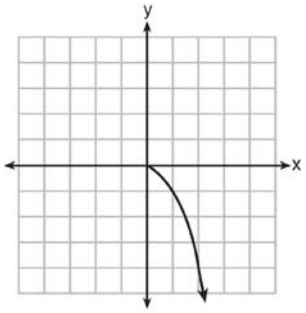
218 If $f(x) = \sqrt{9-x^2}$, what are its domain and range?
1 domain: $\{x | -3 \leq x \leq 3\}$; range: $\{y | 0 \leq y \leq 3\}$
2 domain: $\{x | x \neq \pm 3\}$; range: $\{y | 0 \leq y \leq 3\}$
3 domain: $\{x | x \leq -3 \text{ or } x \geq 3\}$; range: $\{y | y \neq 0\}$
4 domain: $\{x | x \neq 3\}$; range: $\{y | y \geq 0\}$

219 What is the domain of the function shown below?



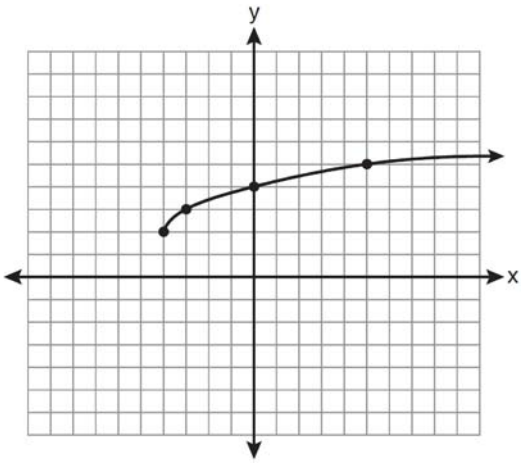
1 $-1 \le x \le 6$
2 $-1 \le y \le 6$
3 $-2 \le x \le 5$
4 $-2 \le y \le 5$

220 What is the range of the function shown below?



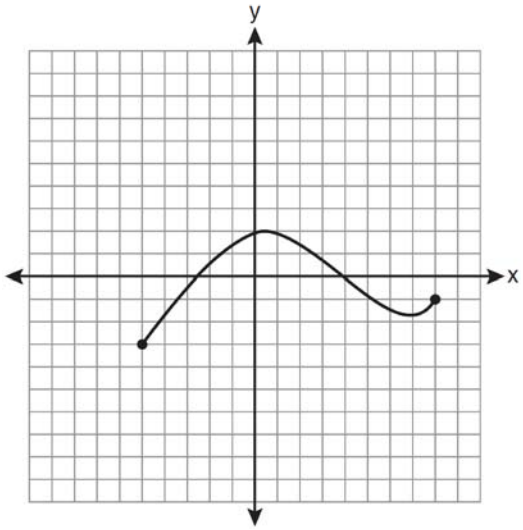
1 $x \le 0$
2 $x \ge 0$
3 $y \le 0$
4 $y \ge 0$

221 What are the domain and the range of the function shown in the graph below?



1 $\{x|x > -4\}$; $\{y|y > 2\}$
2 $\{x|x \ge -4\}$; $\{y|y \ge 2\}$
3 $\{x|x > 2\}$; $\{y|y > -4\}$
4 $\{x|x \ge 2\}$; $\{y|y \ge -4\}$

222 The graph below represents the function $y = f(x)$.



State the domain and range of this function.

A2.A.42: COMPOSITIONS OF FUNCTIONS

223 If $f(x) = \frac{1}{2}x - 3$ and $g(x) = 2x + 5$, what is the value of $(g \circ f)(4)$?

1 -13
2 3.5
3 3
4 6

224 If $f(x) = 4x - x^2$ and $g(x) = \frac{1}{x}$, then $(f \circ g)\left(\frac{1}{2}\right)$ is equal to

1 $\frac{4}{7}$
2 -2
3 $\frac{7}{2}$
4 4

225 If $f(x) = x^2 - 5$ and $g(x) = 6x$, then $g(f(x))$ is equal to

1 $6x^3 - 30x$
2 $6x^2 - 30$
3 $36x^2 - 5$
4 $x^2 + 6x - 5$

226 Which expression is equivalent to $(n \circ m \circ p)(x)$, given $m(x) = \sin x$, $n(x) = 3x$, and $p(x) = x^2$?

1 $\sin(3x)^2$
2 $3\sin x^2$
3 $\sin^2(3x)$
4 $3\sin^2 x$

227 If $f(x) = x^2 - 6$ and $g(x) = 2^x - 1$, determine the value of $(g \circ f)(-3)$.

A2.A.44: INVERSE OF FUNCTIONS

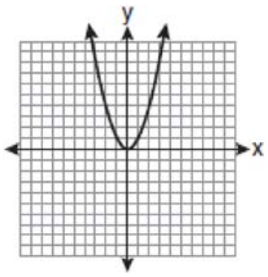
228 Which two functions are inverse functions of each other?

1 $f(x) = \sin x$ and $g(x) = \cos(x)$
2 $f(x) = 3 + 8x$ and $g(x) = 3 - 8x$
3 $f(x) = e^x$ and $g(x) = \ln x$
4 $f(x) = 2x - 4$ and $g(x) = -\frac{1}{2}x + 4$

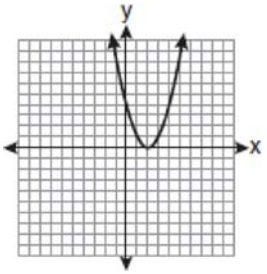
229 If $f(x) = x^2 - 6$, find $f^{-1}(x)$.

A2.A.46: TRANSFORMATIONS WITH FUNCTIONS AND RELATIONS

230 The graph below shows the function f(x).



Which graph represents the function f($x + 2$)?

1


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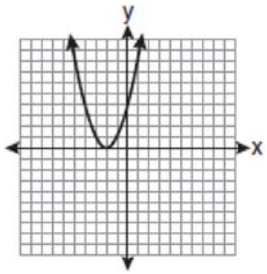

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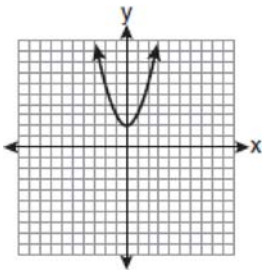

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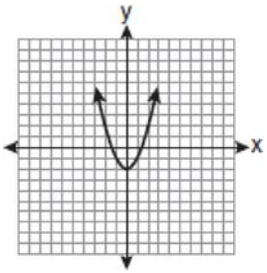


231 The minimum point on the graph of the equation $y = f(x)$ is $(-1, -3)$. What is the minimum point on the graph of the equation $y = f(x) + 5$?

1 $(-1, 2)$
2 $(-1, -8)$
3 $(4, -3)$
4 $(-6, -3)$

SEQUENCES AND SERIES

A2.A.29-33: SEQUENCES

232 What is the formula for the nth term of the sequence $54, 18, 6, \ldots$?

1 $a_n = 6\left(\frac{1}{3}\right)^n$

2 $a_n = 6\left(\frac{1}{3}\right)^{n-1}$

3 $a_n = 54\left(\frac{1}{3}\right)^n$

4 $a_n = 54\left(\frac{1}{3}\right)^{n-1}$

233 What is a formula for the nth term of sequence B shown below?

$B = 10, 12, 14, 16, \ldots$

1 $b_n = 8 + 2n$
2 $b_n = 10 + 2n$
3 $b_n = 10(2)^n$
4 $b_n = 10(2)^{n-1}$

234 A sequence has the following terms: $a_1 = 4$, $a_2 = 10$, $a_3 = 25$, $a_4 = 62.5$. Which formula represents the nth term in the sequence?

1 $a_n = 4 + 2.5n$
2 $a_n = 4 + 2.5(n - 1)$
3 $a_n = 4(2.5)^n$
4 $a_n = 4(2.5)^{n-1}$

235 What is the common difference of the arithmetic sequence $5, 8, 11, 14$?

1 $\frac{8}{5}$
2 -3
3 3
4 9

236 Which arithmetic sequence has a common difference of 4?

1 $\{0, 4n, 8n, 12n, \ldots\}$
2 $\{n, 4n, 16n, 64n, \ldots\}$
3 $\{n+1, n+5, n+9, n+13, \ldots\}$
4 $\{n+4, n+16, n+64, n+256, \ldots\}$

237 What is the common ratio of the geometric sequence shown below?

$$-2, 4, -8, 16, \ldots$$

1 $-\frac{1}{2}$
2 2
3 -2
4 -6

238 What is the common ratio of the sequence $\frac{1}{64}a^5b^3, -\frac{3}{32}a^3b^4, \frac{9}{16}ab^5, \ldots$?

1 $-\frac{3b}{2a^2}$
2 $-\frac{6b}{a^2}$
3 $-\frac{3a^2}{b}$
4 $-\frac{6a^2}{b}$

239 What is the common ratio of the geometric sequence whose first term is 27 and fourth term is 64?

1 $\frac{3}{4}$
2 $\frac{64}{81}$
3 $\frac{4}{3}$
4 $\frac{37}{3}$

240 What is the fifteenth term of the sequence $5, -10, 20, -40, 80, \ldots$?

1 $-163,840$
2 $-81,920$
3 81,920
4 327,680

241 What is the fifteenth term of the geometric sequence $-\sqrt{5}, \sqrt{10}, -2\sqrt{5}, \ldots$?

1 $-128\sqrt{5}$
2 $128\sqrt{10}$
3 $-16384\sqrt{5}$
4 $16384\sqrt{10}$

242 Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$

$$a_n = a_{(n-1)} - n$$

243 Find the third term in the recursive sequence $a_{k+1} = 2a_k - 1$, where $a_1 = 3$.

A2.N.10, A.34: SIGMA NOTATION

244 The value of the expression $\sum_{r=3}^{5}(-r^2 + r)$ is

1 -38
2 -12
3 26
4 62

245 The expression $4 + \sum_{k=2}^{5} 3(k - x)$ is equal to

1 $58 - 4x$
2 $46 - 4x$
3 $58 - 12x$
4 $46 - 12x$

246 The value of the expression $2\sum_{n=0}^{2}(n^2+2^n)$ is

1 12
2 22
3 24
4 26

247 Evaluate: $10+\sum_{n=1}^{5}(n^3-1)$

248 Evaluate: $\sum_{n=1}^{3}(-n^4-n)$

249 Which summation represents $5+7+9+11+\ldots+43$?

1 $\sum_{n=5}^{43} n$

2 $\sum_{n=1}^{20}(2n+3)$

3 $\sum_{n=4}^{24}(2n-3)$

4 $\sum_{n=3}^{23}(3n-4)$

250 Mrs. Hill asked her students to express the sum $1+3+5+7+9+\ldots+39$ using sigma notation. Four different student answers were given. Which student answer is correct?

1 $\sum_{k=1}^{20}(2k-1)$

2 $\sum_{k=2}^{40}(k-1)$

3 $\sum_{k=-1}^{37}(k+2)$

4 $\sum_{k=1}^{39}(2k-1)$

251 Express the sum $7+14+21+28+\ldots+105$ using sigma notation.

A2.A.35: SERIES

252 The sum of the first eight terms of the series $3-12+48-192+\ldots$ is

1 $-13,107$
2 $-21,845$
3 $-39,321$
4 $-65,535$

253 What is the sum of the first 19 terms of the sequence $3, 10, 17, 24, 31, \ldots$?

1 1188
2 1197
3 1254
4 1292

254 An auditorium has 21 rows of seats. The first row has 18 seats, and each succeeding row has two more seats than the previous row. How many seats are in the auditorium?

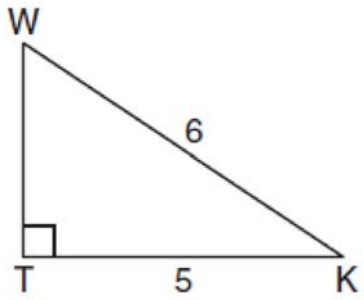
1 540
2 567
3 760
4 798

255 Determine the sum of the first twenty terms of the sequence whose first five terms are 5, 14, 23, 32, 41.

TRIGONOMETRY

A2.A.55: TRIGONOMETRIC RATIOS

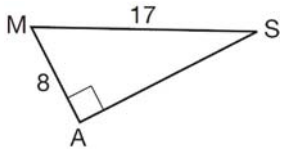
256 In the diagram below of right triangle KTW, $KW = 6$, $KT = 5$, and $m\angle KTW = 90$.



What is the measure of $\angle K$, to the *nearest minute*?

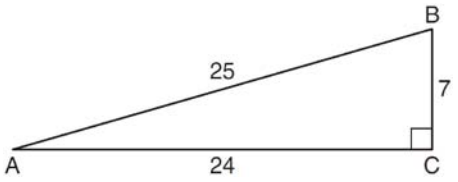
1 33°33'
2 33°34'
3 33°55'
4 33°56'

257 In the right triangle shown below, what is the measure of angle S, to the *nearest minute*?



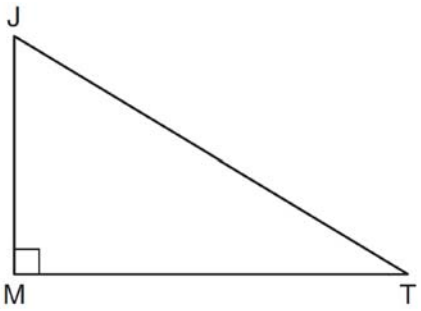
1 28°1'
2 28°4'
3 61°56'
4 61°93'

258 Which ratio represents $\csc A$ in the diagram below?



1 $\frac{25}{24}$
2 $\frac{25}{7}$
3 $\frac{24}{7}$
4 $\frac{7}{24}$

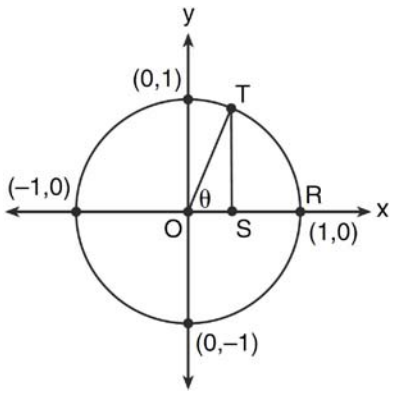
259 In the diagram below of right triangle JTM, $JT = 12$, $JM = 6$, and $m\angle JMT = 90$.



What is the value of $\cot J$?

1 $\frac{\sqrt{3}}{3}$
2 2
3 $\sqrt{3}$
4 $\frac{2\sqrt{3}}{3}$

260 In the diagram below, the length of which line segment is equal to the exact value of $\sin\theta$?



1 $\overline{TO}$
2 $\overline{TS}$
3 $\overline{OR}$
4 $\overline{OS}$

A2.M.1-2: RADIAN MEASURE

261 What is the radian measure of the smaller angle formed by the hands of a clock at 7 o'clock?

1 $\frac{\pi}{2}$
2 $\frac{2\pi}{3}$
3 $\frac{5\pi}{6}$
4 $\frac{7\pi}{6}$

262 What is the radian measure of an angle whose measure is –420°?

1 $-\frac{7\pi}{3}$
2 $-\frac{7\pi}{6}$
3 $\frac{7\pi}{6}$
4 $\frac{7\pi}{3}$

263 What is the number of degrees in an angle whose radian measure is $\frac{11\pi}{12}$?

1 150
2 165
3 330
4 518

264 What is the number of degrees in an angle whose measure is 2 radians?

1 $\frac{360}{\pi}$
2 $\frac{\pi}{360}$
3 360
4 90

265 What is the number of degrees in an angle whose radian measure is $\frac{8\pi}{5}$?

1 576
2 288
3 225
4 113

266 Find, to the *nearest tenth*, the radian measure of 216º.

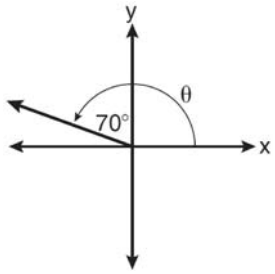
267 Find, to the *nearest minute*, the angle whose measure is 3.45 radians.

268 Find, to the *nearest tenth of a degree*, the angle whose measure is 2.5 radians.

269 Convert 3 radians to degrees and express the answer to the *nearest minute*.

A2.A.60: UNIT CIRCLE

270 In which graph is θ coterminal with an angle of $-70°$?

1


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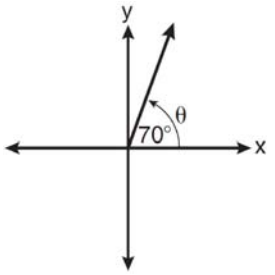

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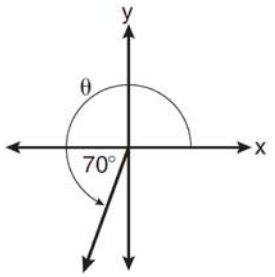

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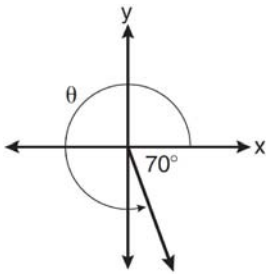
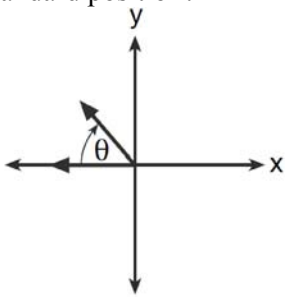
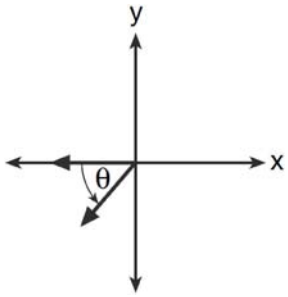
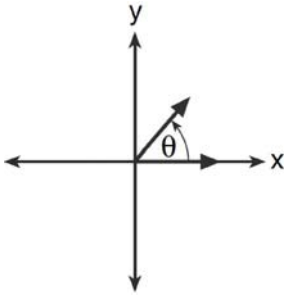
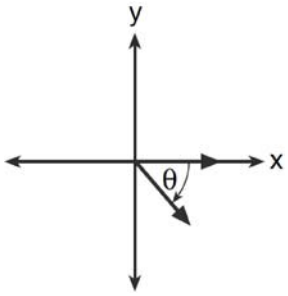


271 If $m\angle\theta = -50$, which diagram represents θ drawn in standard position?

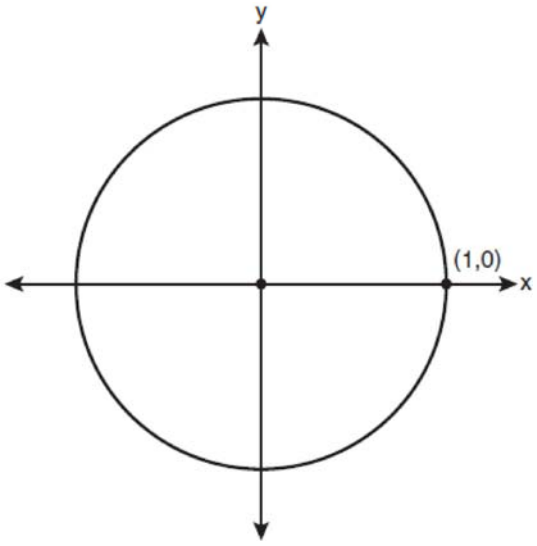
1


2


3


4


272 On the unit circle shown in the diagram below, sketch an angle, in standard position, whose degree measure is 240 and find the exact value of $\sin 240°$.



A2.A.60: FINDING THE TERMINAL SIDE OF AN ANGLE

273 An angle, P, drawn in standard position, terminates in Quadrant II if
1 $\cos P < 0$ and $\csc P < 0$
2 $\sin P > 0$ and $\cos P > 0$
3 $\csc P > 0$ and $\cot P < 0$
4 $\tan P < 0$ and $\sec P > 0$

A2.A.56, 62, 66: DETERMINING TRIGONOMETRIC FUNCTIONS

274 In the interval $0° \le x < 360°$, $\tan x$ is undefined when x equals
1 0º and 90º
2 90º and 180º
3 180º and 270º
4 90º and 270º

275 Express the product of cos 30° and sin 45° in simplest radical form.

276 If θ is an angle in standard position and its terminal side passes through the point $(-3, 2)$, find the exact value of $\csc \theta$.

277 The value of $\tan 126°43'$ to the *nearest ten-thousandth* is
1 −1.3407
2 −1.3408
3 −1.3548
4 −1.3549

278 The value of $\csc 138°23'$ rounded to four decimal places is
1 −1.3376
2 −1.3408
3 1.5012
4 1.5057

279 Which expression, when rounded to three decimal places, is equal to −1.155?
1 $\sec\left(\frac{5\pi}{6}\right)$
2 $\tan(49°20')$
3 $\sin\left(-\frac{3\pi}{5}\right)$
4 $\csc(-118°)$

A2.A.64: USING INVERSE TRIGONOMETRIC FUNCTIONS

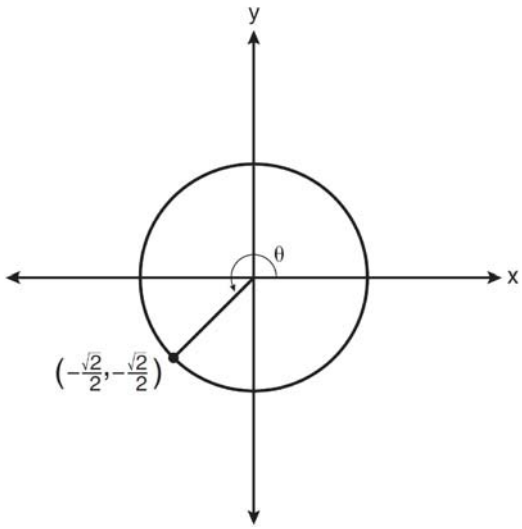
280 What is the principal value of $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$?
1 −30°
2 60°
3 150°
4 240°

281 If $\sin^{-1}\left(\frac{5}{8}\right) = A$, then
1 $\sin A = \frac{5}{8}$
2 $\sin A = \frac{8}{5}$
3 $\cos A = \frac{5}{8}$
4 $\cos A = \frac{8}{5}$

282 If $\tan\left(\text{Arc}\cos\frac{\sqrt{3}}{k}\right)=\frac{\sqrt{3}}{3}$, then k is

1 1
2 2
3 $\sqrt{2}$
4 $3\sqrt{2}$

283 In the diagram below of a unit circle, the ordered pair $\left(-\frac{\sqrt{2}}{2},-\frac{\sqrt{2}}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is m$\angle\theta$?

1 45
2 135
3 225
4 240

A2.A.57: REFERENCE ANGLES

284 Expressed as a function of a positive acute angle, $\cos(-305°)$ is equal to

1 $-\cos 55°$
2 $\cos 55°$
3 $-\sin 55°$
4 $\sin 55°$

A2.A.61: ARC LENGTH

285 A circle has a radius of 4 inches. In inches, what is the length of the arc intercepted by a central angle of 2 radians?

1 2π
2 2
3 8π
4 8

286 A circle is drawn to represent a pizza with a 12 inch diameter. The circle is cut into eight congruent pieces. What is the length of the outer edge of any one piece of this circle?

1 $\frac{3\pi}{4}$
2 π
3 $\frac{3\pi}{2}$
4 3π

A2.A.58-59: COFUNCTION AND RECIPROCAL TRIGONOMETRIC FUNCTIONS

287 If $\angle A$ is acute and $\tan A=\frac{2}{3}$, then

1 $\cot A=\frac{2}{3}$
2 $\cot A=\frac{1}{3}$
3 $\cot(90°-A)=\frac{2}{3}$
4 $\cot(90°-A)=\frac{1}{3}$

288 The expression $\frac{\sin^2\theta+\cos^2\theta}{1-\sin^2\theta}$ is equivalent to

1 $\cos^2\theta$
2 $\sin^2\theta$
3 $\sec^2\theta$
4 $\csc^2\theta$

289 Express $\cos\theta(\sec\theta-\cos\theta)$, in terms of $\sin\theta$.

290 Express $\frac{\cot x \sin x}{\sec x}$ as a single trigonometric function, in simplest form, for all values of x for which it is defined.

291 If $\sec(a + 15)° = \csc(2a)°$, find the smallest positive value of a, in degrees.

292 Express the exact value of $\csc 60°$, with a rational denominator.

A2.A.67: PROVING TRIGONOMETRIC IDENTITIES

293 Which expression always equals 1?
1 $\cos^2 x - \sin^2 x$
2 $\cos^2 x + \sin^2 x$
3 $\cos x - \sin x$
4 $\cos x + \sin x$

294 Starting with $\sin^2 A + \cos^2 A = 1$, derive the formula $\tan^2 A + 1 = \sec^2 A$.

A2.A.76: ANGLE SUM AND DIFFERENCE IDENTITIES

295 The expression $\cos 4x \cos 3x + \sin 4x \sin 3x$ is equivalent to
1 $\sin x$
2 $\sin 7x$
3 $\cos x$
4 $\cos 7x$

296 Given angle A in Quadrant I with $\sin A = \frac{12}{13}$ and angle B in Quadrant II with $\cos B = -\frac{3}{5}$, what is the value of $\cos(A - B)$?
1 $\frac{33}{65}$
2 $-\frac{33}{65}$
3 $\frac{63}{65}$
4 $-\frac{63}{65}$

297 If $\tan A = \frac{2}{3}$ and $\sin B = \frac{5}{\sqrt{41}}$ and angles A and B are in Quadrant I, find the value of $\tan(A + B)$.

298 Express as a single fraction the exact value of $\sin 75°$.

299 The value of $\sin(180 + x)$ is equivalent to
1 $-\sin x$
2 $-\sin(90 - x)$
3 $\sin x$
4 $\sin(90 - x)$

300 The expression $\sin(\theta + 90)°$ is equivalent to
1 $-\sin\theta$
2 $-\cos\theta$
3 $\sin\theta$
4 $\cos\theta$

A2.A.77: DOUBLE AND HALF ANGLE IDENTITIES

301 The expression $\cos^2\theta - \cos 2\theta$ is equivalent to
1 $\sin^2\theta$
2 $-\sin^2\theta$
3 $\cos^2\theta + 1$
4 $-\cos^2\theta - 1$

302 If $\sin A = \frac{2}{3}$ where $0° < A < 90°$, what is the value of $\sin 2A$?
1 $\frac{2\sqrt{5}}{3}$
2 $\frac{2\sqrt{5}}{9}$
3 $\frac{4\sqrt{5}}{9}$
4 $-\frac{4\sqrt{5}}{9}$

303 If $\sin A = \frac{1}{3}$, what is the value of $\cos 2A$?

1 $-\frac{2}{3}$

2 $\frac{2}{3}$

3 $-\frac{7}{9}$

4 $\frac{7}{9}$

304 What is a positive value of $\tan \frac{1}{2}x$, when $\sin x = 0.8$?

1 0.5
2 0.4
3 0.33
4 0.25

A2.A.68: TRIGONOMETRIC EQUATIONS

305 What is the solution set for $2\cos\theta - 1 = 0$ in the interval $0° \le \theta < 360°$?

1 $\{30°, 150°\}$
2 $\{60°, 120°\}$
3 $\{30°, 330°\}$
4 $\{60°, 300°\}$

306 What are the values of θ in the interval $0° \le \theta < 360°$ that satisfy the equation $\tan\theta - \sqrt{3} = 0$?

1 60º, 240º
2 72º, 252º
3 72º, 108º, 252º, 288º
4 60º, 120º, 240º, 300º

307 What is the solution set of the equation $-\sqrt{2}\sec x = 2$ when $0° \le x < 360°$?

1 $\{45°, 135°, 225°, 315°\}$
2 $\{45°, 315°\}$
3 $\{135°, 225°\}$
4 $\{225°, 315°\}$

308 Solve the equation $2\tan C - 3 = 3\tan C - 4$ algebraically for all values of C in the interval $0° \le C < 360°$.

309 Find, algebraically, the measure of the obtuse angle, to the *nearest degree*, that satisfies the equation $5\csc\theta = 8$.

310 Find all values of θ in the interval $0° \le \theta < 360°$ that satisfy the equation $\sin 2\theta = \sin\theta$.

A2.A.69: PROPERTIES OF TRIGONOMETRIC FUNCTIONS

311 What is the period of the function $f(\theta) = -2\cos 3\theta$?

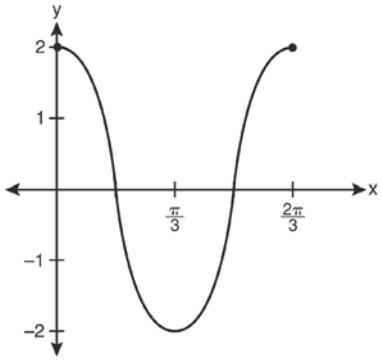
1 π
2 $\frac{2\pi}{3}$
3 $\frac{3\pi}{2}$
4 2π

312 What is the period of the function $y = \frac{1}{2}\sin\left(\frac{x}{3} - \pi\right)$?

1 $\frac{1}{2}$
2 $\frac{1}{3}$
3 $\frac{2}{3}\pi$
4 6π

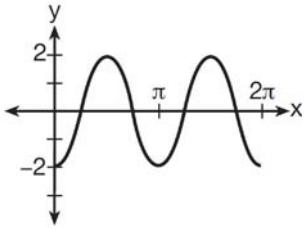
A2.A.72: IDENTIFYING THE EQUATION OF A TRIGONOMETRIC GRAPH

313 Which equation is represented by the graph below?



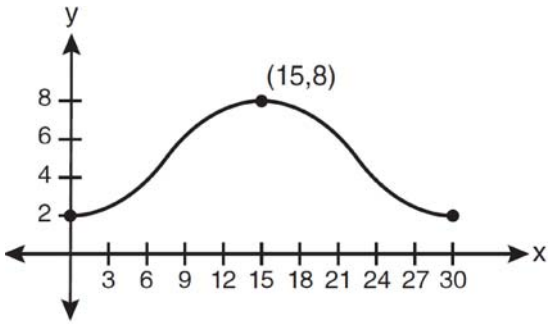
1 $y = 2\cos 3x$
2 $y = 2\sin 3x$
3 $y = 2\cos\frac{2\pi}{3}x$
4 $y = 2\sin\frac{2\pi}{3}x$

314 Which equation represents the graph below?



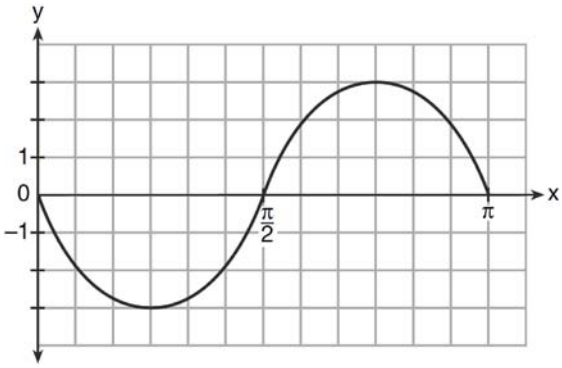
1 $y = -2\sin 2x$
2 $y = -2\sin\frac{1}{2}x$
3 $y = -2\cos 2x$
4 $y = -2\cos\frac{1}{2}x$

315 Which equation is graphed in the diagram below?



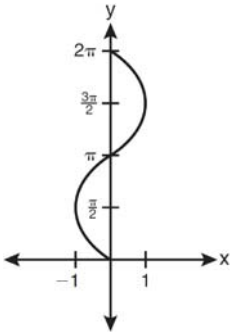
1 $y = 3\cos\left(\frac{\pi}{30}x\right) + 8$
2 $y = 3\cos\left(\frac{\pi}{15}x\right) + 5$
3 $y = -3\cos\left(\frac{\pi}{30}x\right) + 8$
4 $y = -3\cos\left(\frac{\pi}{15}x\right) + 5$

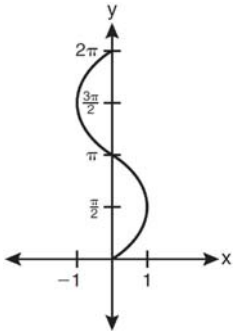
316 Write an equation for the graph of the trigonometric function shown below.

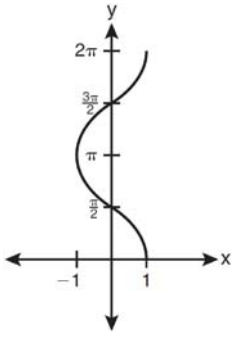


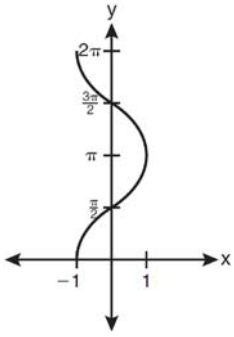
A2.A.65, 70-71: GRAPHING TRIGONOMETRIC FUNCTIONS

317 Which graph shows $y = \cos^{-1}x$?

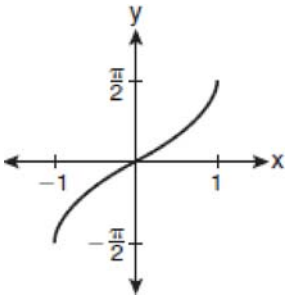
1 

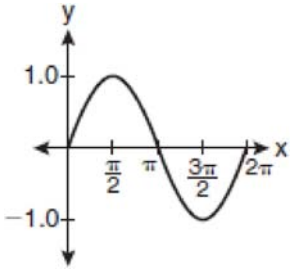
2 

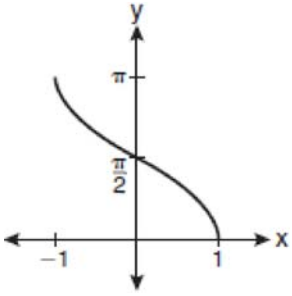
3 

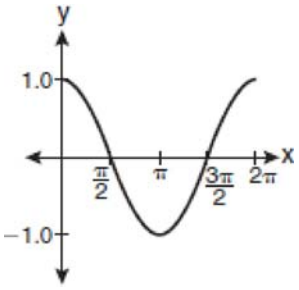
4 

318 Which graph represents the equation $y = \cos^{-1}x$?

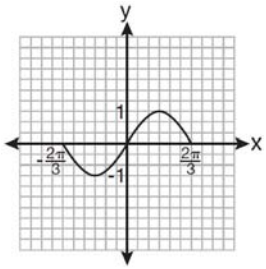
1 

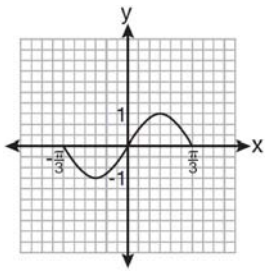
2 

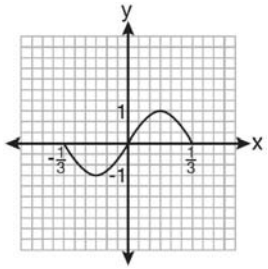
3 

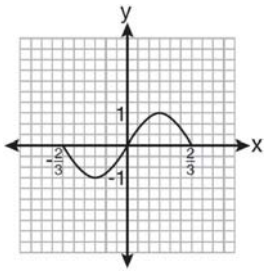
4 

319 Which graph represents one complete cycle of the equation $y = \sin 3\pi x$?

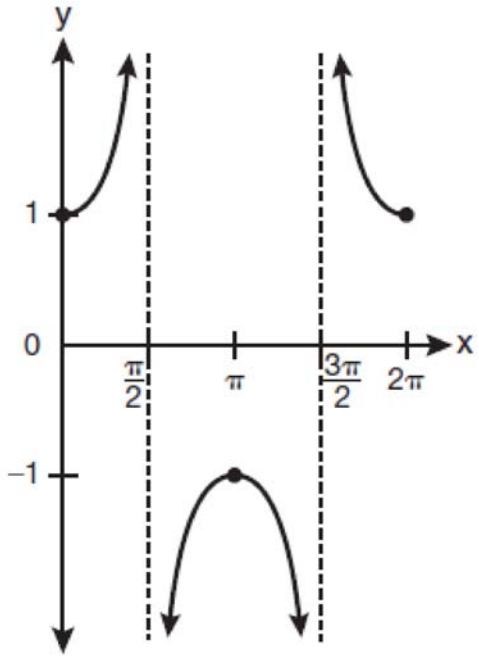
1


2


3


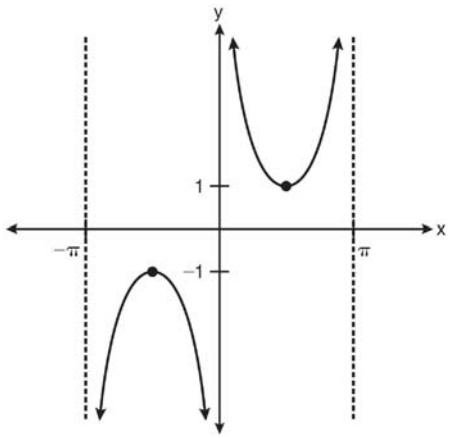
4


320 Which equation is represented by the graph below?



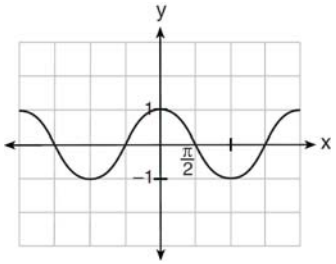
1 $y = \cot x$
2 $y = \csc x$
3 $y = \sec x$
4 $y = \tan x$

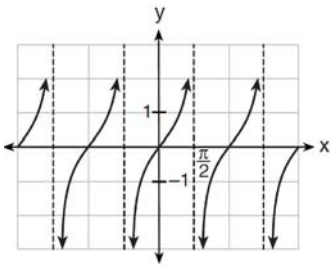
321 Which equation is sketched in the diagram below?

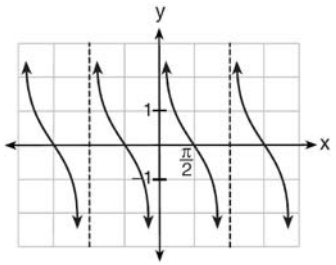


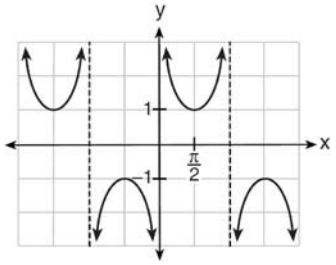
1 $y = \csc x$
2 $y = \sec x$
3 $y = \cot x$
4 $y = \tan x$

322 Which is a graph of $y = \cot x$?

1 

2 

3 

4 

A2.A.63: DOMAIN AND RANGE

323 In which interval of $f(x) = \cos(x)$ is the inverse also a function?

1 $-\frac{\pi}{2} < x < \frac{\pi}{2}$

2 $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$

3 $0 \le x \le \pi$

4 $\frac{\pi}{2} \le x \le \frac{3\pi}{2}$

324 The function $f(x) = \tan x$ is defined in such a way that $f^{-1}(x)$ is a function. What can be the domain of $f(x)$?

1 $\{x|0 \le x \le \pi\}$

2 $\{x|0 \le x \le 2\pi\}$

3 $\left\{x|-\frac{\pi}{2} < x < \frac{\pi}{2}\right\}$

4 $\left\{x|-\frac{\pi}{2} < x < \frac{3\pi}{2}\right\}$

A2.A.74: USING TRIGONOMETRY TO FIND AREA

325 In ΔABC, $m\angle A = 120$, $b = 10$, and $c = 18$. What is the area of ΔABC to the *nearest square inch*?

1 52
2 78
3 90
4 156

326 A ranch in the Australian Outback is shaped like triangle ACE, with $m\angle A = 42$, $m\angle E = 103$, and $AC = 15$ miles. Find the area of the ranch, to the *nearest square mile*.

327 The area of triangle ABC is 42. If $AB = 8$ and $m\angle B = 61$, the length of $\overline{BC}$ is approximately

1 5.1
2 9.2
3 12.0
4 21.7

328 In parallelogram $BFLO$, $OL = 3.8$, $LF = 7.4$, and $m\angle O = 126$. If diagonal $\overline{BL}$ is drawn, what is the area of ΔBLF?

1 11.4
2 14.1
3 22.7
4 28.1

329 The sides of a parallelogram measure 10 cm and 18 cm. One angle of the parallelogram measures 46 degrees. What is the area of the parallelogram, to the *nearest square centimeter*?
1 65
2 125
3 129
4 162

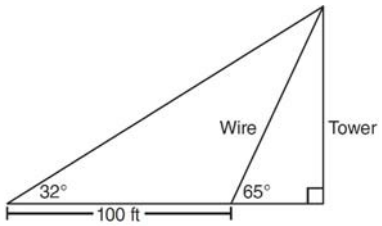
330 Two sides of a parallelogram are 24 feet and 30 feet. The measure of the angle between these sides is 57°. Find the area of the parallelogram, to the *nearest square foot*.

331 The two sides and included angle of a parallelogram are 18, 22, and 60°. Find its exact area in simplest form.

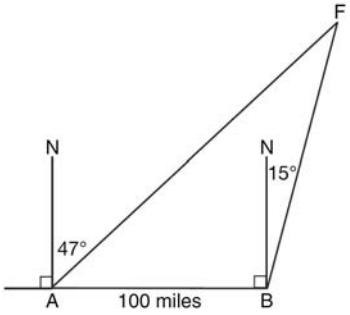
A2.A.73: LAW OF SINES

332 In ΔPQR, p equals
1 $\frac{r\sin P}{\sin Q}$
2 $\frac{r\sin P}{\sin R}$
3 $\frac{r\sin R}{\sin P}$
4 $\frac{q\sin R}{\sin Q}$

333 The diagram below shows the plans for a cell phone tower. A guy wire attached to the top of the tower makes an angle of 65 degrees with the ground. From a point on the ground 100 feet from the end of the guy wire, the angle of elevation to the top of the tower is 32 degrees. Find the height of the tower, to the *nearest foot*.



334 As shown in the diagram below, fire-tracking station A is 100 miles due west of fire-tracking station B. A forest fire is spotted at F, on a bearing 47° northeast of station A and 15° northeast of station B. Determine, to the *nearest tenth of a mile*, the distance the fire is from *both* station A and station B. [N represents due north.]



335 In ΔABC, $m\angle A = 32$, $a = 12$, and $b = 10$. Find the measures of the missing angles and side of ΔABC. Round each measure to the *nearest tenth*.

A2.A.75: LAW OF SINES-THE AMBIGUOUS CASE

336 In ΔABC, $m\angle A = 74$, $a = 59.2$, and $c = 60.3$. What are the two possible values for $m\angle C$, to the *nearest tenth*?
1 73.7 and 106.3
2 73.7 and 163.7
3 78.3 and 101.7
4 78.3 and 168.3

337 How many distinct triangles can be formed if $m\angle A = 35$, $a = 10$, and $b = 13$?
1 1
2 2
3 3
4 0

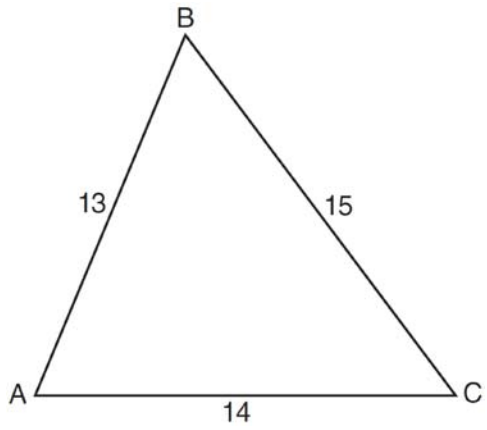
338 Given ΔABC with $a = 9$, $b = 10$, and $m\angle B = 70$, what type of triangle can be drawn?
1 an acute triangle, only
2 an obtuse triangle, only
3 both an acute triangle and an obtuse triangle
4 neither an acute triangle nor an obtuse triangle

339 In ΔMNP, $m = 6$ and $n = 10$. Two distinct triangles can be constructed if the measure of angle M is
1 35
2 40
3 45
4 50

340 In ΔKLM, $KL = 20$, $LM = 13$, and $m\angle K = 40$. The measure of $\angle M$?
1 must be between 0° and 90°
2 must equal 90°
3 must be between 90° and 180°
4 is ambiguous

A2.A.73: LAW OF COSINES

341 In ΔABC, $a = 15$, $b = 14$, and $c = 13$, as shown in the diagram below. What is the $m\angle C$, to the *nearest degree*?



1 53
2 59
3 67
4 127

342 In ΔABC, $a = 3$, $b = 5$, and $c = 7$. What is $m\angle C$?
1 22
2 38
3 60
4 120

343 In a triangle, two sides that measure 6 cm and 10 cm form an angle that measures 80°. Find, to the *nearest degree*, the measure of the smallest angle in the triangle.

A2.A.73: VECTORS

344 Two forces of 25 newtons and 85 newtons acting on a body form an angle of 55°. Find the magnitude of the resultant force, to the *nearest hundredth of a newton*. Find the measure, to the *nearest degree*, of the angle formed between the resultant and the larger force.

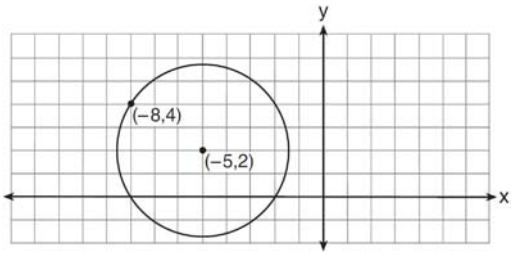
345 The measures of the angles between the resultant and two applied forces are 60° and 45°, and the magnitude of the resultant is 27 pounds. Find, to the *nearest pound*, the magnitude of each applied force.

CONICS

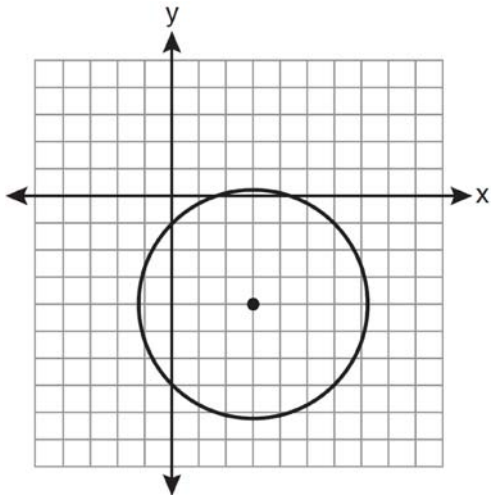
A2.A.47, 49: EQUATIONS OF CIRCLES

346 The equation $x^2 + y^2 - 2x + 6y + 3 = 0$ is equivalent to
1 $(x-1)^2 + (y+3)^2 = -3$
2 $(x-1)^2 + (y+3)^2 = 7$
3 $(x+1)^2 + (y+3)^2 = 7$
4 $(x+1)^2 + (y+3)^2 = 10$

347 Write an equation of the circle shown in the diagram below.

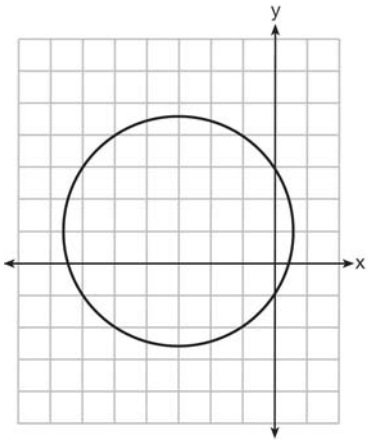


348 Which equation represents the circle shown in the graph below that passes through the point $(0, -1)$?



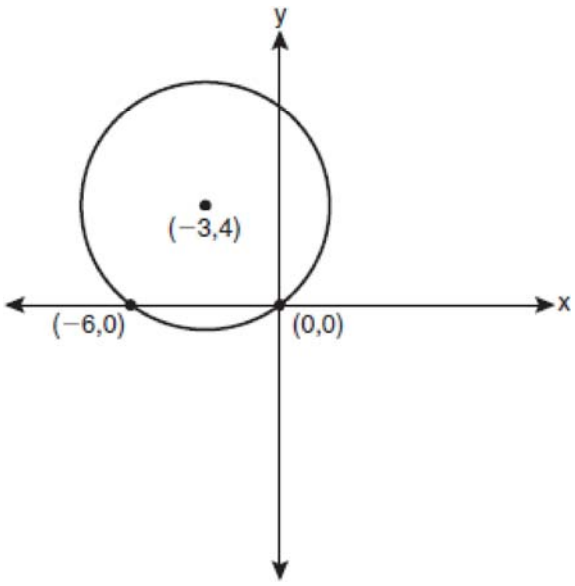
1 $(x-3)^2+(y+4)^2=16$
2 $(x-3)^2+(y+4)^2=18$
3 $(x+3)^2+(y-4)^2=16$
4 $(x+3)^2+(y-4)^2=18$

349 Which equation is represented by the graph below?

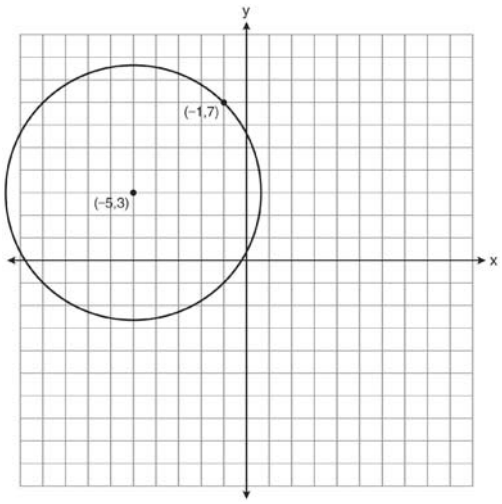


1 $(x-3)^2+(y+1)^2=5$
2 $(x+3)^2+(y-1)^2=5$
3 $(x-1)^2+(y+3)^2=13$
4 $(x+3)^2+(y-1)^2=13$

350 Write an equation of the circle shown in the graph below.



351 A circle shown in the diagram below has a center of $(-5, 3)$ and passes through point $(-1, 7)$.



Write an equation that represents the circle.

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic
Answer Section

1 ANS: 4 PTS: 2 REF: 011127a2 STA: A2.S.1
TOP: Analysis of Data

2 ANS: 4 PTS: 2 REF: 061101a2 STA: A2.S.1
TOP: Analysis of Data

3 ANS: 2 PTS: 2 REF: 061301a2 STA: A2.S.1
TOP: Analysis of Data

4 ANS:
Controlled experiment because Howard is comparing the results obtained from an experimental sample against a control sample.

PTS: 2 REF: 081030a2 STA: A2.S.1 TOP: Analysis of Data

5 ANS: 4
Students entering the library are more likely to spend more time studying, creating bias.

PTS: 2 REF: fall0904a2 STA: A2.S.2 TOP: Analysis of Data

6 ANS: 4 PTS: 2 REF: 011201a2 STA: A2.S.2
TOP: Analysis of Data

7 ANS: 4 PTS: 2 REF: 061124a2 STA: A2.S.3
TOP: Average Known with Missing Data

8 ANS: 4

$$\frac{4\cdot 0+6\cdot 1+10\cdot 2+0\cdot 3+4k+2\cdot 5}{4+6+10+0+k+2}=2$$

$$\frac{4k+36}{k+22}=2$$

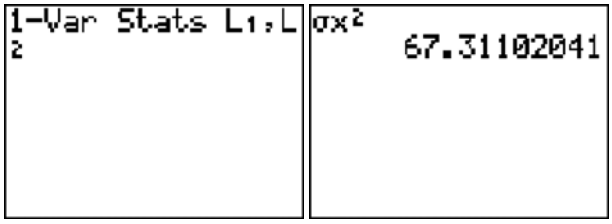
$$4k+36=2k+44$$

$$2k=8$$

$$k=4$$

PTS: 2 REF: 061221a2 STA: A2.S.3 TOP: Average Known with Missing Data

9 ANS: 3



PTS: 2 REF: fall0924a2 STA: A2.S.4 TOP: Dispersion
KEY: range, quartiles, interquartile range, variance

10 ANS:
Ordered, the heights are 71, 71, 72, 74, 74, 75, 78, 79, 79, 83. $Q_1 = 72$ and $Q_3 = 79$. $79 - 72 = 7$.

PTS: 2 REF: 011331a2 STA: A2.S.4 TOP: Dispersion
KEY: range, quartiles, interquartile range, variance

11 ANS:
7.4

PTS: 2 REF: 061029a2 STA: A2.S.4 TOP: Dispersion
KEY: basic, group frequency distributions

12 ANS:
$\sigma_x = 14.9$. $\bar{x} = 40$. There are 8 scores between 25.1 and 54.9.

PTS: 4 REF: 061237a2 STA: A2.S.4 TOP: Dispersion
KEY: advanced

13 ANS:
$\sigma_x \approx 6.2$. 6 scores are within a population standard deviation of the mean. $Q_3 - Q_1 = 41 - 37 = 4$
$\bar{x} \approx 38.2$

PTS: 4 REF: 061338a2 STA: A2.S.4 TOP: Dispersion
KEY: advanced

14 ANS: 3 PTS: 2 REF: 061127a2 STA: A2.S.6
TOP: Regression

15 ANS:
$y = 10.596(1.586)^x$

PTS: 2 REF: 081031a2 STA: A2.S.7 TOP: Exponential Regression

16 ANS:
$y = 180.377(0.954)^x$

PTS: 2 REF: 061231a2 STA: A2.S.7 TOP: Exponential Regression

17 ANS:
$y = 27.2025(1.1509)^x$. $y = 27.2025(1.1509)^{18} \approx 341$

PTS: 4 REF: 011238a2 STA: A2.S.7 TOP: Exponential Regression

18 ANS:
$y = 215.983(1.652)^x$. $215.983(1.652)^7 \approx 7250$

PTS: 4 REF: 011337a2 STA: A2.S.7 TOP: Exponential Regression

19 ANS:
$y = 2.001x^{2.298}$, 1,009. $y = 2.001(15)^{2.298} \approx 1009$

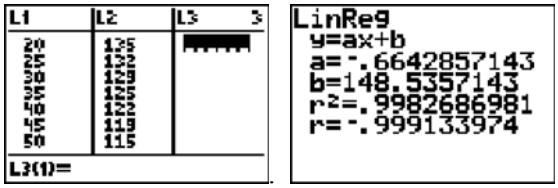
PTS: 4 REF: fall0938a2 STA: A2.S.7 TOP: Power Regression

20 ANS: 2 PTS: 2 REF: 061021a2 STA: A2.S.8
TOP: Correlation Coefficient

21 ANS: 1
(4) shows the strongest linear relationship, but if $r < 0$, $b < 0$. The Regents announced that a correct solution was not provided for this question and all students should be awarded credit.

PTS: 2 REF: 011223a2 STA: A2.S.8 TOP: Correlation Coefficient

22 ANS: 1



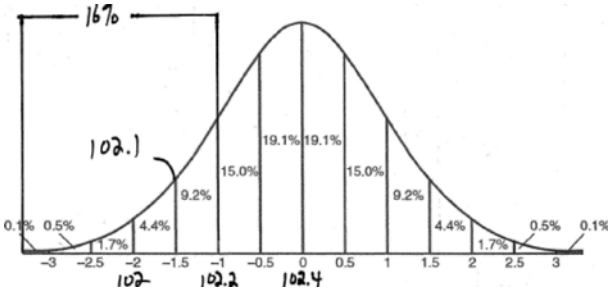
PTS: 2 REF: 061225a2 STA: A2.S.8 TOP: Correlation Coefficient

23 ANS: 2
Since the coefficient of t is greater than 0, $r > 0$.

PTS: 2 REF: 011303a2 STA: A2.S.8 TOP: Correlation Coefficient

24 ANS: 1 PTS: 2 REF: 061316a2 STA: A2.S.8
TOP: Correlation Coefficient

25 ANS: 1



PTS: 2 REF: fall0915a2 STA: A2.S.5 TOP: Normal Distributions
KEY: interval

26 ANS: 2

$\bar{x} \pm \sigma$

153 ± 22

$131 - 175$

PTS: 2 REF: 011307a2 STA: A2.S.5 TOP: Normal Distributions
KEY: interval

27 ANS: 3
$68\% \times 50 = 34$

PTS: 2 REF: 081013a2 STA: A2.S.5 TOP: Normal Distributions
KEY: predict

28 ANS: 3
$34.1\% + 19.1\% = 53.2\%$

PTS: 2 REF: 011212a2 STA: A2.S.5 TOP: Normal Distributions
KEY: probability

29 ANS:
68% of the students are within one standard deviation of the mean. 16% of the students are more than one standard deviation above the mean.

PTS: 2 REF: 011134a2 STA: A2.S.5 TOP: Normal Distributions
KEY: percent

30 ANS:
no. over 20 is more than 1 standard deviation above the mean. $0.159 \cdot 82 \approx 13.038$

PTS: 2 REF: 061129a2 STA: A2.S.5 TOP: Normal Distributions
KEY: predict

31 ANS: 1
$8 \times 8 \times 7 \times 1 = 448$. The first digit cannot be 0 or 5. The second digit cannot be 5 or the same as the first digit. The third digit cannot be 5 or the same as the first or second digit.

PTS: 2 REF: 011125a2 STA: A2.S.10 TOP: Permutations

32 ANS: 1
$\frac{{}_6P_6}{3!2!} = \frac{720}{12} = 60$

PTS: 2 REF: 011324a2 STA: A2.S.10 TOP: Permutations

33 ANS: 4 PTS: 2 REF: fall0925a2 STA: A2.S.10
TOP: Permutations

34 ANS:
39,916,800. $\frac{{}_{12}P_{12}}{3! \cdot 2!} = \frac{479,001,600}{12} = 39,916,800$

PTS: 2 REF: 081035a2 STA: A2.S.10 TOP: Permutations

35 ANS:
$\frac{{}_{10}P_{10}}{3! \cdot 3! \cdot 2!} = \frac{3,628,800}{72} = 50,400$

PTS: 2 REF: 061330a2 STA: A2.S.10 TOP: Permutations

36 ANS:
No. TENNESSEE: $\frac{{}_9P_9}{4! \cdot 2! \cdot 2!} = \frac{362,880}{96} = 3,780$. VERMONT: ${}_7P_7 = 5,040$

PTS: 4 REF: 061038a2 STA: A2.S.10 TOP: Permutations

37 ANS: 2
${}_{15}C_8 = 6,435$

PTS: 2 REF: 081012a2 STA: A2.S.11 TOP: Combinations

38 ANS: 1
$_{10}C_4 = 210$

PTS: 2 REF: 061113a2 STA: A2.S.11 TOP: Combinations

39 ANS: 4
$_{15}C_5 = 3,003.\ _{25}C_5 = {}_{25}C_{20} = 53,130.\ _{25}C_{15} = 3,268,760.$

PTS: 2 REF: 061227a2 STA: A2.S.11 TOP: Combinations

40 ANS:
$_{25}C_{20} = 53,130$

PTS: 2 REF: 011232a2 STA: A2.S.11 TOP: Combinations

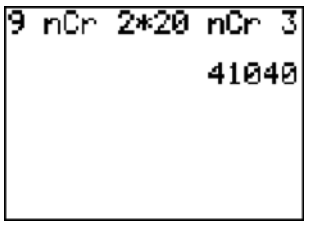
41 ANS: 3 PTS: 2 REF: 061007a2 STA: A2.S.9
TOP: Differentiating Permutations and Combinations

42 ANS: 1 PTS: 2 REF: 011117a2 STA: A2.S.9
TOP: Differentiating Permutations and Combinations

43 ANS: 1 PTS: 2 REF: 011310a2 STA: A2.S.9
TOP: Differentiating Permutations and Combinations

44 ANS: 1 PTS: 2 REF: 061317a2 STA: A2.S.9
TOP: Differentiating Permutations and Combinations

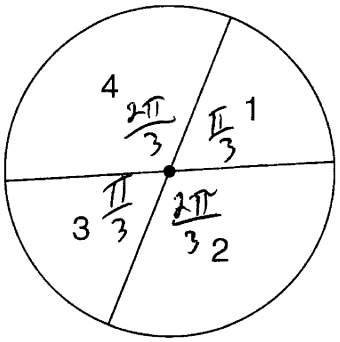
45 ANS:



41,040.

PTS: 2 REF: fall0935a2 STA: A2.S.12 TOP: Sample Space

46 ANS: 2



$$\frac{\frac{\pi}{3}+\frac{\pi}{3}}{2\pi} = \frac{\frac{2\pi}{3}}{2\pi} = \frac{1}{3}$$

PTS: 2 REF: 011108a2 STA: A2.S.13 TOP: Geometric Probability

47 ANS: 4

$${}_3C_2\left(\frac{5}{8}\right)^2\left(\frac{3}{8}\right)^1 = \frac{225}{512}$$

PTS: 2 REF: 011221a2 STA: A2.S.15 TOP: Binomial Probability
KEY: spinner

48 ANS: 1 PTS: 2 REF: 061223a2 STA: A2.S.15
TOP: Binomial Probability KEY: modeling

49 ANS:

$${}_7C_3\left(\frac{1}{4}\right)^3\left(\frac{3}{4}\right)^4 = 35\left(\frac{1}{64}\right)\left(\frac{81}{256}\right) = \frac{2835}{16384} \approx 0.173$$

PTS: 2 REF: 061335a2 STA: A2.S.15 TOP: Binomial Probability
KEY: exactly

50 ANS:

0.468. ${}_8C_6\left(\frac{2}{3}\right)^6\left(\frac{1}{3}\right)^2 \approx 0.27313$. ${}_8C_7\left(\frac{2}{3}\right)^7\left(\frac{1}{3}\right)^1 \approx 0.15607$. ${}_8C_8\left(\frac{2}{3}\right)^8\left(\frac{1}{3}\right)^0 \approx 0.03902$.

PTS: 4 REF: 011138a2 STA: A2.S.15 TOP: Binomial Probability
KEY: at least or at most

51 ANS:

$$\frac{51}{243} \cdot {}_5C_3\left(\frac{1}{3}\right)^3\left(\frac{2}{3}\right)^2 = \frac{40}{243}$$

$${}_5C_4\left(\frac{1}{3}\right)^4\left(\frac{2}{3}\right)^1 = \frac{10}{243}$$

$${}_5C_3\left(\frac{1}{3}\right)^5\left(\frac{2}{3}\right)^0 = \frac{1}{243}$$

PTS: 4 REF: 061138a2 STA: A2.S.15 TOP: Binomial Probability
KEY: at least or at most

52 ANS:

0.167. ${}_{10}C_8 \cdot 0.6^8 \cdot 0.4^2 + {}_{10}C_9 \cdot 0.6^9 \cdot 0.4^1 + {}_{10}C_{10} \cdot 0.6^{10} \cdot 0.4^0 \approx 0.167$

PTS: 4 REF: 061036a2 STA: A2.S.15 TOP: Binomial Probability
KEY: at least or at most

53 ANS:

26.2%. ${}_{10}C_8 \cdot 0.65^8 \cdot 0.35^2 + {}_{10}C_9 \cdot 0.65^9 \cdot 0.35^1 + {}_{10}C_{10} \cdot 0.65^{10} \cdot 0.35^0 \approx 0.262$

PTS: 4 REF: 081038a2 STA: A2.S.15 TOP: Binomial Probability
KEY: at least or at most

54 ANS: 1

$4a + 6 = 4a - 10$. $4a + 6 = -4a + 10$. $\left|4\left(\frac{1}{2}\right) + 6\right| - 4\left(\frac{1}{2}\right) = -10$

$6 \neq -10$ $8a = 4$ $8 - 2 \neq -10$

$a = \frac{4}{8} = \frac{1}{2}$

PTS: 2 REF: 011106a2 STA: A2.A.1 TOP: Absolute Value Equations

55 ANS: 1

$6x - 7 \leq 5$ $6x - 7 \geq -5$

$6x \leq 12$ $6x \geq 2$

$x \leq 2$ $x \geq \frac{1}{3}$

PTS: 2 REF: fall0905a2 STA: A2.A.1 TOP: Absolute Value Inequalities
KEY: graph

56 ANS: 3

$\frac{4x - 5}{3} > 1$ or $\frac{4x - 5}{3} < -1$

$4x - 5 > 3$ $4x - 5 < -3$

$4x > 8$ $4x < 2$

$x > 2$ $x < \frac{1}{2}$

PTS: 2 REF: 061209a2 STA: A2.A.1 TOP: Absolute Value Inequalities
KEY: graph

57 ANS: 1

$2x - 1 > 5$. $2x - 1 < -5$

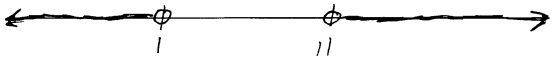
$2x > 6$ $2x > -4$

$x > 3$ $x < -2$

PTS: 2 REF: 061307a2 STA: A2.A.1 TOP: Absolute Value Inequalities
KEY: graph

58 ANS:

$-3|6 - x| < -15$.



$|6 - x| > 5$

$6 - x > 5$ or $6 - x < -5$

$1 > x$ or $11 < x$

PTS: 2 REF: 061137a2 STA: A2.A.1 TOP: Absolute Value Inequalities
KEY: graph

59 ANS:

$3 - 2x \geq 7$ or $3 - 2x \leq -7$

$-2x \geq 4$ $\quad -2x \leq -10$

$x \leq -2$ $\quad x \geq 5$

PTS: 2 REF: 011334a2 STA: A2.A.1 TOP: Absolute Value Inequalities
KEY: graph

60 ANS: 2

sum: $\frac{-b}{a} = \frac{4}{6} = \frac{2}{3}$. product: $\frac{c}{a} = \frac{-12}{6} = -2$

PTS: 2 REF: 011209a2 STA: A2.A.20 TOP: Roots of Quadratics

61 ANS:

Sum $\frac{-b}{a} = -\frac{11}{5}$. Product $\frac{c}{a} = -\frac{3}{5}$

PTS: 2 REF: 061030a2 STA: A2.A.20 TOP: Roots of Quadratics

62 ANS:

$3x^2 - 11x + 6 = 0$. Sum $\frac{-b}{a} = \frac{11}{3}$. Product $\frac{c}{a} = \frac{6}{3} = 2$

PTS: 2 REF: 011329a2 STA: A2.A.20 TOP: Roots of Quadratics

63 ANS:

Sum $\frac{-b}{a} = -\frac{1}{12}$. Product $\frac{c}{a} = -\frac{1}{2}$

PTS: 2 REF: 061328a2 STA: A2.A.20 TOP: Roots of Quadratics

64 ANS: 3

$S = \frac{-b}{a} = \frac{-(-3)}{4} = \frac{3}{4}$. $P = \frac{c}{a} = \frac{-8}{4} = -2$

PTS: 2 REF: fall0912a2 STA: A2.A.21 TOP: Roots of Quadratics
KEY: basic

65 ANS: 3

$\frac{-b}{a} = \frac{-6}{2} = -3$. $\frac{c}{a} = \frac{4}{2} = 2$

PTS: 2 REF: 011121a2 STA: A2.A.21 TOP: Roots of Quadratics
KEY: basic

66 ANS: 3

sum of the roots, $\frac{-b}{a} = \frac{-(-9)}{4} = \frac{9}{4}$. product of the roots, $\frac{c}{a} = \frac{3}{4}$

PTS: 2 REF: 061208a2 STA: A2.A.21 TOP: Roots of Quadratics
KEY: basic

67 ANS:

$x^2 - 6x - 27 = 0$, $\frac{-b}{a} = 6$. $\frac{c}{a} = -27$. If $a = 1$ then $b = -6$ and $c = -27$

PTS: 4 REF: 061130a2 STA: A2.A.21 TOP: Roots of Quadratics
KEY: basic

68 ANS: 4

$6x - x^3 - x^2 = -x(x^2 + x - 6) = -x(x + 3)(x - 2)$

PTS: 2 REF: fall0917a2 STA: A2.A.7 TOP: Factoring Polynomials
KEY: single variable

69 ANS: 4

$12x^4 + 10x^3 - 12x^2 = 2x^2(6x^2 + 5x - 6) = 2x^2(2x + 3)(3x - 2)$

PTS: 2 REF: 061008a2 STA: A2.A.7 TOP: Factoring Polynomials
KEY: single variable

70 ANS:

$10ax^2 - 23ax - 5a = a(10x^2 - 23x - 5) = a(5x + 1)(2x - 5)$

PTS: 2 REF: 081028a2 STA: A2.A.7 TOP: Factoring Polynomials
KEY: multiple variables

71 ANS:

$12t^8 - 75t^4 = 3t^4(4t^4 - 25) = 3t^4(2t^2 + 5)(2t^2 - 5)$

PTS: 2 REF: 061133a2 STA: A2.A.7
TOP: Factoring the Difference of Perfect Squares KEY: binomial

72 ANS: 2

$x^3 + 3x^2 - 4x - 12$

$x^2(x + 3) - 4(x + 3)$

$(x^2 - 4)(x + 3)$

$(x + 2)(x - 2)(x + 3)$

PTS: 2 REF: 061214a2 STA: A2.A.7 TOP: Factoring by Grouping

73 ANS: 3

$3x^3 - 5x^2 - 48x + 80$

$x^2(3x - 5) - 16(3x - 5)$

$(x^2 - 16)(3x - 5)$

$(x + 4)(x - 4)(3x - 5)$

PTS: 2 REF: 011317a2 STA: A2.A.7 TOP: Factoring by Grouping

74 ANS: 3

$$\frac{-7 \pm \sqrt{7^2 - 4(2)(-3)}}{2(2)} = \frac{-7 \pm \sqrt{73}}{4}$$

PTS: 2 REF: 081009a2 STA: A2.A.25 TOP: Quadratic Formula

75 ANS: 4

$$\frac{3 \pm \sqrt{(-3)^2 - 4(1)(-9)}}{2(1)} = \frac{3 \pm \sqrt{45}}{2} = \frac{3 \pm 3\sqrt{5}}{2}$$

PTS: 2 REF: 061009a2 STA: A2.A.25 TOP: Quadratic Formula

76 ANS:

$$\frac{2 \pm \sqrt{(-2)^2 - 4(6)(-3)}}{2(6)} = \frac{2 \pm \sqrt{76}}{12} = \frac{2 \pm \sqrt{4}\sqrt{19}}{12} = \frac{2 \pm 2\sqrt{19}}{12} = \frac{1 \pm \sqrt{19}}{6}$$

PTS: 2 REF: 011332a2 STA: A2.A.25 TOP: Quadratics with Irrational Solutions

77 ANS: 4

$b^2 - 4ac = 3^2 - 4(9)(-4) = 9 + 144 = 153$

PTS: 2 REF: 081016a2 STA: A2.A.2 TOP: Using the Discriminant
KEY: determine nature of roots given equation

78 ANS: 3

$b^2 - 4ac = (-10)^2 - 4(1)(25) = 100 - 100 = 0$

PTS: 2 REF: 011102a2 STA: A2.A.2 TOP: Using the Discriminant
KEY: determine nature of roots given equation

79 ANS: 4 PTS: 2 REF: 011323a2 STA: A2.A.2
TOP: Using the Discriminant KEY: determine nature of roots given equation

80 ANS:

$$b^2 - 4ac = 0$$
$$k^2 - 4(1)(4) = 0$$
$$k^2 - 16 = 0$$
$$(k+4)(k-4) = 0$$
$$k = \pm 4$$

PTS: 2 REF: 061028a2 STA: A2.A.2 TOP: Using the Discriminant
KEY: determine equation given nature of roots

81 ANS: 2 PTS: 2 REF: 061122a2 STA: A2.A.24
TOP: Completing the Square

82 ANS: 2

$x^2 + 2 = 6x$

$x^2 - 6x = -2$

$x^2 - 6x + 9 = -2 + 9$

$(x-3)^2 = 7$

PTS: 2 REF: 011116a2 STA: A2.A.24 TOP: Completing the Square

83 ANS:

$3 \pm \sqrt{7}$. $2x^2 - 12x + 4 = 0$

$x^2 - 6x + 2 = 0$

$x^2 - 6x = -2$

$x^2 - 6x + 9 = -2 + 9$

$(x-3)^2 = 7$

$x - 3 = \pm\sqrt{7}$

$x = 3 \pm \sqrt{7}$

PTS: 4 REF: fall0936a2 STA: A2.A.24 TOP: Completing the Square

84 ANS: 1

$y \geq x^2 - x - 6$

$y \geq (x-3)(x+2)$

PTS: 2 REF: 061017a2 STA: A2.A.4 TOP: Quadratic Inequalities
KEY: two variables

85 ANS: 3

$x^2 - 3x - 10 > 0$ or

$(x-5)(x+2) > 0$ $x - 5 < 0$ and $x + 2 < 0$

$x - 5 > 0$ and $x + 2 > 0$ $x < 5$ and $x < -2$

$x > 5$ and $x > -2$ $x < -2$

$x > 5$

PTS: 2 REF: 011115a2 STA: A2.A.4 TOP: Quadratic Inequalities
KEY: one variable

86 ANS:

$x < -1$ or $x > 5$. $x^2 - 4x - 5 > 0$. $x - 5 > 0$ and $x + 1 > 0$ or $x - 5 < 0$ and $x + 1 < 0$

$(x-5)(x+1) > 0$ $x > 5$ and $x > -1$ $x < 5$ and $x < -1$

$x > 5$ $x < -1$

PTS: 2 REF: 011228a2 STA: A2.A.4 TOP: Quadratic Inequalities
KEY: one variable

87 ANS: 2

$x^2 - x - 6 = 3x - 6$

$x^2 - 4x = 0$

$x(x - 4) = 0$

$x = 0, 4$

PTS: 2 REF: 081015a2 STA: A2.A.3 TOP: Quadratic-Linear Systems
KEY: equations

88 ANS: 4

$x = 2y.\ \ y^2 - (3y)^2 + 32 = 0 \quad .\ \ x = 3(-2) = -6$

$y^2 - 9y^2 = -32$

$-8y^2 = -32$

$y^2 = 4$

$y = \pm 2$

PTS: 2 REF: 061312a2 STA: A2.A.3 TOP: Quadratic-Linear Systems
KEY: equations

89 ANS: 3

$x + y = 5 \qquad .\ \ -5 + y = 5$

$y = -x + 5 \qquad y = 10$

$(x + 3)^2 + (-x + 5 - 3)^2 = 53$

$x^2 + 6x + 9 + x^2 - 4x + 4 = 53$

$2x^2 + 2x - 40 = 0$

$x^2 + x - 20 = 0$

$(x + 5)(x - 4) = 0$

$x = -5, 4$

PTS: 2 REF: 011302a2 STA: A2.A.3 TOP: Quadratic-Linear Systems
KEY: equations

90 ANS:

$\left(-\frac{9}{2}, \frac{1}{2}\right)$ and $\left(\frac{1}{2}, \frac{11}{2}\right)$. $y = x + 5$. $4x^2 + 17x - 4 = x + 5$

$y = 4x^2 + 17x - 4$ $4x^2 + 16x - 9 = 0$

$(2x + 9)(2x - 1) = 0$

$x = -\frac{9}{2}$ and $x = \frac{1}{2}$

$y = -\frac{9}{2} + 5 = \frac{1}{2}$ and $y = \frac{1}{2} + 5 = \frac{11}{2}$

PTS: 6 REF: 061139a2 STA: A2.A.3 TOP: Quadratic-Linear Systems
KEY: equations

91 ANS: 2 PTS: 2 REF: 011114a2 STA: A2.N.3
TOP: Operations with Polynomials

92 ANS: 1 PTS: 2 REF: 011314a2 STA: A2.N.3
TOP: Operations with Polynomials

93 ANS: 2
The binomials are conjugates, so use FL.

PTS: 2 REF: 011206a2 STA: A2.N.3 TOP: Operations with Polynomials

94 ANS: 1
The binomials are conjugates, so use FL.

PTS: 2 REF: 061201a2 STA: A2.N.3 TOP: Operations with Polynomials

95 ANS:

$\frac{4}{9}x^2 - \frac{4}{3}x + 1$. $\left(\frac{2}{3}x - 1\right)^2 = \left(\frac{2}{3}x - 1\right)\left(\frac{2}{3}x - 1\right) = \frac{4}{9}x^2 - \frac{2}{3}x - \frac{2}{3}x + 1 = \frac{4}{9}x^2 - \frac{4}{3}x + 1$

PTS: 2 REF: 081034a2 STA: A2.N.3 TOP: Operations with Polynomials

96 ANS:

$6y^3 - \frac{37}{10}y^2 - \frac{1}{5}y$. $\left(\frac{1}{2}y^2 - \frac{1}{3}y\right)\left(12y + \frac{3}{5}\right) = 6y^3 + \frac{3}{10}y^2 - 4y^2 - \frac{1}{5}y = 6y^3 - \frac{37}{10}y^2 - \frac{1}{5}y$

PTS: 2 REF: 061128a2 STA: A2.N.3 TOP: Operations with Polynomials

97 ANS: 3

$\frac{3^{-2}}{(-2)^{-3}} = \frac{\frac{1}{9}}{-\frac{1}{8}} = -\frac{8}{9}$

PTS: 2 REF: 061003a2 STA: A2.N.1 TOP: Negative and Fractional Exponents

98 ANS: 3

$6n^{-1} < 4n^{-1}$. Flip sign when multiplying each side of the inequality by n, since a negative number.

$\frac{6}{n} < \frac{4}{n}$

$6 > 4$

PTS: 2 REF: 061314a2 STA: A2.N.1 TOP: Negative and Fractional Exponents

99 ANS: 1 PTS: 2 REF: 011306a2 STA: A2.A.8
TOP: Negative and Fractional Exponents

100 ANS: 2

$\left(\frac{w^{-5}}{w^{-9}}\right)^{\frac{1}{2}} = (w^4)^{\frac{1}{2}} = w^2$

PTS: 2 REF: 081011a2 STA: A2.A.8 TOP: Negative and Fractional Exponents

101 ANS: 1 PTS: 2 REF: fall0914a2 STA: A2.A.9
TOP: Negative and Fractional Exponents

102 ANS: 1 PTS: 2 REF: 061210a2 STA: A2.A.9
TOP: Negative Exponents

103 ANS: 1 PTS: 2 REF: 061324a2 STA: A2.A.9
TOP: Negative Exponents

104 ANS:

$\frac{12x^2}{y^9} \cdot \frac{3x^{-4}y^5}{(2x^3y^{-7})^{-2}} = \frac{3y^5(2x^3y^{-7})^2}{x^4} = \frac{3y^5(4x^6y^{-14})}{x^4} = \frac{12x^6y^{-9}}{x^4} = \frac{12x^2}{y^9}$

PTS: 2 REF: 061134a2 STA: A2.A.9 TOP: Negative Exponents

105 ANS: 2

$\frac{x^{-1}-1}{x-1} = \frac{\frac{1}{x}-1}{x-1} = \frac{\frac{1-x}{x}}{x-1} = \frac{\frac{-(x-1)}{x}}{x-1} = -\frac{1}{x}$

PTS: 2 REF: 081018a2 STA: A2.A.9 TOP: Negative Exponents

106 ANS: 2

$\frac{x^{-1}+1}{x+1} = \frac{\frac{1}{x}+1}{x+1} = \frac{\frac{1+x}{x}}{x+1} = \frac{1}{x}$

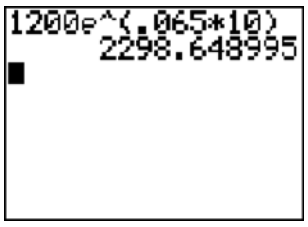
PTS: 2 REF: 011211a2 STA: A2.A.9 TOP: Negative Exponents

107 ANS:

$e^{3\ln 2} = e^{\ln 2^3} = e^{\ln 8} = 8$

PTS: 2 REF: 061131a2 STA: A2.A.12 TOP: Evaluating Exponential Expressions

108 ANS:



2,298.65.

PTS: 2 REF: fall0932a2 STA: A2.A.12 TOP: Evaluating Exponential Expressions

109 ANS:

$A = 750e^{(0.03)(8)} \approx 953$

PTS: 2 REF: 061229a2 STA: A2.A.12 TOP: Evaluating Exponential Expressions

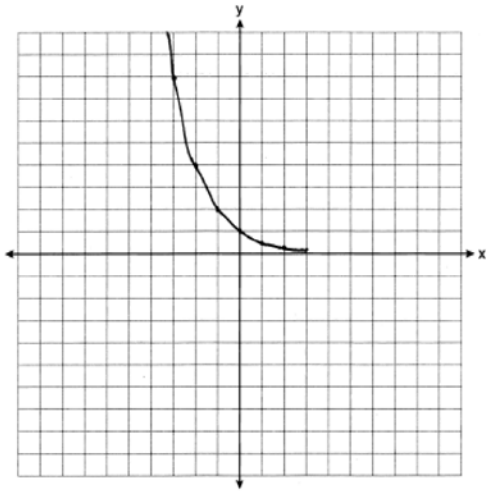
110 ANS: 2

$8^2 = 64$

PTS: 2 REF: fall0909a2 STA: A2.A.18 TOP: Evaluating Logarithmic Expressions

111 ANS: 4 PTS: 2 REF: 011124a2 STA: A2.A.18
TOP: Evaluating Logarithmic Expressions

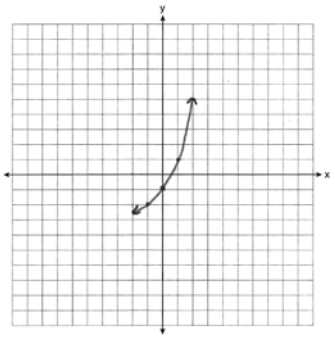
112 ANS:



$y = 0$

PTS: 2 REF: 061031a2 STA: A2.A.53 TOP: Graphing Exponential Functions

113 ANS:



PTS: 2 REF: 011234a2 STA: A2.A.53 TOP: Graphing Exponential Functions

114 ANS: 2 PTS: 2 REF: 011301a2 STA: A2.A.53
TOP: Graphing Exponential Functions

115 ANS: 2

$f^{-1}(x) = \log_4 x$

PTS: 2 REF: fall0916a2 STA: A2.A.54 TOP: Graphing Logarithmic Functions

116 ANS: 1 PTS: 2 REF: 061211a2 STA: A2.A.54
TOP: Graphing Logarithmic Functions

117 ANS: 3

$\log 4m^2 = \log 4 + \log m^2 = \log 4 + 2\log m$

PTS: 2 REF: 061321a2 STA: A2.A.19 TOP: Properties of Logarithms
KEY: splitting logs

118 ANS: 4 PTS: 2 REF: 061120a2 STA: A2.A.19
TOP: Properties of Logarithms KEY: splitting logs

119 ANS: 2

$\log x^2 = \log 3a + \log 2a$

$2\log x = \log 6a^2$

$\log x = \frac{\log 6}{2} + \frac{\log a^2}{2}$

$\log x = \frac{1}{2}\log 6 + \frac{2\log a}{2}$

$\log x = \frac{1}{2}\log 6 + \log a$

PTS: 2 REF: 011224a2 STA: A2.A.19 TOP: Properties of Logarithms
KEY: splitting logs

120 ANS: 1

$2\log x - (3\log y + \log z) = \log x^2 - \log y^3 - \log z = \log \frac{x^2}{y^3 z}$

PTS: 2 REF: 061010a2 STA: A2.A.19 TOP: Properties of Logarithms

121 ANS: 4 PTS: 2 REF: 061207a2 STA: A2.A.19
TOP: Properties of Logarithms KEY: antilogarithms

122 ANS: 2

$$\log 9 - \log 20$$

$$\log 3^2 - \log(10 \cdot 2)$$

$$2\log 3 - (\log 10 + \log 2)$$

$$2b - (1 + a)$$

$$2b - a - 1$$

PTS: 2 REF: 011326a2 STA: A2.A.19 TOP: Properties of Logarithms
KEY: expressing logs algebraically

123 ANS: 3

$x = 5^4 = 625$

PTS: 2 REF: 061106a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: basic

124 ANS: 4

$2\log_4(5x) = 3$

$$\log_4(5x) = \frac{3}{2}$$

$$5x = 4^{\frac{3}{2}}$$

$$5x = 8$$

$$x = \frac{8}{5}$$

PTS: 2 REF: fall0921a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: advanced

125 ANS:

800. $x = 4^{2.5} = 32$. $y^{-\frac{3}{2}} = 125$. $\frac{x}{y} = \frac{32}{\frac{1}{25}} = 800$

$y = 125^{-\frac{2}{3}} = \frac{1}{25}$

PTS: 4 REF: 011237a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: advanced

126 ANS:

$$(x+4)^2 = 17x - 4$$
$$x^2 + 8x + 16 = 17x - 4$$
$$x^2 - 9x + 20 = 0$$
$$(x-4)(x-5) = 0$$
$$x = 4, 5$$

PTS: 4 REF: 011336a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: basic

127 ANS:

$x = -\frac{1}{3}, -1$ $\log_{x+3} \frac{x^3 + x - 2}{x} = 2$

$$\frac{x^3 + x - 2}{x} = (x+3)^2$$
$$\frac{x^3 + x - 2}{x} = x^2 + 6x + 9$$
$$x^3 + x - 2 = x^3 + 6x^2 + 9x$$
$$0 = 6x^2 + 8x + 2$$
$$0 = 3x^2 + 4x + 1$$
$$0 = (3x+1)(x+1)$$
$$x = -\frac{1}{3}, -1$$

PTS: 6 REF: 081039a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: basic

128 ANS:

$$2x - 1 = 27^{\frac{4}{3}}$$
$$2x - 1 = 81$$
$$2x = 82$$
$$x = 41$$

PTS: 2 REF: 061329a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: advanced

129 ANS:

$\ln(T - T_0) = -kt + 4.718$. $\ln(T - 68) = -0.104(10) + 4.718.$

$\ln(150 - 68) = -k(3) + 4.718$ $\ln(T - 68) = 3.678$

$4.407 \approx -3k + 4.718$ $T - 68 \approx 39.6$

$k \approx 0.104$ $T \approx 108$

PTS: 6 REF: 011139a2 STA: A2.A.28 TOP: Logarithmic Equations
KEY: advanced

130 ANS: 2

$$320 = 10(2)^{\frac{t}{60}}$$

$$32 = (2)^{\frac{t}{60}}$$

$$\log 32 = \log(2)^{\frac{t}{60}}$$

$$\log 32 = \frac{t \log 2}{60}$$

$$\frac{60 \log 32}{\log 2} = t$$

$$300 = t$$

PTS: 2 REF: 011205a2 STA: A2.A.6 TOP: Exponential Growth

131 ANS: 3

$$1000 = 500e^{.05t}$$

$$2 = e^{.05t}$$

$$\ln 2 = \ln e^{.05t}$$

$$\frac{\ln 2}{.05} = \frac{.05t \cdot \ln e}{.05}$$

$$13.9 \approx t$$

PTS: 2 REF: 061313a2 STA: A2.A.6 TOP: Exponential Growth

132 ANS:

$$30700 = 50e^{3t}$$

$$614 = e^{3t}$$

$$\ln 614 = \ln e^{3t}$$

$$\ln 614 = 3t \ln e$$

$$\ln 614 = 3t$$

$$2.14 \approx t$$

PTS: 2 REF: 011333a2 STA: A2.A.6 TOP: Exponential Growth

133 ANS: 3

$$75000 = 25000e^{.0475t}$$

$$3 = e^{.0475t}$$

$$\ln 3 = \ln e^{.0475t}$$

$$\frac{\ln 3}{.0475} = \frac{.0475t \cdot \ln e}{.0475}$$

$$23.1 \approx t$$

PTS: 2 REF: 061117a2 STA: A2.A.6 TOP: Exponential Growth

134 ANS: 3

$4^{x^2+4x} = 2^{-6}$.

$(2^2)^{x^2+4x} = 2^{-6}$

$2^{2x^2+8x} = 2^{-6}$

$2x^2 + 8x = -6$

$2x^2 + 8x + 6 = 0$

$x^2 + 4x + 3 = 0$

$(x+3)(x+1) = 0$

$x = -3 \; x = -1$

PTS: 2 REF: 061015a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base shown

135 ANS: 2

$$4^{2x+5} = 8^{3x} \quad .$$

$$\left(2^2\right)^{2x+5} = \left(2^3\right)^{3x}$$

$$2^{4x+10} = 2^{9x}$$

$$4x + 10 = 9x$$

$$10 = 5x$$

$$2 = x$$

PTS: 2 REF: 061105a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

136 ANS: 4

$8^{3k+4} = 4^{2k-1}$.

$(2^3)^{3k+4} = (2^2)^{2k-1}$

$2^{9k+12} = 2^{4k-2}$

$9k + 12 = 4k - 2$

$5k = -14$

$k = -\frac{14}{5}$

PTS: 2 REF: 011309a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

137 ANS: 4

$9^{3x+1} = 27^{x+2}$.

$(3^2)^{3x+1} = (3^3)^{x+2}$

$3^{6x+2} = 3^{3x+6}$

$6x + 2 = 3x + 6$

$3x = 4$

$x = \frac{4}{3}$

PTS: 2 REF: 081008a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

138 ANS:

$81^{x^3+2x^2} = 27^{\frac{5x}{3}}$

$\left(3^4\right)^{x^3+2x^2} = \left(3^3\right)^{\frac{5x}{3}}$

$3^{4x^3+8x^2} = 3^{5x}$

$4x^3 + 8x^2 - 5x = 0$

$x(4x^2 + 8x - 5) = 0$

$x(2x - 1)(2x + 5) = 0$

$x = 0, \frac{1}{2}, -\frac{5}{2}$

PTS: 6 REF: 061239a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

139 ANS:

$16^{2x+3} = 64^{x+2}$

$(4^2)^{2x+3} = (4^3)^{x+2}$

$4x + 6 = 3x + 6$

$x = 0$

PTS: 2 REF: 011128a2 STA: A2.A.27 TOP: Exponential Equations
KEY: common base not shown

140 ANS: 1

${}_9C_3 a^6(-4b)^3 = -5376a^6b^3$

PTS: 2 REF: 061126a2 STA: A2.A.36 TOP: Binomial Expansions

141 ANS: 3

${}_3C_2(2x^4)^1(-y)^2 = 6x^4y^2$

PTS: 2 REF: 011215a2 STA: A2.A.36 TOP: Binomial Expansions

142 ANS: 1

${}_5C_3(3x)^2(-2)^3 = 10 \cdot 9x^2 \cdot -8 = -720x^2$

PTS: 2 REF: fall0919a2 STA: A2.A.36 TOP: Binomial Expansions

143 ANS: 3

${}_8C_3 \cdot x^{8-3} \cdot (-2)^3 = 56x^5 \cdot (-8) = -448x^5$

PTS: 2 REF: 011308a2 STA: A2.A.36 TOP: Binomial Expansions

144 ANS: 3

${}_6C_3\left(\frac{x}{2}\right)^3(-2y)^3 = 20 \cdot \frac{x^3}{8} \cdot -8y^3 = -20x^3y^3$

PTS: 2 REF: 061215a2 STA: A2.A.36 TOP: Binomial Expansions

145 ANS:

$32x^5 - 80x^4 + 80x^3 - 40x^2 + 10x - 1$. ${}_5C_0(2x)^5(-1)^0 = 32x^5$. ${}_5C_1(2x)^4(-1)^1 = -80x^4$. ${}_5C_2(2x)^3(-1)^2 = 80x^3$. ${}_5C_3(2x)^2(-1)^3 = -40x^2$. ${}_5C_4(2x)^1(-1)^4 = 10x$. ${}_5C_5(2x)^0(-1)^5 = -1$

PTS: 4 REF: 011136a2 STA: A2.A.36 TOP: Binomial Expansions

146 ANS: 2

$x^3 + x^2 - 2x = 0$

$x(x^2 + x - 2) = 0$

$x(x + 2)(x - 1) = 0$

$x = 0, -2, 1$

PTS: 2 REF: 011103a2 STA: A2.A.26 TOP: Solving Polynomial Equations

147 ANS: 3

$$3x^5 - 48x = 0$$
$$3x(x^4 - 16) = 0$$
$$3x(x^2 + 4)(x^2 - 4) = 0$$
$$3x(x^2 + 4)(x + 2)(x - 2) = 0$$

PTS: 2 REF: 011216a2 STA: A2.A.26 TOP: Solving Polynomial Equations

148 ANS:

$$x^4 + 4x^3 + 4x^2 + 16x = 0$$
$$x(x^3 + 4x^2 + 4x + 16) = 0$$
$$x(x^2(x + 4) + 4(x + 4)) = 0$$
$$x(x^2 + 4)(x + 4) = 0$$
$$x = 0, \pm 2i, -4$$

PTS: 6 REF: 061339a2 STA: A2.A.26 TOP: Solving Polynomial Equations

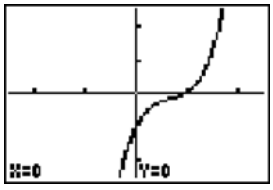
149 ANS:

$\pm\frac{3}{2}, -\frac{1}{2}$. $8x^3 + 4x^2 - 18x - 9 = 0$

$$4x^2(2x + 1) - 9(2x + 1) = 0$$
$$(4x^2 - 9)(2x + 1) = 0$$
$$4x^2 - 9 = 0 \text{ or } 2x + 1 = 0$$
$(2x + 3)(2x - 3) = 0$ $x = -\frac{1}{2}$
$$x = \pm\frac{3}{2}$$

PTS: 4 REF: fall0937a2 STA: A2.A.26 TOP: Solving Polynomial Equations

150 ANS: 4



PTS: 2 REF: 061222a2 STA: A2.A.50 TOP: Solving Polynomial Equations

151 ANS: 4 PTS: 2 REF: 061005a2 STA: A2.A.50
TOP: Solving Polynomial Equations

152 ANS: 2
The roots are $-1, 2, 3$.

PTS: 2 REF: 081023a2 STA: A2.A.50 TOP: Solving Polynomial Equations

153 ANS: 4

$(3+\sqrt{5})(3-\sqrt{5}) = 9-\sqrt{25} = 4$

PTS: 2 REF: 081001a2 STA: A2.N.4 TOP: Operations with Irrational Expressions
KEY: without variables | index = 2

154 ANS: 3

$\sqrt[3]{4^3a^{15}a} = 4a^5\sqrt[3]{a}$

PTS: 2 REF: 061204a2 STA: A2.A.13 TOP: Simplifying Radicals
KEY: index > 2

155 ANS:

$-\frac{a^2b^3}{4}$

PTS: 2 REF: 011231a2 STA: A2.A.13 TOP: Simplifying Radicals
KEY: index > 2

156 ANS: 3

$\sqrt[3]{6a^4b^2} + \sqrt[3]{(27\cdot 6)a^4b^2}$

$a\sqrt[3]{6ab^2} + 3a\sqrt[3]{6ab^2}$

$4a\sqrt[3]{6ab^2}$

PTS: 2 REF: 011319a2 STA: A2.N.2 TOP: Operations with Radicals

157 ANS:

$5\sqrt{3x^3} - 2\sqrt{27x^3} = 5\sqrt{x^2}\sqrt{3x} - 2\sqrt{9x^2}\sqrt{3x} = 5x\sqrt{3x} - 6x\sqrt{3x} = -x\sqrt{3x}$

PTS: 2 REF: 061032a2 STA: A2.N.2 TOP: Operations with Radicals

158 ANS: 4

$4ab\sqrt{2b} - 3a\sqrt{9b^2}\sqrt{2b} + 7ab\sqrt{6b} = 4ab\sqrt{2b} - 9ab\sqrt{2b} + 7ab\sqrt{6b} = -5ab\sqrt{2b} + 7ab\sqrt{6b}$

PTS: 2 REF: fall0918a2 STA: A2.A.14 TOP: Operations with Radicals
KEY: with variables | index = 2

159 ANS:

$\frac{\sqrt{108x^5y^8}}{\sqrt{6xy^5}} = \sqrt{18x^4y^3} = 3x^2y\sqrt{2y}$

PTS: 2 REF: 011133a2 STA: A2.A.14 TOP: Operations with Radicals
KEY: with variables | index = 2

160 ANS: 1

$\frac{\sqrt{3}+5}{\sqrt{3}-5}\cdot\frac{\sqrt{3}+5}{\sqrt{3}+5} = \frac{3+5\sqrt{3}+5\sqrt{3}+25}{3-25} = \frac{28+10\sqrt{3}}{-22} = -\frac{14+5\sqrt{3}}{11}$

PTS: 2 REF: 061012a2 STA: A2.N.5 TOP: Rationalizing Denominators

161 ANS: 3

$$\frac{4}{5-\sqrt{13}} \cdot \frac{5+\sqrt{13}}{5+\sqrt{13}} = \frac{4(5+\sqrt{13})}{25-13} = \frac{5+\sqrt{13}}{3}$$

PTS: 2 REF: 061116a2 STA: A2.N.5 TOP: Rationalizing Denominators

162 ANS:

$$\frac{5(3+\sqrt{2})}{7} \cdot \frac{5}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}} = \frac{5(3+\sqrt{2})}{9-2} = \frac{5(3+\sqrt{2})}{7}$$

PTS: 2 REF: fall0928a2 STA: A2.N.5 TOP: Rationalizing Denominators

163 ANS: 3

$$\frac{3}{\sqrt{3a^2b}} = \frac{3}{a\sqrt{3b}} \cdot \frac{\sqrt{3b}}{\sqrt{3b}} = \frac{3\sqrt{3b}}{3ab} = \frac{\sqrt{3b}}{ab}$$

PTS: 2 REF: 081019a2 STA: A2.A.15 TOP: Rationalizing Denominators
KEY: index = 2

164 ANS: 4

$$\frac{2x+4}{\sqrt{x+2}} \cdot \frac{\sqrt{x+2}}{\sqrt{x+2}} = \frac{2(x+2)\sqrt{x+2}}{x+2} = 2\sqrt{x+2}$$

PTS: 2 REF: 011122a2 STA: A2.A.15 TOP: Rationalizing Denominators
KEY: index = 2

165 ANS: 4

$$\frac{x}{x-\sqrt{x}} \times \frac{x+\sqrt{x}}{x+\sqrt{x}} = \frac{x^2+x\sqrt{x}}{x^2-x} = \frac{x(x+\sqrt{x})}{x(x-1)} = \frac{x+\sqrt{x}}{x-1}$$

PTS: 2 REF: 061325a2 STA: A2.A.15 TOP: Rationalizing Denominators
KEY: index = 2

166 ANS: 3

$3x+16 = (x+2)^2$. -4 is an extraneous solution.

$3x+16 = x^2+4x+4$

$0 = x^2+x-12$

$0 = (x+4)(x-3)$

$x = -4 \quad x = 3$

PTS: 2 REF: 061121a2 STA: A2.A.22 TOP: Solving Radicals
KEY: extraneous solutions

167 ANS: 1

$5x + 29 = (x + 3)^2$. $(-5) + 3$ shows an extraneous solution.

$5x + 29 = x^2 + 6x + 9$

$0 = x^2 + x - 20$

$0 = (x + 5)(x - 4)$

$x = -5, 4$

PTS: 2 REF: 061213a2 STA: A2.A.22 TOP: Solving Radicals
KEY: extraneous solutions

168 ANS: 1 PTS: 2 REF: 061018a2 STA: A2.A.22
TOP: Solving Radicals KEY: extraneous solutions

169 ANS:

7. $4 - \sqrt{2x - 5} = 1$

$-\sqrt{2x - 5} = -3$

$2x - 5 = 9$

$2x = 14$

$x = 7$

PTS: 2 REF: 011229a2 STA: A2.A.22 TOP: Solving Radicals
KEY: basic

170 ANS:

$\sqrt{x^2 + x - 1} = -4x + 3$

$x^2 + x - 1 = 16x^2 - 24x + 9$

$0 = 15x^2 - 25x + 10$

$0 = 3x^2 - 5x + 2$

$0 = (3x - 2)(x - 1)$

$x = \frac{2}{3}, x \neq 1$

$-4\left(\frac{2}{3}\right) + 3 \geq 0$

$\frac{1}{3} \geq 0$

$-4(1) + 3 < 0$

1 is extraneous

PTS: 6 REF: 011339a2 STA: A2.A.22 TOP: Solving Radicals
KEY: extraneous solutions

171 ANS: 4

$x^{-\frac{2}{5}} = \frac{1}{x^{\frac{2}{5}}} = \frac{1}{\sqrt[5]{x^2}}$

PTS: 2 REF: 011118a2 STA: A2.A.10 TOP: Fractional Exponents as Radicals

172 ANS: 2 PTS: 2 REF: 061011a2 STA: A2.A.10
TOP: Fractional Exponents as Radicals

173 ANS: 1

$\sqrt[4]{16x^2y^7} = 16^{\frac{1}{4}}x^{\frac{2}{4}}y^{\frac{7}{4}} = 2x^{\frac{1}{2}}y^{\frac{7}{4}}$

PTS: 2 REF: 061107a2 STA: A2.A.11 TOP: Radicals as Fractional Exponents

174 ANS: 3

$\sqrt{-300} = \sqrt{100}\sqrt{-1}\sqrt{3}$

PTS: 2 REF: 061006a2 STA: A2.N.6 TOP: Square Roots of Negative Numbers

175 ANS: 1 PTS: 2 REF: 061019a2 STA: A2.N.7
TOP: Imaginary Numbers

176 ANS: 1

$2i^2 + 3i^3 = 2(-1) + 3(-i) = -2 - 3i$

PTS: 2 REF: 081004a2 STA: A2.N.7 TOP: Imaginary Numbers

177 ANS:

$i^{13} + i^{18} + i^{31} + n = 0$

$i + (-1) - i + n = 0$

$-1 + n = 0$

$n = 1$

PTS: 2 REF: 061228a2 STA: A2.N.7 TOP: Imaginary Numbers

178 ANS: 2 PTS: 2 REF: 081024a2 STA: A2.N.8
TOP: Conjugates of Complex Numbers

179 ANS: 4 PTS: 2 REF: 011111a2 STA: A2.N.8
TOP: Conjugates of Complex Numbers

180 ANS: 2 PTS: 2 REF: 011213a2 STA: A2.N.8
TOP: Conjugates of Complex Numbers

181 ANS: 3 PTS: 2 REF: 061219a2 STA: A2.N.8
TOP: Conjugates of Complex Numbers

Algebra 2/Trigonometry Regents Exam Questions by Performance Indicator: Topic
Answer Section

182 ANS: 2

$(3-7i)(3-7i) = 9-21i-21i+49i^2 = 9-42i-49 = -40-42i$

PTS: 2 REF: fall0901a2 STA: A2.N.9
TOP: Multiplication and Division of Complex Numbers

183 ANS: 4

$(x+i)^2-(x-i)^2 = x^2+2xi+i^2-(x^2-2xi+i^2) = 4xi$

PTS: 2 REF: 011327a2 STA: A2.N.9
TOP: Multiplication and Division of Complex Numbers

184 ANS: 3

$(3i)(2i)^2(m+i)$

$(3i)(4i^2)(m+i)$

$(3i)(-4)(m+i)$

$(-12i)(m+i)$

$-12mi-12i^2$

$-12mi+12$

PTS: 2 REF: 061319a2 STA: A2.N.9
TOP: Multiplication and Division of Complex Numbers

185 ANS:

$$\frac{-2(x^2+6)}{x^4}\cdot\frac{x^2(x-3)+6(x-3)}{x^2-4x}\cdot\frac{2x-4}{x^4-3x^3}\div\frac{x^2+2x-8}{16-x^2}$$

$$\frac{(x^2+6)(x-3)}{x(x-4)}\cdot\frac{2(x-2)}{x^3(x-3)}\cdot\frac{(4+x)(4-x)}{(x+4)(x-2)}$$

$$\frac{-2(x^2+6)}{x^4}$$

PTS: 6 REF: 011239a2 STA: A2.A.16 TOP: Multiplication and Division of Rationals
KEY: division

186 ANS:

$$\frac{-(x^2-4)}{(x+4)(x+3)}\times\frac{x+3}{2(x-2)}=\frac{-(x+2)(x-2)}{x+4}\times\frac{1}{2(x-2)}=\frac{-(x+2)}{2(x+4)}$$

PTS: 4 REF: 061236a2 STA: A2.A.16 TOP: Multiplication and Division of Rationals
KEY: division

187 ANS: 3

$$\frac{3y}{2y-6}+\frac{9}{6-2y}=\frac{3y}{2y-6}-\frac{9}{2y-6}=\frac{3y-9}{2y-6}=\frac{3(y-3)}{2(y-3)}=\frac{3}{2}$$

PTS: 2 REF: 011325a2 STA: A2.A.16 TOP: Addition and Subtraction of Rationals

188 ANS:

no solution. $\frac{4x}{x-3}=2+\frac{12}{x-3}$

$$\frac{4x-12}{x-3}=2$$

$$\frac{4(x-3)}{x-3}=2$$

$$4\neq 2$$

PTS: 2 REF: fall0930a2 STA: A2.A.23 TOP: Solving Rationals
KEY: rational solutions

189 ANS:

$\frac{1}{3}$ $\frac{1}{x+3}-\frac{2}{3-x}=\frac{4}{x^2-9}$

$$\frac{1}{x+3}+\frac{2}{x-3}=\frac{4}{x^2-9}$$

$$\frac{x-3+2(x+3)}{(x+3)(x-3)}=\frac{4}{(x+3)(x-3)}$$

$$x-3+2x+6=4$$

$$3x=1$$

$$x=\frac{1}{3}$$

PTS: 4 REF: 081036a2 STA: A2.A.23 TOP: Solving Rationals
KEY: rational solutions

190 ANS:

$\frac{13}{x}=10-x$. $x=\frac{10\pm\sqrt{100-4(1)(13)}}{2(1)}=\frac{10\pm\sqrt{48}}{2}=\frac{10\pm4\sqrt{3}}{2}=5\pm2\sqrt{3}$

$13=10x-x^2$

$x^2-10x+13=0$

PTS: 4 REF: 061336a2 STA: A2.A.23 TOP: Solving Rationals
KEY: irrational and complex solutions

191 ANS: 2

$$\frac{\frac{x}{4}-\frac{1}{x}}{\frac{1}{2x}+\frac{1}{4}}=\frac{\frac{x^2-4}{4x}}{\frac{2x+4}{8x}}=\frac{(x+2)(x-2)}{4x}\times\frac{8x}{2(x+2)}=x-2$$

PTS: 2 REF: fall0920a2 STA: A2.A.17 TOP: Complex Fractions

192 ANS: 2

$$\frac{1-\frac{4}{x}}{1-\frac{2}{x}-\frac{8}{x^2}}\times\frac{x^2}{x^2}=\frac{x^2-4x}{x^2-2x-8}=\frac{x(x-4)}{(x-4)(x+2)}=\frac{x}{x+2}$$

PTS: 2 REF: 061305a2 STA: A2.A.17 TOP: Complex Fractions

193 ANS:

$$\frac{\frac{1}{2}-\frac{4}{d}}{\frac{1}{d}+\frac{3}{2d}}=\frac{\frac{d-8}{2d}}{\frac{2d+3d}{2d^2}}=\frac{d-8}{2d}\times\frac{2d^2}{5d}=\frac{d-8}{5}$$

PTS: 2 REF: 061035a2 STA: A2.A.17 TOP: Complex Fractions

194 ANS: 1

$$10\cdot\frac{3}{2}=\frac{3}{5}p$$

$$15=\frac{3}{5}p$$

$$25=p$$

PTS: 2 REF: 011226a2 STA: A2.A.5 TOP: Inverse Variation

195 ANS: 1

$$20(-2)=x(-2x+2)$$

$$-40=-2x^2+2x$$

$$2x^2-2x-40=0$$

$$x^2-x-20=0$$

$$(x+4)(x-5)=0$$

$$x=-4,5$$

PTS: 2 REF: 011321a2 STA: A2.A.5 TOP: Inverse Variation

196 ANS: 2

$2^2 \cdot 3 = 12 \quad . \quad 6^2 d = 12$

$4^2 \cdot \frac{3}{4} = 12 \quad 36d = 12$

$d = \frac{1}{3}$

PTS: 2 REF: 061310a2 STA: A2.A.5 TOP: Inverse Variation

197 ANS:

$12 \cdot 6 = 9w$

$8 = w$

PTS: 2 REF: 011130a2 STA: A2.A.5 TOP: Inverse Variation

198 ANS: 4

$y - 2\sin\theta = 3$

$y = 2\sin\theta + 3$

$f(\theta) = 2\sin\theta + 3$

PTS: 2 REF: fall0927a2 STA: A2.A.40 TOP: Functional Notation

199 ANS: 2

$f(10) = \frac{-10}{(-10)^2 - 16} = \frac{-10}{84} = -\frac{5}{42}$

PTS: 2 REF: 061102a2 STA: A2.A.41 TOP: Functional Notation

200 ANS:

$g(10) = \left(a(10)\sqrt{1-x} \right)^2 = 100a^2(-9) = -900a^2$

PTS: 2 REF: 061333a2 STA: A2.A.41 TOP: Functional Notation

201 ANS: 3 PTS: 2 REF: 011119a2 STA: A2.A.52
TOP: Families of Functions

202 ANS: 4 PTS: 2 REF: 011219a2 STA: A2.A.52
TOP: Properties of Graphs of Functions and Relations

203 ANS: 1 PTS: 2 REF: 061004a2 STA: A2.A.52
TOP: Identifying the Equation of a Graph

204 ANS: 2 PTS: 2 REF: 061108a2 STA: A2.A.52
TOP: Identifying the Equation of a Graph

205 ANS: 4 PTS: 2 REF: fall0908a2 STA: A2.A.38
TOP: Defining Functions KEY: graphs

206 ANS: 4 PTS: 2 REF: 011101a2 STA: A2.A.38
TOP: Defining Functions KEY: graphs

207 ANS: 3 PTS: 2 REF: 061114a2 STA: A2.A.38
TOP: Defining Functions KEY: graphs

208 ANS: 1 PTS: 2 REF: 061013a2 STA: A2.A.38
TOP: Defining Functions

209 ANS: 3 PTS: 2 REF: 011305a2 STA: A2.A.38
TOP: Defining Functions KEY: graphs

210 ANS: 3

(1) and (4) fail the horizontal line test and are not one-to-one. Not every element of the range corresponds to only one element of the domain. (2) fails the vertical line test and is not a function. Not every element of the domain corresponds to only one element of the range.

PTS: 2 REF: 081020a2 STA: A2.A.43 TOP: Defining Functions

211 ANS: 4 PTS: 2 REF: 061303a2 STA: A2.A.43
TOP: Defining Functions

212 ANS: 2 PTS: 2 REF: 011225a2 STA: A2.A.43
TOP: Defining Functions

213 ANS: 2 PTS: 2 REF: 061218a2 STA: A2.A.43
TOP: Defining Functions

214 ANS: 4

(4) fails the horizontal line test. Not every element of the range corresponds to only one element of the domain.

PTS: 2 REF: fall0906a2 STA: A2.A.43 TOP: Defining Functions

215 ANS: 3 PTS: 2 REF: fall0923a2 STA: A2.A.39
TOP: Domain and Range KEY: real domain

216 ANS: 4 PTS: 2 REF: 061112a2 STA: A2.A.39
TOP: Domain and Range KEY: real domain

217 ANS: 2 PTS: 2 REF: 011222a2 STA: A2.A.39
TOP: Domain and Range KEY: real domain

218 ANS: 1 PTS: 2 REF: 011313a2 STA: A2.A.39
TOP: Domain and Range KEY: real domain

219 ANS: 1 PTS: 2 REF: 061202a2 STA: A2.A.51
TOP: Domain and Range

220 ANS: 3 PTS: 2 REF: 061308ge STA: A2.A.51
TOP: Domain and Range

221 ANS: 2 PTS: 2 REF: 081003a2 STA: A2.A.51
TOP: Domain and Range

222 ANS:

D: $-5 \le x \le 8$. R: $-3 \le y \le 2$

PTS: 2 REF: 011132a2 STA: A2.A.51 TOP: Domain and Range

223 ANS: 3

$f(4) = \frac{1}{2}(4) - 3 = -1$. $g(-1) = 2(-1) + 5 = 3$

PTS: 2 REF: fall0902a2 STA: A2.A.42 TOP: Compositions of Functions
KEY: numbers

224 ANS: 4

$g\left(\frac{1}{2}\right) = \frac{1}{\frac{1}{2}} = 2$. $f(2) = 4(2) - 2^2 = 4$

PTS: 2 REF: 011204a2 STA: A2.A.42 TOP: Compositions of Functions
KEY: numbers

225 ANS: 2

$6(x^2 - 5) = 6x^2 - 30$

PTS: 2 REF: 011109a2 STA: A2.A.42 TOP: Compositions of Functions
KEY: variables

226 ANS: 2 PTS: 2 REF: 061216a2 STA: A2.A.42
TOP: Compositions of Functions KEY: variables

227 ANS:

7. $f(-3) = (-3)^2 - 6 = 3$. $g(x) = 2^3 - 1 = 7$.

PTS: 2 REF: 061135a2 STA: A2.A.42 TOP: Compositions of Functions
KEY: numbers

228 ANS: 3 PTS: 2 REF: 081027a2 STA: A2.A.44
TOP: Inverse of Functions KEY: equations

229 ANS:

$y = x^2 - 6$. $f^{-1}(x)$ is not a function.

$x = y^2 - 6$

$x + 6 = y^2$

$\pm\sqrt{x+6} = y$

PTS: 2 REF: 061132a2 STA: A2.A.44 TOP: Inverse of Functions
KEY: equations

230 ANS: 2 PTS: 2 REF: fall0926a2 STA: A2.A.46
TOP: Transformations with Functions and Relations

231 ANS: 1 PTS: 2 REF: 081022a2 STA: A2.A.46
TOP: Transformations with Functions and Relations

232 ANS: 4 PTS: 2 REF: 061026a2 STA: A2.A.29
TOP: Sequences

233 ANS: 1

common difference is 2. $b_n = x + 2n$

$10 = x + 2(1)$

$8 = x$

PTS: 2 REF: 081014a2 STA: A2.A.29 TOP: Sequences

234 ANS: 4

$\frac{10}{4} = 2.5$

PTS: 2 REF: 011217a2 STA: A2.A.29 TOP: Sequences

235 ANS: 3 PTS: 2 REF: 061001a2 STA: A2.A.30 TOP: Sequences

236 ANS: 3 PTS: 2 REF: 011110a2 STA: A2.A.30 TOP: Sequences

237 ANS: 3

$\frac{4}{-2} = -2$

PTS: 2 REF: 011304a2 STA: A2.A.31 TOP: Sequences

238 ANS: 2

$\frac{-\frac{3}{32}a^3b^4}{\frac{1}{64}a^5b^3} = -\frac{6b}{a^2}$

PTS: 2 REF: 061326a2 STA: A2.A.31 TOP: Sequences

239 ANS: 3

$27r^{4-1} = 64$

$r^3 = \frac{64}{27}$

$r = \frac{4}{3}$

PTS: 2 REF: 081025a2 STA: A2.A.31 TOP: Sequences

240 ANS: 3

$a_n = 5(-2)^{n-1}$

$a_{15} = 5(-2)^{15-1} = 81,920$

PTS: 2 REF: 011105a2 STA: A2.A.32 TOP: Sequences

241 ANS: 1

$a_n = -\sqrt{5}(-\sqrt{2})^{n-1}$

$a_{15} = -\sqrt{5}(-\sqrt{2})^{15-1} = -\sqrt{5}(-\sqrt{2})^{14} = -\sqrt{5} \cdot 2^7 = -128\sqrt{5}$

PTS: 2 REF: 061109a2 STA: A2.A.32 TOP: Sequences

242 ANS:

$-3, -5, -8, -12$

PTS: 2 REF: fall0934a2 STA: A2.A.33 TOP: Recursive Sequences

243 ANS:
$a_1 = 3.\ a_2 = 2(3) - 1 = 5.\ a_3 = 2(5) - 1 = 9.$

PTS: 2 REF: 061233a2 STA: A2.A.33 TOP: Recursive Sequences

244 ANS: 1

n	3	4	5	Σ
$-r^2 + r$	$-3^2 + 3 = -6$	$-4^2 + 4 = -12$	$-5^2 + 5 = -20$	-38

PTS: 2 REF: 061118a2 STA: A2.N.10 TOP: Sigma Notation
KEY: basic

245 ANS: 4
$4 + 3(2 - x) + 3(3 - x) + 3(4 - x) + 3(5 - x)$

$4 + 6 - 3x + 9 - 3x + 12 - 3x + 15 - 3x$

$46 - 12x$

PTS: 2 REF: 061315a2 STA: A2.N.10 TOP: Sigma Notation
KEY: basic

246 ANS: 3

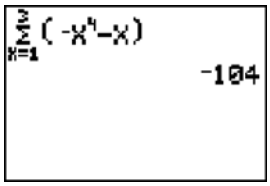
n	0	1	2	Σ
$n^2 + 2^n$	$0^2 + 2^0 = 1$	$1^2 + 2^2 = 3$	$2^2 + 2^2 = 8$	12

$2 \times 12 = 24$

PTS: 2 REF: fall0911a2 STA: A2.N.10 TOP: Sigma Notation
KEY: basic

247 ANS:
230. $10 + (1^3 - 1) + (2^3 - 1) + (3^3 - 1) + (4^3 - 1) + (5^3 - 1) = 10 + 0 + 7 + 26 + 63 + 124 = 230$

PTS: 2 REF: 011131a2 STA: A2.N.10 TOP: Sigma Notation
KEY: basic

248 ANS:


-104.

PTS: 2 REF: 011230a2 STA: A2.N.10 TOP: Sigma Notation
KEY: basic

249 ANS: 2 PTS: 2 REF: 061205a2 STA: A2.A.34
TOP: Sigma Notation

250 ANS: 1 PTS: 2 REF: 061025a2 STA: A2.A.34
TOP: Sigma Notation

251 ANS:

$$\sum_{n=1}^{15} 7n$$

PTS: 2 REF: 081029a2 STA: A2.A.34 TOP: Sigma Notation

252 ANS: 3

$$S_8 = \frac{3(1-(-4)^8)}{1-(-4)} = \frac{196,605}{5} = -39,321$$

PTS: 2 REF: 061304a2 STA: A2.A.35 TOP: Summations
KEY: geometric

253 ANS: 3

$$S_n = \frac{n}{2}[2a + (n-1)d] = \frac{19}{2}[2(3) + (19-1)7] = 1254$$

PTS: 2 REF: 011202a2 STA: A2.A.35 TOP: Summations
KEY: arithmetic

254 ANS: 4

$$S_n = \frac{n}{2}[2a + (n-1)d] = \frac{21}{2}[2(18) + (21-1)2] = 798$$

PTS: 2 REF: 061103a2 STA: A2.A.35 TOP: Series
KEY: arithmetic

255 ANS:

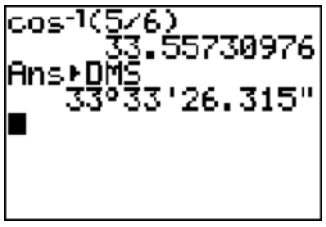
$a_n = 9n - 4$. $S_n = \frac{20(5+176)}{2} = 1810$

$a_1 = 9(1) - 4 = 5$

$a_{20} = 9(20) - 4 = 176$

PTS: 2 REF: 011328a2 STA: A2.A.35 TOP: Summations
KEY: arithmetic

256 ANS: 1



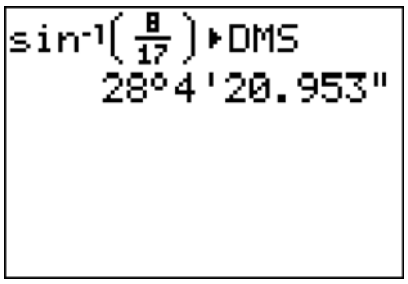
$\cos K = \frac{5}{6}$

$K = \cos^{-1}\frac{5}{6}$

$K \approx 33°33'$

PTS: 2 REF: 061023a2 STA: A2.A.55 TOP: Trigonometric Ratios

257 ANS: 2



$\sin S = \frac{8}{17}$

$S = \sin^{-1}\frac{8}{17}$

$S \approx 28°4'$

PTS: 2 REF: 061311a2 STA: A2.A.55 TOP: Trigonometric Ratios

258 ANS: 2 PTS: 2 REF: 081010a2 STA: A2.A.55
TOP: Trigonometric Ratios

259 ANS: 1

$\sqrt{12^2 - 6^2} = \sqrt{108} = \sqrt{36}\sqrt{3} = 6\sqrt{3}$. $\cot J = \frac{A}{O} = \frac{6}{6\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

PTS: 2 REF: 011120a2 STA: A2.A.55 TOP: Trigonometric Ratios

260 ANS: 2 PTS: 2 REF: 011315a2 STA: A2.A.55
TOP: Trigonometric Ratios

261 ANS: 3

$2\pi \cdot \frac{5}{12} = \frac{10\pi}{12} = \frac{5\pi}{6}$

PTS: 2 REF: 061125a2 STA: A2.M.1 TOP: Radian Measure

262 ANS: 1

$-420\left(\frac{\pi}{180}\right) = -\frac{7\pi}{3}$

PTS: 2 REF: 081002a2 STA: A2.M.2 TOP: Radian Measure
KEY: radians

263 ANS: 2

$\frac{11\pi}{12} \cdot \frac{180}{\pi} = 165$

PTS: 2 REF: 061002a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

264 ANS: 1

$2 \cdot \frac{180}{\pi} = \frac{360}{\pi}$

PTS: 2 REF: 011220a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

265 ANS: 2

$\frac{8\pi}{5} \cdot \frac{180}{\pi} = 288$

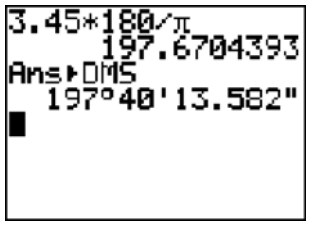
PTS: 2 REF: 061302a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

266 ANS:

$216\left(\frac{\pi}{180}\right) \approx 3.8$

PTS: 2 REF: 061232a2 STA: A2.M.2 TOP: Radian Measure
KEY: radians

267 ANS:



197º40'. $3.45 \times \frac{180}{\pi} \approx 197°40'$.

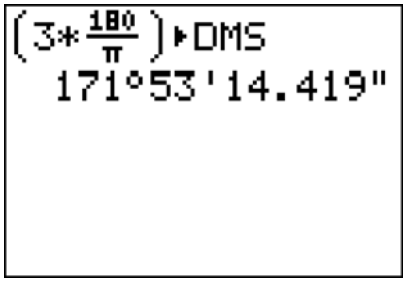
PTS: 2 REF: fall0931a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

268 ANS:

$2.5 \cdot \frac{180}{\pi} \approx 143.2°$

PTS: 2 REF: 011129a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

269 ANS:



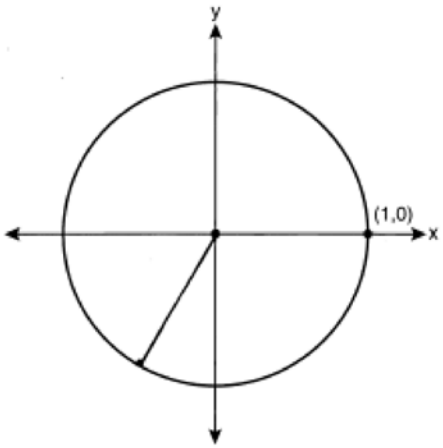
$3 \times \frac{180}{\pi} \approx 171.89° \approx 171°53'$.

PTS: 2 REF: 011335a2 STA: A2.M.2 TOP: Radian Measure
KEY: degrees

270 ANS: 4 PTS: 2 REF: 081005a2 STA: A2.A.60
TOP: Unit Circle

271 ANS: 4 PTS: 2 REF: 061206a2 STA: A2.A.60
TOP: Unit Circle

272 ANS:



$-\frac{\sqrt{3}}{2}$

PTS: 2 REF: 061033a2 STA: A2.A.60 TOP: Unit Circle

273 ANS: 3

If $\csc P > 0$, $\sin P > 0$. If $\cot P < 0$ and $\sin P > 0$, $\cos P < 0$

PTS: 2 REF: 061320a2 STA: A2.A.60 TOP: Finding the Terminal Side of an Angle

274 ANS: 4 PTS: 1 REF: 011312a2 STA: A2.A.56

TOP: Determining Trigonometric Functions KEY: degrees, common angles

275 ANS:

$\frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2} = \frac{\sqrt{6}}{4}$

PTS: 2 REF: 061331a2 STA: A2.A.56 TOP: Determining Trigonometric Functions

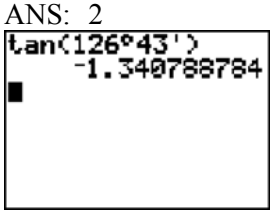
KEY: degrees, common angles

276 ANS:

$\frac{\sqrt{13}}{2}$. $\sin\theta = \frac{y}{\sqrt{x^2+y^2}} = \frac{2}{\sqrt{(-3)^2+2^2}} = \frac{2}{\sqrt{13}}$. $\csc\theta = \frac{\sqrt{13}}{2}$.

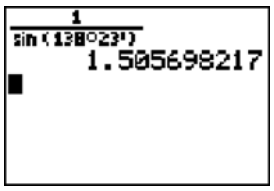
PTS: 2 REF: fall0933a2 STA: A2.A.62 TOP: Determining Trigonometric Functions

277 ANS: 2



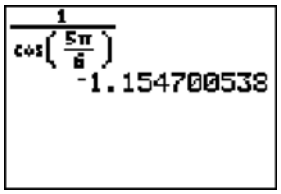
PTS: 2 REF: 061115a2 STA: A2.A.66 TOP: Determining Trigonometric Functions

278 ANS: 4



PTS: 2 REF: 061217a2 STA: A2.A.66 TOP: Determining Trigonometric Functions

279 ANS: 1



PTS: 2 REF: 011203a2 STA: A2.A.66 TOP: Determining Trigonometric Functions

280 ANS: 3 PTS: 2 REF: 081007a2 STA: A2.A.64
TOP: Using Inverse Trigonometric Functions KEY: basic

281 ANS: 1 PTS: 2 REF: 011112a2 STA: A2.A.64
TOP: Using Inverse Trigonometric Functions KEY: advanced

282 ANS: 2

$\tan 30 = \frac{\sqrt{3}}{3}$. $\text{Arc}\cos\frac{\sqrt{3}}{k} = 30$

$\frac{\sqrt{3}}{k} = \cos 30$

$k = 2$

PTS: 2 REF: 061323a2 STA: A2.A.64 TOP: Using Inverse Trigonometric Functions
KEY: advanced

283 ANS: 3 PTS: 2 REF: 011104a2 STA: A2.A.64
TOP: Using Inverse Trigonometric Functions KEY: unit circle

284 ANS: 2

$\cos(-305° + 360°) = \cos(55°)$

PTS: 2 REF: 061104a2 STA: A2.A.57 TOP: Reference Angles

285 ANS: 4

$s = \theta r = 2 \cdot 4 = 8$

PTS: 2 REF: fall0922a2 STA: A2.A.61 TOP: Arc Length
KEY: arc length

286 ANS: 3

$s = \theta r = \frac{2\pi}{8} \cdot 6 = \frac{3\pi}{2}$

PTS: 2 REF: 061212a2 STA: A2.A.61 TOP: Arc Length
KEY: arc length

287 ANS: 3
Cofunctions tangent and cotangent are complementary

PTS: 2 REF: 061014a2 STA: A2.A.58 TOP: Cofunction Trigonometric Relationships

288 ANS: 3

$$\frac{\sin^2\theta+\cos^2\theta}{1-\sin^2\theta}=\frac{1}{\cos^2\theta}=\sec^2\theta$$

PTS: 2 REF: 061123a2 STA: A2.A.58 TOP: Reciprocal Trigonometric Relationships

289 ANS:

$$\cos\theta\cdot\frac{1}{\cos\theta}-\cos^2\theta=1-\cos^2\theta=\sin^2\theta$$

PTS: 2 REF: 061230a2 STA: A2.A.58 TOP: Reciprocal Trigonometric Relationships

290 ANS:

$$\frac{\cot x\sin x}{\sec x}=\frac{\frac{\cos x}{\sin x}\sin x}{\frac{1}{\cos x}}=\cos^2 x$$

PTS: 2 REF: 061334a2 STA: A2.A.58 TOP: Reciprocal Trigonometric Relationships

291 ANS:

$$a+15+2a=90$$
$$3a+15=90$$
$$3a=75$$
$$a=25$$

PTS: 2 REF: 011330a2 STA: A2.A.58 TOP: Cofunction Trigonometric Relationships

292 ANS:

$\frac{2\sqrt{3}}{3}$. If $\sin 60=\frac{\sqrt{3}}{2}$, then $\csc 60=\frac{2}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\frac{2\sqrt{3}}{3}$

PTS: 2 REF: 011235a2 STA: A2.A.59 TOP: Reciprocal Trigonometric Relationships

293 ANS: 2 PTS: 2 REF: 011208a2 STA: A2.A.67
TOP: Proving Trigonometric Identities

294 ANS:

$$\frac{\sin^2 A}{\cos^2 A}+\frac{\cos^2 A}{\cos^2 A}=\frac{1}{\cos^2 A}$$
$$\tan^2 A+1=\sec^2 A$$

PTS: 2 REF: 011135a2 STA: A2.A.67 TOP: Proving Trigonometric Identities

295 ANS: 3 PTS: 2 REF: fall0910a2 STA: A2.A.76
TOP: Angle Sum and Difference Identities KEY: simplifying

296 ANS: 1

$$\cos(A-B)=\left(\frac{5}{13}\right)\left(-\frac{3}{5}\right)+\left(\frac{12}{13}\right)\left(\frac{4}{5}\right)=-\frac{15}{65}+\frac{48}{65}=\frac{33}{65}$$

PTS: 2 REF: 011214a2 STA: A2.A.76 TOP: Angle Sum and Difference Identities
KEY: evaluating

297 ANS:

$\frac{23}{2}$

$$\cos^2 B+\sin^2 B=1 \qquad \tan B=\frac{\sin B}{\cos B}=\frac{\frac{5}{\sqrt{41}}}{\frac{4}{\sqrt{41}}}=\frac{5}{4}$$

$$\cos^2 B+\left(\frac{5}{\sqrt{41}}\right)^2=1$$

$$\cos^2 B+\frac{25}{41}=\frac{41}{41}$$

$$\cos^2 B=\frac{16}{41}$$

$$\cos B=\frac{4}{\sqrt{41}}$$

$$\tan(A+B)=\frac{\frac{2}{3}+\frac{5}{4}}{1-\left(\frac{2}{3}\right)\left(\frac{5}{4}\right)}=\frac{\frac{8+15}{12}}{\frac{12}{12}-\frac{10}{12}}=\frac{\frac{23}{12}}{\frac{2}{12}}=\frac{23}{2}$$

PTS: 4 REF: 081037a2 STA: A2.A.76 TOP: Angle Sum and Difference Identities
KEY: evaluating

298 ANS:

$$\sin(45+30)=\sin 45\cos 30+\cos 45\sin 30$$

$$=\frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2}+\frac{\sqrt{2}}{2}\cdot\frac{1}{2}=\frac{\sqrt{6}}{4}+\frac{\sqrt{2}}{4}=\frac{\sqrt{6}+\sqrt{2}}{4}$$

PTS: 4 REF: 061136a2 STA: A2.A.76 TOP: Angle Sum and Difference Identities
KEY: evaluating

299 ANS: 1

$$\sin(180+x)=(\sin 180)(\cos x)+(\cos 180)(\sin x)=0+(-\sin x)=-\sin x$$

PTS: 2 REF: 011318a2 STA: A2.A.76 TOP: Angle Sum and Difference Identities
KEY: identities

300 ANS: 4

$$\sin(\theta+90)=\sin\theta\cdot\cos 90+\cos\theta\cdot\sin 90=\sin\theta\cdot(0)+\cos\theta\cdot(1)=\cos\theta$$

PTS: 2 REF: 061309a2 STA: A2.A.76 TOP: Angle Sum and Difference Identities
KEY: identities

301 ANS: 1

$\cos^2\theta - \cos 2\theta = \cos^2\theta - (\cos^2\theta - \sin^2\theta) = \sin^2\theta$

PTS: 2 REF: 061024a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: simplifying

302 ANS: 3

$\left(\frac{2}{3}\right)^2 + \cos^2 A = 1$

$\cos^2 A = \frac{5}{9}$

$\cos A = +\frac{\sqrt{5}}{3}$, sin A is acute.

$\sin 2A = 2\sin A\cos A$

$= 2\left(\frac{2}{3}\right)\left(\frac{\sqrt{5}}{3}\right)$

$= \frac{4\sqrt{5}}{9}$

PTS: 2 REF: 011107a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating

303 ANS: 4

$\cos 2A = 1 - 2\sin^2 A = 1 - 2\left(\frac{1}{3}\right)^2 = 1 - \frac{2}{9} = \frac{7}{9}$

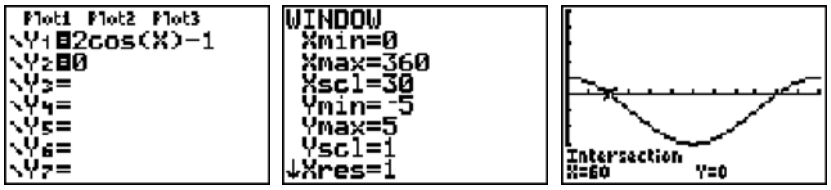
PTS: 2 REF: 011311a2 STA: A2.A.77 TOP: Double Angle Identities
KEY: evaluating

304 ANS: 1

If $\sin x = 0.8$, then $\cos x = 0.6$. $\tan\frac{1}{2}x = \sqrt{\frac{1-0.6}{1+0.6}} = \sqrt{\frac{0.4}{1.6}} = 0.5$.

PTS: 2 REF: 061220a2 STA: A2.A.77 TOP: Half Angle Identities

305 ANS: 4



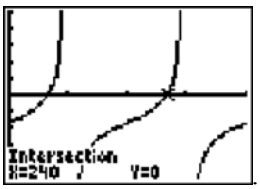
$2\cos\theta = 1$

$\cos\theta = \frac{1}{2}$

$\theta = \cos^{-1}\frac{1}{2} = 60, 300$

PTS: 2 REF: 061203a2 STA: A2.A.68 TOP: Trigonometric Equations
KEY: basic

306 ANS: 1



$\tan\theta - \sqrt{3} = 0$.

$\tan\theta = \sqrt{3}$

$\theta = \tan^{-1}\sqrt{3}$

$\theta = 60, 240$

PTS: 2 REF: fall0903a2 STA: A2.A.68 TOP: Trigonometric Equations
KEY: basic

307 ANS: 3

$-\sqrt{2}\sec x = 2$

$\sec x = -\frac{2}{\sqrt{2}}$

$\cos x = -\frac{\sqrt{2}}{2}$

$x = 135, 225$

PTS: 2 REF: 011322a2 STA: A2.A.68 TOP: Trigonometric Equations
KEY: reciprocal functions

308 ANS:

45, 225 $2\tan C - 3 = 3\tan C - 4$

$1 = \tan C$

$\tan^{-1} 1 = C$

$C = 45, 225$

PTS: 2 REF: 081032a2 STA: A2.A.68 TOP: Trigonometric Equations
KEY: basic

309 ANS:

$5\csc\theta = 8$

$\csc\theta = \frac{8}{5}$

$\sin\theta = \frac{5}{8}$

$\theta \approx 141$

PTS: 2 REF: 061332a2 STA: A2.A.68 TOP: Trigonometric Equations
KEY: reciprocal functions

310 ANS:
0, 60, 180, 300.

$$\sin 2\theta = \sin\theta$$
$$\sin 2\theta - \sin\theta = 0$$
$$2\sin\theta\cos\theta - \sin\theta = 0$$
$$\sin\theta(2\cos\theta - 1) = 0$$
$$\sin\theta = 0 \quad 2\cos\theta - 1 = 0$$
$$\theta = 0, 180 \quad \cos\theta = \frac{1}{2}$$
$$\theta = 60, 300$$

PTS: 4 REF: 061037a2 STA: A2.A.68 TOP: Trigonometric Equations
KEY: double angle identities

311 ANS: 2

$$\frac{2\pi}{b} = \frac{2\pi}{3}$$

PTS: 2 REF: 061111a2 STA: A2.A.69
TOP: Properties of Graphs of Trigonometric Functions KEY: period

312 ANS: 4

$$\frac{2\pi}{b} = \frac{2\pi}{\frac{1}{3}} = 6\pi$$

PTS: 2 REF: 061027a2 STA: A2.A.69
TOP: Properties of Graphs of Trigonometric Functions KEY: period

313 ANS: 1 PTS: 2 REF: 011320a2 STA: A2.A.72
TOP: Identifying the Equation of a Trigonometric Graph

314 ANS: 3 PTS: 2 REF: 061306a2 STA: A2.A.72
TOP: Identifying the Equation of a Trigonometric Graph

315 ANS: 4

$$\frac{2\pi}{b} = 30$$

$$b = \frac{\pi}{15}$$

PTS: 2 REF: 011227a2 STA: A2.A.72
TOP: Identifying the Equation of a Trigonometric Graph

316 ANS:
$y = -3\sin 2x$. The period of the function is π, the amplitude is 3 and it is reflected over the x-axis.

PTS: 2 REF: 061235a2 STA: A2.A.72
TOP: Identifying the Equation of a Trigonometric Graph

317 ANS: 3 PTS: 2 REF: 061119a2 STA: A2.A.65
TOP: Graphing Trigonometric Functions

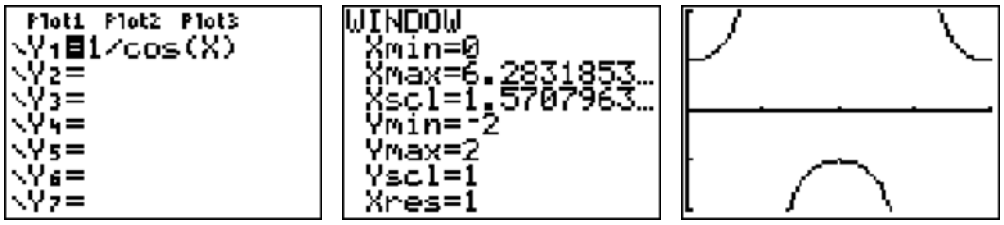
318 ANS: 3 PTS: 2 REF: fall0913a2 STA: A2.A.65
TOP: Graphing Trigonometric Functions

319 ANS: 3

$$\text{period} = \frac{2\pi}{b} = \frac{2\pi}{3\pi} = \frac{2}{3}$$

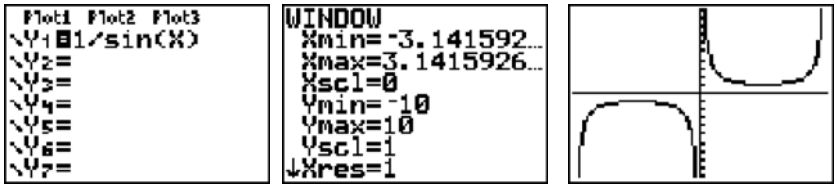
PTS: 2 REF: 081026a2 STA: A2.A.70 TOP: Graphing Trigonometric Functions
KEY: recognize

320 ANS: 3



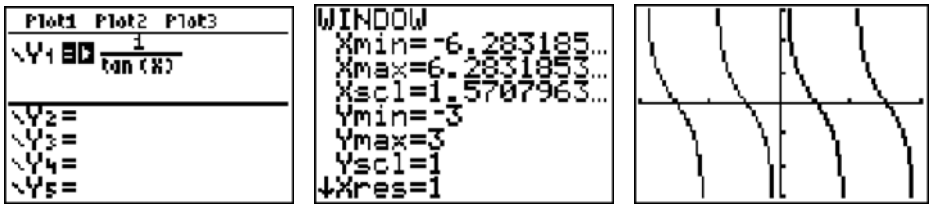
PTS: 2 REF: 061020a2 STA: A2.A.71 TOP: Graphing Trigonometric Functions

321 ANS: 1



PTS: 2 REF: 011123a2 STA: A2.A.71 TOP: Graphing Trigonometric Functions

322 ANS: 3



PTS: 2 REF: 011207a2 STA: A2.A.71 TOP: Graphing Trigonometric Functions

323 ANS: 3 PTS: 2 REF: 061224a2 STA: A2.A.63
TOP: Domain and Range

324 ANS: 3 PTS: 2 REF: 061022a2 STA: A2.A.63
TOP: Domain and Range

325 ANS: 2

$$K = \frac{1}{2}(10)(18)\sin 120 = 45\sqrt{3} \approx 78$$

PTS: 2 REF: fall0907a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

326 ANS:

$\frac{15}{\sin 103} = \frac{a}{\sin 42}$. $\frac{1}{2}(15)(10.3)\sin 35 \approx 44$

$a \approx 10.3$

PTS: 4 REF: 061337a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: advanced

327 ANS: 3

$42 = \frac{1}{2}(a)(8)\sin 61$

$42 \approx 3.5a$

$12 \approx a$

PTS: 2 REF: 011316a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

328 ANS: 1

$\frac{1}{2}(7.4)(3.8)\sin 126 \approx 11.4$

PTS: 2 REF: 011218a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: basic

329 ANS: 3

$K = (10)(18)\sin 46 \approx 129$

PTS: 2 REF: 081021a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: parallelograms

330 ANS:

$K = ab\sin C = 24 \cdot 30\sin 57 \approx 604$

PTS: 2 REF: 061034a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: parallelograms

331 ANS:

$K = ab\sin C = 18 \cdot 22\sin 60 = 396\frac{\sqrt{3}}{2} = 198\sqrt{3}$

PTS: 2 REF: 061234a2 STA: A2.A.74 TOP: Using Trigonometry to Find Area
KEY: Parallelograms

332 ANS: 2 PTS: 2 REF: 061322a2 STA: A2.A.73
TOP: Law of Sines KEY: side, without calculator

333 ANS:

88. $\frac{100}{\sin 33} = \frac{x}{\sin 32}$. $\sin 66 \approx \frac{T}{97.3}$

$x \approx 97.3$ $t \approx 88$

PTS: 4 REF: 011236a2 STA: A2.A.73 TOP: Law of Sines
KEY: advanced

334 ANS:

$\frac{100}{\sin 32} = \frac{b}{\sin 105}$. $\frac{100}{\sin 32} = \frac{a}{\sin 43}$

$b \approx 182.3$ $a \approx 128.7$

PTS: 4 REF: 011338a2 STA: A2.A.73 TOP: Law of Sines
KEY: basic

335 ANS:

$\frac{12}{\sin 32} = \frac{10}{\sin B}$. $C \approx 180 - (32 + 26.2) \approx 121.8$. $\frac{12}{\sin 32} = \frac{c}{\sin 121.8}$

$B = \sin^{-1} \frac{10 \sin 32}{12} \approx 26.2$ $c = \frac{12 \sin 121.8}{\sin 32} \approx 19.2$

PTS: 4 REF: 011137a2 STA: A2.A.73 TOP: Law of Sines
KEY: basic

336 ANS: 3

$\frac{59.2}{\sin 74} = \frac{60.3}{\sin C}$ $180 - 78.3 = 101.7$

$C \approx 78.3$

PTS: 2 REF: 081006a2 STA: A2.A.75 TOP: Law of Sines - The Ambiguous Case

337 ANS: 2

$\frac{10}{\sin 35} = \frac{13}{\sin B}$. $35 + 48 < 180$

$B \approx 48, 132$ $35 + 132 < 180$

PTS: 2 REF: 011113a2 STA: A2.A.75 TOP: Law of Sines - The Ambiguous Case

338 ANS: 1

$\frac{9}{\sin A} = \frac{10}{\sin 70}$. $58° + 70°$ is possible. $122° + 70°$ is not possible.

$A = 58$

PTS: 2 REF: 011210a2 STA: A2.A.75 TOP: Law of Sines - The Ambiguous Case

339 ANS: 1

$\frac{6}{\sin 35} = \frac{10}{\sin N}$

$N \approx 73$

$73 + 35 < 180$

$(180 - 73) + 35 < 180$

PTS: 2 REF: 061226a2 STA: A2.A.75 TOP: Law of Sines - The Ambiguous Case

340 ANS: 4

$\frac{13}{\sin 40} = \frac{20}{\sin M}$. $81 + 40 < 180$. $(180 - 81) + 40 < 180$

$M \approx 81$

PTS: 2 REF: 061327a2 STA: A2.A.75 TOP: Law of Sines - The Ambiguous Case

341 ANS: 1

$13^2 = 15^2 + 14^2 - 2(15)(14)\cos C$

$169 = 421 - 420\cos C$

$-252 = -420\cos C$

$\frac{252}{420} = \cos C$

$53 \approx C$

PTS: 2 REF: 061110a2 STA: A2.A.73 TOP: Law of Cosines
KEY: find angle

342 ANS: 4

$7^2 = 3^2 + 5^2 - 2(3)(5)\cos A$

$49 = 34 - 30\cos A$

$15 = -30\cos A$

$-\frac{1}{2} = \cos A$

$120 = \cos A$

PTS: 2 REF: 081017a2 STA: A2.A.73 TOP: Law of Cosines
KEY: angle, without calculator

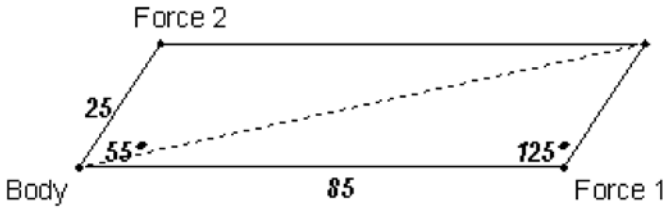
343 ANS:

33. $a = \sqrt{10^2 + 6^2 - 2(10)(6)\cos 80} \approx 10.7$. $\angle C$ is opposite the shortest side. $\frac{6}{\sin C} = \frac{10.7}{\sin 80}$

$C \approx 33$

PTS: 6 REF: 061039a2 STA: A2.A.73 TOP: Law of Cosines
KEY: advanced

344 ANS:



101.43, 12. $r^2 = 25^2 + 85^2 - 2(25)(85)\cos 125.$

$r^2 \approx 10287.7$

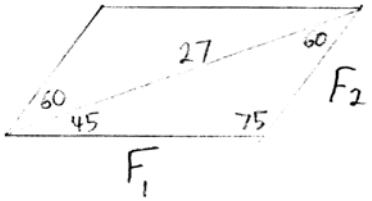
$r \approx 101.43$

$\frac{2.5}{\sin x} = \frac{101.43}{\sin 125}$

$x \approx 12$

PTS: 6 REF: fall0939a2 STA: A2.A.73 TOP: Vectors

345 ANS:



$\frac{27}{\sin 75} = \frac{F_1}{\sin 60}$. $\frac{27}{\sin 75} = \frac{F_2}{\sin 45}$.

$F_1 \approx 24$ $F_1 \approx 20$

PTS: 4 REF: 061238a2 STA: A2.A.73 TOP: Vectors

346 ANS: 2

$x^2 - 2x + y^2 + 6y = -3$

$x^2 - 2x + 1 + y^2 + 6y + 9 = -3 + 1 + 9$

$(x-1)^2 + (y+3)^2 = 7$

PTS: 2 REF: 061016a2 STA: A2.A.47 TOP: Equations of Circles

347 ANS:

$r = \sqrt{2^2 + 3^2} = \sqrt{13}$. $(x+5)^2 + (y-2)^2 = 13$

PTS: 2 REF: 011234a2 STA: A2.A.49 TOP: Writing Equations of Circles

348 ANS: 2 PTS: 2 REF: 011126a2 STA: A2.A.49
TOP: Equations of Circles

349 ANS: 4 PTS: 2 REF: 061318a2 STA: A2.A.49
TOP: Equations of Circles

350 ANS:

$(x+3)^2 + (y-4)^2 = 25$

PTS: 2 REF: fall0929a2 STA: A2.A.49 TOP: Writing Equations of Circles

351 ANS:
$(x+5)^2+(y-3)^2=32$

PTS: 2 REF: 081033a2 STA: A2.A.49 TOP: Writing Equations of Circles