Algebra 2 - Midterm Exam Review

The Algebra 2 Midterm Exam must be taken by ALL Algebra 2 students.

An exemption pass may be used to exempt the score for the Algebra 2 Midterm Exam. It should be presented to your teacher prior to taking the exam.

The Algebra 2 Midterm Exam will consist of 30 multiple choice questions. And it will be worth 100 Assessment points.

You will not be allowed to write on the test. A scantron will be used to record your answer choices. (So, bring a pencil on exam day.)

The review is a good indicator of what you should study for the exam. It is comprehensive and will cover Units 1, 2, 3, and 4.

1. In the first year, the tuition at a local college is $3000. If the tuition increases by $200, how much will tuition be in the tenth year?

2. In a geometric sequence where $a_1 = 1$ and $a_5 = 256$, what is the the first term in the sequence that is a multiple of 16?

3. A career advisor tells Jamal that a financial consultant earns $41000 for the first year, and there is a 3.5% annual pay raise. If Jamal takes a job as a financial consultant, what will be his highest annual salary after working for a total of 25 years. Round answer to the nearest dollar.

4. J'Quitta is starting a new workout program. Each day she will complete 2 more sit-ups than the day before. If she starts with 20 sit-ups on the first day, how many sit-ups will she do on the 12th day.

5. Find the 90th term of the following arithmetic sequence: $-6, -2, 2, 6, ...$

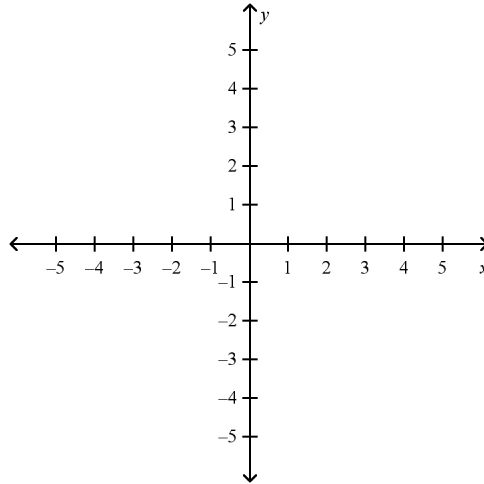6. Given an arithmetic sequence in which $a_1 = 2$, $a_5 = 18$, and $a_n = 142$, what is n?

7. Graph the following system of inequalities. Describe the solution set.
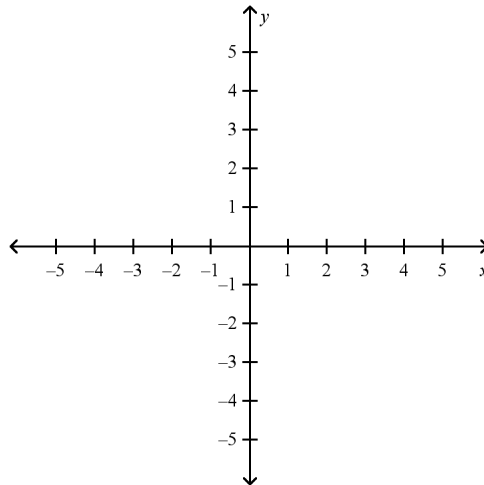
$$-2x + 4y \le 12$$
$$4x - 2y < -4$$

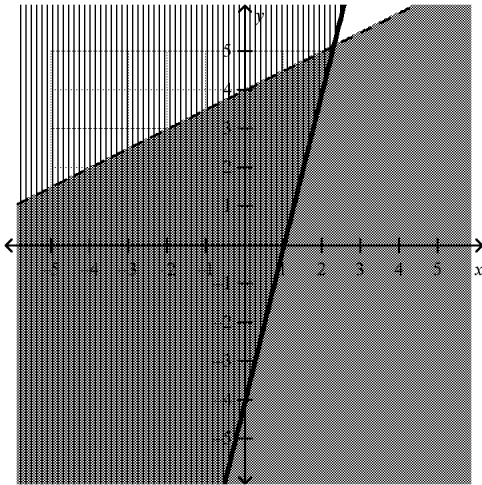8. Graph the following system of inequalities. Describe the solution set.

$$y \le x$$
$$y \ge -6$$
$$y \le -2x + 3$$

9. Which system of inequalities describes this graph?

10. If A is a 5 x 7 matrix, B is a 6 x 8 matrix, and C is a 7 x 6 matrix, what are the dimensions of A x C x B?

11. Antebella has investments in Funds A, B, and C. Each fund invests money in both stocks and bonds. The matrices show the dollar amounts invested in each fund and the annual yields. Use this information to determine how many dollars Fund B will earn in one year.

$$
\begin{array}{c} \\ A \\ B \\ C \end{array}
\begin{array}{cc} Stocks & Bonds \\ \left[\begin{array}{cc} \$24000 & \$18000 \\ \$16000 & \$16000 \\ \$17000 & \$19000 \end{array}\right] \end{array}
\qquad
\begin{array}{c} Annual\ Yield \\ \begin{array}{c} Stocks \\ Bonds \end{array} \left[\begin{array}{c} 0.02 \\ 0.04 \end{array}\right] \end{array}
$$

12. Determine the axis of symmetry for the given equation: $y = 6(x - 1)^2 - 3$

13. Given the equation: $y = -3(x + 2)^2 - 4$. Write as many true statements as you can about the given equation.

14. Determine the vertex for the given quadratic function: $y = -2x^2 + 12x - 2$

15. Write a quadratic function that has the vertex $(3, 29)$

16. Evaluate $\displaystyle\sum_{n=1}^{5} (n - 3)$.

Solve the compound inequality. Graph the solution set.

17. $7x - 5 < -19$ or $10x + 6 > 36$

18. $-2 \le 2x - 4 < 4$

Solve the inequality. Graph the solution.

19. $|4x + 4| \ge 28$

Which ordered triple satisfies the following system?

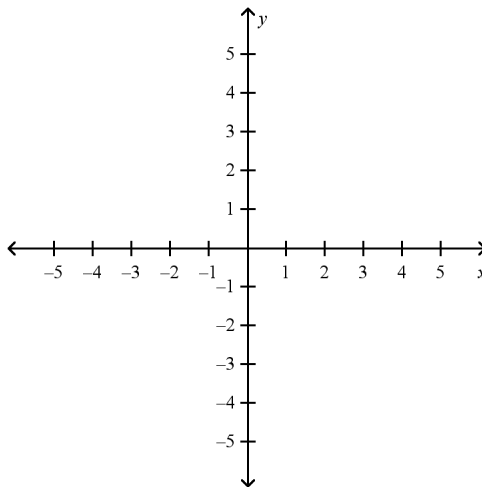20. $\begin{cases} -x + y - 2z = 4 \\ 4x + 3y - 5z = 3 \\ -4x + 4y + 3z = -6 \end{cases}$

Determine the value of y in the following system of equations.

21. $\begin{cases} -3x - 3y - z = 3 \\ -2x - 3y - 2z = -10 \\ -2x - 2y - 2z = -6 \end{cases}$

Graph the system of constraints and find the value of x and y that maximize the objective function.

22.

$$\text{Constraints} \begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq \dfrac{1}{5}x + 2 \\ 5 \leq y + x \end{cases}$$

Objective function: $C(x,y) = 6x - 2y$

Find the sum of the given matrices.

23. $\begin{bmatrix} -4 & -1 & 7 \\ 0 & -2 & 2 \end{bmatrix} + \begin{bmatrix} -2 & 0 & -5 \\ -1 & 5 & -1 \end{bmatrix}$

Find the product.

24. $\begin{bmatrix} -9 & -9 & -8 \end{bmatrix} \begin{bmatrix} 9 \\ -6 \\ -3 \end{bmatrix}$

Evaluate the determinant.

25. $\begin{vmatrix} -1 & 3 \\ -5 & 3 \end{vmatrix}$

Does the given matrix, A, have an inverse? If it does, what is A^{-1}?

26. $A = \begin{bmatrix} 3 & 14 \\ 2 & 9 \end{bmatrix}$

What is the expression in factored form?
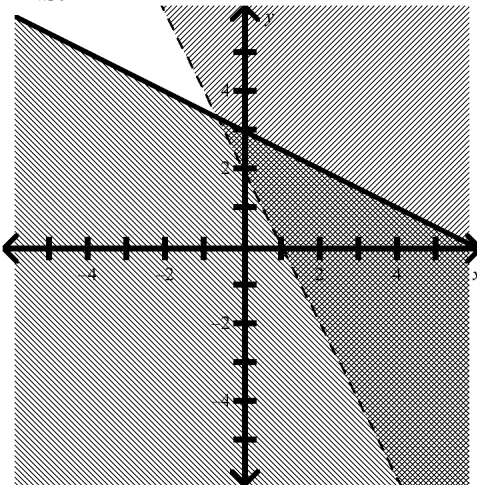
27. $20x^2 + 8x$

28. $-5x^2 + 10x + 75$

29. $x^2 - 9x + 18$
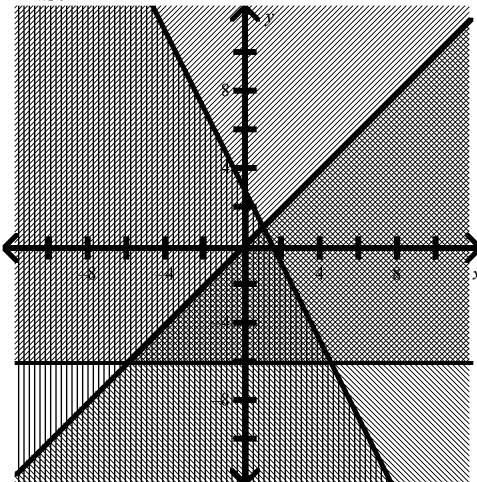
30. $25x^2 - 4$

Algebra 2 - Midterm Exam Review
Answer Section

SHORT ANSWER

1. ANS:
   $4800

2. ANS:
   $a_3 = 16$

3. ANS:
   $93616

4. ANS:
   42

5. ANS:
   350

6. ANS:
   36

7. ANS:

8. ANS:

9. ANS:
   $y < 0.5x + 4$
   $y \geq 4x - 4$
10. ANS:
    5 x 8
11. ANS:
    $960
12. ANS:
    $x = 1$
13. ANS:
    The graph of the function has a minimum value of −4.
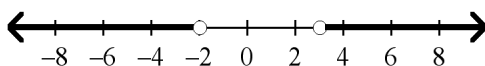14. ANS:
    (3, 16)
15. ANS:
    $y = -(x - 3)^2 + 29$
16. ANS:
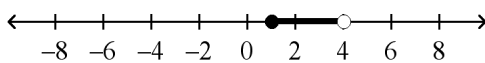   0

    OBJ: 9-4.1 To define arithmetic series and find their sums
17. ANS:

    OBJ: 1-4.2 Compound Inequalities
18. ANS:

    OBJ: 1-4.2 Compound Inequalities
19. ANS:
    $\{ x \mid x \leq -8 \text{ or } x \geq 6 \}$

    OBJ: 1-5.2 Absolute Value Inequalities
20. ANS:
    $(-1, -1, -2)$

    OBJ: 3-5.1 To solve systems in three variables using elimination
21. ANS:
    4

    OBJ: 3-6.1 Solving Three-Variable Systems by Elimination

22. ANS:
(5,0)

OBJ: 3-4.1 To solve problems using linear programming
23. ANS:
$$\begin{bmatrix} -6 & -1 & 2 \\ -1 & 3 & 1 \end{bmatrix}$$

OBJ: 4-2.1 Adding and Subtracting Matrices
24. ANS:
$[-3]$

OBJ: 4-3.2 Multiplying Matrices
25. ANS:
12

OBJ: 4-5.1 Evaluating Determinants of 2 x 2 Matrices
26. ANS:
$$\begin{bmatrix} -9 & 14 \\ 2 & -3 \end{bmatrix}$$

OBJ: 12-3.1 To find the inverse of a matrix
27. ANS:
$4x(5x+2)$

OBJ: 4-4.1 To find common and binomial factors of quadratic expressions
28. ANS:
$-5(x-5)(x+3)$

OBJ: 4-4.1 To find common and binomial factors of quadratic expressions
29. ANS:
$(x-6)(x-3)$

OBJ: 4-4.1 To find common and binomial factors of quadratic expressions
30. ANS:
$(5x+2)(5x-2)$

OBJ: 4-4.2 To factor special quadratic expressions

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