## 2011-

## Algebra 1 Placement Exam Study Guide

First Edition

This is a study guide to help you strengthen the skills tested on the Algebra 1 Placement Exam. The Algebra 1 Placement Exam is a district developed test based on the State's 8th grade TEKS.


## ALGEBRA 1 PLACEMENT EXAM

## What Is The Algebra 1 Placement Exam Study Guide?

This is a study guide to help you strengthen the skills tested on the Algebra 1 Placement Exam. The Algebra 1 Placement Exam is a district developed test based on the State's 8th grade TEKS.

The Algebra 1 Placement Exam is a timed test administered online. It is designed to provide an accurate measure of Algebra 1 readiness in Grand Prairie schools. Research supports the claim that by mastering skills and concepts taught in the $8^{\text {th }}$ grade, you will be better prepared to succeed on this placement exam and in the Algebra 1 course during the next school year. As a result of these findings, the Algebra 1 Placement Exam will be based on critical $8^{\text {th }}$ grade concepts.

This study guide covers a sample of mathematics problems that are similar to the ones used on the Algebra 1 Placement Exam. It may be helpful to use TAKS study guides to help with the explanation of concepts. Interactive online and print versions of TAKS study guides can be found at the following web address:
http://perspective.pearsonaccess.com/perspective/appmanager/tx/family/

## How Is This Study Guide Organized?

This study guide is divided into the five categories tested on Algebra 1 Placement Exam. Each category comes from the (NCTM) National Standards Mathematics Content and corresponds to a TAKS Objective. The specific goals for the categories were provided by the Texas Essential Knowledge and Skills (TEKS).

## NCTM Standards

- Number and Operation
- Patterns, Functions, and Algebra
- Geometry
- Measurement
- Data Analysis, Statistics, and Probability


## Corresponding TAKS Objectives

- Objective 1: The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.
- Objective 2: The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.
- Objective 3: The student will demonstrate an understanding of geometry and spatial reasoning.
- Objective 4: The student will demonstrate an understanding of the concepts and uses of measurement.
- Objective 5: The student will demonstrate an understanding of probability and statistics.


## Algebra 1 Placement Exam Blueprint

The Algebra Placement Exam will consist of 5 mini assessments with 6-10 questions each. The exam will assess five categories for a total of 40 questions.

| Tested Category | Number of <br> Questions | Automatic <br> Qualification | Conditional <br> Qualification |
| :--- | :---: | :---: | :---: |
| Number and Operation <br> (TEKS) $8.1 A, 8.1 B, 8.1 D, 8.2 B, 8.2 D$ | $\mathbf{1 0}$ | $\geq 90 \%$ | $\geq 80 \%$ |

## Category 1: Number and Operation

1. A league of five soccer teams has numerous games postponed because of bad weather. On 1 February, the teams are $42 \%, \frac{1}{3}, \frac{2}{7}, 61 \%$, and $\frac{3}{5}$ of the way through their scheduled games. Which list shows the completion rates in order from least to greatest?
a) $\frac{2}{7}, \frac{1}{3}, 42 \%, \frac{3}{5}, 60 \%$
b) $\frac{1}{3}, \frac{2}{7}, 42 \%, \frac{3}{5}, 60 \%$
c) $\frac{1}{3}, \frac{2}{7}, \frac{3}{5}, 42 \%, 60 \%$
d) $\frac{2}{7}, \frac{1}{3}, \frac{3}{5}, 42 \%, 60 \%$
2. The local cable company carries $25 \%$ movie channels, $14 \%$ educational channels, $20 \%$ sports channels, and $41 \%$ family channels. If Katelyn randomly turns on a channel, which equation below can be used to determine the probability of Katelyn's channel being a sports channel, $x$, out of the 170 channels that the cable company carries?
a) $\frac{x}{170}=\frac{20}{100}$
b) $\frac{x}{100}=\frac{20}{170}$
c) $\frac{170}{100}=\frac{20}{x}$
d) $\frac{20}{100}=\frac{170}{x}$
3. The sun is approximately $93,000,000$ miles away from the earth. How is this number of miles correctly expressed in scientific notation?
a) $9.3 \times 10^{7}$
b) $9.3 \times 10^{6}$
c) $93 \times 10^{6}$
d) $93 \times 10^{7}$
4. A recipe for 12 cookies calls for $1 \frac{1}{3}$ cups of milk, $2 \frac{1}{2}$ cups of flour, and $1 \frac{3}{4}$ cups of other ingredients. How many total cups of milk, flour, and other ingredients are needed to make 24 cookies?
a) $10 \frac{1}{6}$ cups
b) $11 \frac{1}{6}$ cups
c) $11 \frac{2}{5}$ cups
d) $10 \frac{2}{5}$ cups
5. Which equation can be used to find $h$, the number of hours in $d$ days?
a) $h=24 d$
b) $h=d+24$
c) $h=d \div 24$
d) $h=24-d$

## Category 2: Patterns, Functions, \& Algebra

6. Jeremy runs a steel mill. To make a certain steel, 3 lbs of titanium is alloyed with 150 lbs of iron. If Jeremy wants to make that same steel using 4.3 tons of titanium, which equation can he use to find the number of tons of iron he must procure?
a) $\frac{4.3}{150}=\frac{x}{3}$
b) $\frac{3}{4.3}=\frac{x}{150}$
c) $\frac{4.3}{x}=\frac{3}{150}$
d) $\frac{4.3}{x}=\frac{150}{3}$
7. Shaneka pays $\$ 33$ for 22 pounds of peanuts. If the price per pound is the same, how much will Shaneka have to pay in order to buy 15 pounds of peanuts?
a) $\$ 22.50$
b) $\$ 18.00$
c) $\$ 12.50$
d) $\$ 10.00$
8. The graph of the line $y=-\frac{2}{5} x-2$ is drawn on the coordinate grid below.


Which table of ordered pairs contains only points on this line?
a)

| $x$ | $y$ |
| ---: | ---: |
| -5 | 0 |
| 0 | -2 |
| 5 | -4 |
| 10 | -6 |

b)

| $x$ | $y$ |
| ---: | ---: |
| -5 | -4 |
| 0 | -2 |
| 5 | 0 |
| 10 | 2 |

c)

| $x$ | $y$ |
| ---: | ---: |
| -2 | 2 |
| 0 | -2 |
| 2 | -6 |
| 4 | -10 |

d)

| $x$ | $y$ |
| ---: | ---: |
| -2 | -4 |
| 0 | -2 |
| 1 | 0 |
| 2 | 2 |

9. A passenger elevator in the Sears Tower in Chicago can lift people 960 feet in 1 minute and 30 seconds. How fast must the freight elevator be traveling if it lifts cargo the same height but in 2 minutes and 30 seconds? [ $D=r t$ ]
a) 6.4 feet per second
b) 10.7 feet per second
c) 19.2 feet per second
d) 38.4 feet per second
10. In the sequence below, which expression can be used to find the value of the term in the $n$th position?

| Position | Value of Term |
| :---: | :---: |
| 1 | 120 |
| 2 | 60 |
| 3 | 40 |
| 4 | 30 |
| 5 | 24 |
| $n$ | $?$ |

a) $n+19$
b) $12 n$
c) $\frac{120}{n}$
d) $100-20 n$

## Category 3: Geometry

11. A circle with a radius of 6 cm is enlarged to be a circle with a radius of 15 cm . What scale factor was used to dilate the small circle into becoming the larger circle?
a) 0.4
b) 4.5
c) 2.5
d) 9.0
12. If $\triangle A B C$ is translated 4 units to the right and 2 units down, what are the coordinates of point $B^{\prime}$ ?

a) $(5,7)$
b) $(-3,7)$
c) $(5,3)$
d) $(-3,3)$
13. The drawings show the top and front views of a solid figure built with cubes.

Top View

Front View

Which drawing shows a 3-dimensional view of the solid figure represented above?
a)

b)

c)

d)

14. A large pulley on a crane pulls 201 centimeters of cable in 1 full rotation. What is the diameter of the pulley, to the nearest centimeter?
a) 64 cm
b) 32 cm
c) 16 cm
d) 27 cm
15. Which figure best represents a triangle with sides $x, y$, and $z$ in which the relationship $x^{2}+y^{2}=z^{2}$ is always true?
a)

b)

c)

d)

16. Carson's algebra teacher drew a line and shaded part of the coordinate plane.


Which list is made up of coordinate pairs representing points in the shaded part of the coordinate plane?
a) $(3,-4),(-2,5),(6,-3)$
b) $(-3,-4),(6,0),(9,-2)$
c) $(-6,3),(1,6),(-2,1)$
d) $(-3,5),(4,-1),(-5,3)$

## Category 4: Measurement

17. A paint roller has a width of 12 inches and a radius of 3 inches.


To the nearest square inch, what is the surface area that can be painted with one complete rotation of the roller?
a) $226 \mathrm{in}^{2}$
b) $339 \mathrm{in}^{2}$
c) $1,357 \mathrm{in}^{2}$
d) $1,507 \mathrm{in}^{2}$
18. A sponge is in the shape of a cube with sides of 3 inches. What is the best approximation of the surface area of the sponge?
a) 9 square inches
b) 27 square inches
c) 54 square inches
d) 81 square inches
19. Chase has a rectangular garden which is 5 feet wide by 12 feet long. He wants to divide the garden into four sections by running a line of bricks down both diagonals of the garden as shown below.


What is the minimum length of bricks that Chase needs in order to divide his garden?
a) 13 ft
b) 17 ft
c) 26 ft
d) 34 ft
20. Parallelogram $A B C D$ is similar to parallelogram TUVW.


What is the length of $\overline{B C}$ ?
a) 12 units
b) 16 units
c) 19 units
d) 24 units
21. Rectangle STUV is similar to rectangle $L M N O$.


If the area of rectangle STUV is 60 square units, what is the area of rectangle $L M N O$ ?
a) 90 units $^{2}$
b) 135 units $^{2}$
C) 120 units $^{2}$
d) 180 units $^{2}$
22. There are two cubes of different sizes. The large cube's edges are three times longer than the smaller cube's edges. If the volume of the large cube is 1728 cubic feet, what is the volume of the small cube?
a) $576 \mathrm{ft}^{3}$
b) $315 \mathrm{ft}^{3}$
C) $192 \mathrm{ft}^{3}$
d) $64 \mathrm{ft}^{3}$

## Category 5: Data Analysis, Statistics, \& Probability

23. Mrs. Jones tosses a coin four times in her math class. What is the probability that she will get exactly one head and three tails (in any order)?
a) $\frac{1}{16}$
b) $\frac{1}{4}$
C) $\frac{1}{2}$
d) $\frac{3}{4}$
24. A random survey of semiconductor chips coming off of an assembly line shows that 3 out of 500 are defective. If 80,000 chips came off of that assembly line today, what is the best estimate for the number of those chips that are defective?
a) 30
b) 300
c) 480
d) 1250
25. A farmer sold 200 watermelons. He recorded the following data about these watermelons.

Watermelons

| Measure of Data | Weight (pounds) |
| :---: | :---: |
| Range | 13.6 |
| Median | 17.8 |
| Mean | 18.5 |
| Mode | 19.2 |

Which measure of data could be used to calculate the weight of the average watermelon sold?
a) Mode
b) Mean
c) Median
d) Range
26. The scatterplot below shows the weight of Miss Carson's students as a function of their height.


Based on the information in the scatterplot, which statement is a valid conclusion?
a) The average students' height is more than their weight.
b) The average student weighs more than Miss Carson.
c) As the students' height increased, their weight increased.
d) As the students' height increased, their weight decreased.
27. The table below shows the number of students in each grade at Masonville Middle School who participate in various sports.

| Sport | 6th <br> Grade | 7th <br> Grade | 8th <br> Grade |
| :--- | :---: | :---: | :---: |
| Volleyball | 5 | 11 | 14 |
| Football | 23 | 35 | 33 |
| Softball | 11 | 9 | 13 |
| Track | 18 | 15 | 27 |

Which graph best represents the data in the table?
a)

b) Masonville Middle School

c)

d)

28. A cell phone company surveyed 100 girls aged 12 to 16 about their preferred cell phone colors. The results are shown in the table.

Cell Phone Colors

| Color | Frequency |
| :--- | :---: |
| Pink | 34 |
| Purple | 32 |
| Red | 17 |
| Yellow | 17 |

If the company uses only these data to order new cell phones, which conclusion best reflects the data collected?
a) Two-thirds of each order should be pink and purple phones.
b) More than half of each order should be red and yellow phones.
c) Half of each order should be pink phones, the other half purple phones.
d) One-third of each order should be red phones, another third yellow phones.

## Answer Key (part 1)

1. 

Answer: a
Objective: 8.1A
2.

Answer: a
Objective: 8.1B
3.

Answer: a
Objective: 8.1D
4.

Answer: b
Objective: $\quad 8.2 \mathrm{~B}$
5.

Answer: a
Objective: 8.2D
6.

Answer: c
Objective: 8.3A
7.

Answer: a
Objective: 8.3B
8.

Answer: a
Objective: 8.4A
9.

Answer: a
Objective: $\quad 8.5 \mathrm{~A}$
10.

Answer: C
Objective: 8.5B
11.

Answer: c
Objective: 8.6A
12.

Answer: c
Objective: 8.6B
13.

Answer: b
Objective: $\quad 8.7 \mathrm{~A}$
14.

Answer: a
Objective: 8.7B
15.

Answer: d
Objective: 8.7C
16.

Answer: b
Objective: 8.7D
17.

Answer: a
Objective: $\quad 8.8 \mathrm{~A}$
18.

Answer: c
Objective: 8.8C
19.

Answer: c
Objective: $\quad 8.9 \mathrm{~A}$
20.

Answer: a
Objective: 8.9B
21.

Answer: b
Objective: 8.10A
22.

Answer: d
Objective: 8.10B
23.

Answer: b
Objective: $\quad 8.11 \mathrm{~A}$
24.

Answer: c
Objective: 8.11B
25.

Answer: c
Objective: 8.12A
26.

Answer: c
Objective: 8.12B

## Answer Key (part 2)

27. 

Answer: b
Objective: 8.12C
28.

Answer: a
Objective: 8.13B

