CCSS

Diagnostic and Placement Tests

Grade K-Algebra 2

Diagnostic and Placement Tests for Grades K through 8, Algebra 1, Geometry, and Algebra 2

simplify placement decisions

suggestions for intervention and remediation

suggested materials

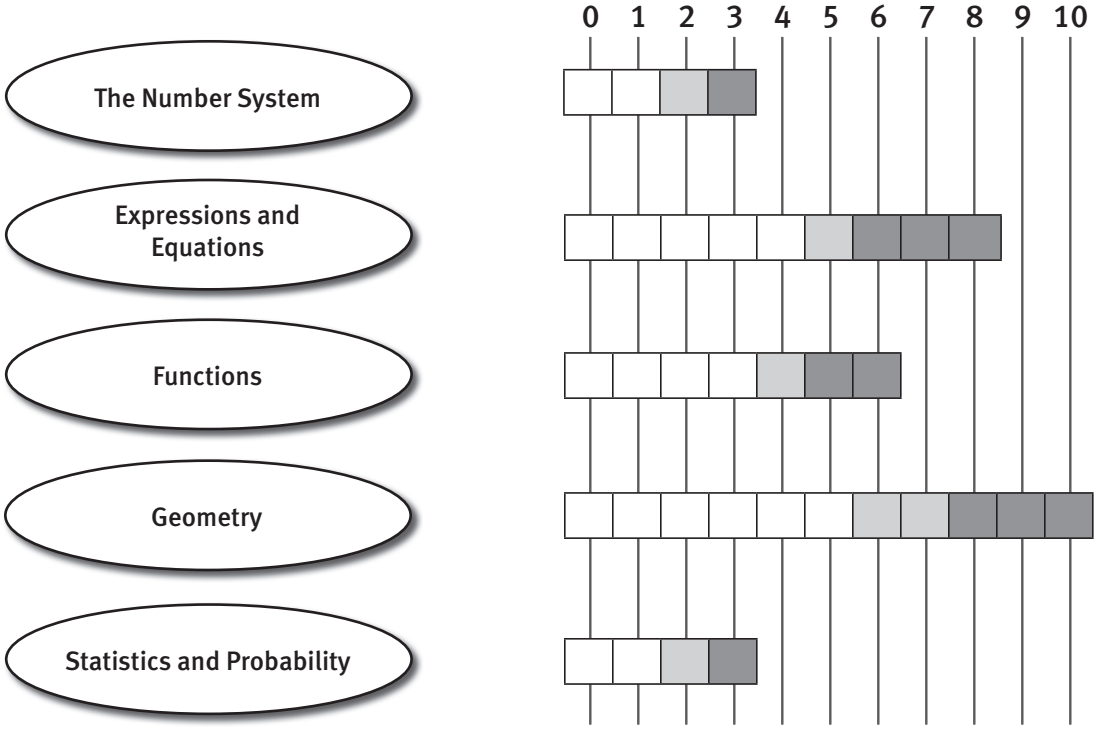
Mc Graw Hill

Placement Test 8

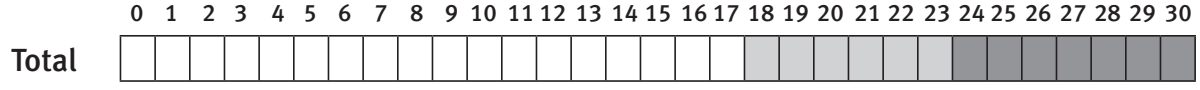
Scoring Guide

Student Name _____

For each part, mark the box under the number of correctly answered questions.



Mark the total number correct below.



Key: Consider this student for...

- ☐ *Math Triumphs*
- ☐ Grade 8 Strategic Intervention—See page 103 for materials list.
- ☐ *Glencoe Math, Course 3*

Placement Test 8

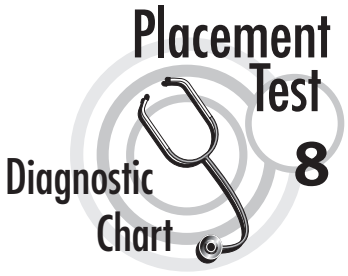
Learning Objectives

Student Name _____

In the column on the left, mark the questions that the student answered *incorrectly*.

Domain	Question Number	Objective
The Number System	☐ 1	Use rational approximations of irrational numbers to compare the size of irrational numbers.
	☐ 2	Use rational approximations of irrational numbers to estimate the value of expressions
	☐ 3	Know that numbers that are not rational are called irrational.
Expressions and Equations	☐ 4	Graph proportional relationships.
	☐ 5	Solve linear equations in one variable.
	☐ 6	Solve linear equations in one variable.
	☐ 7	Perform operations with numbers expressed in scientific notation.
	☐ 8	Perform operations with numbers expressed in scientific notation.
	☐ 9	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
	☐ 10	Analyze and solve pairs of simultaneous linear equations.
	☐ 11	Solve linear equations with rational number coefficients, including equations whose solutions require using the distributive property.
Functions	☐ 12	Construct a function to model a linear relationship between two quantities.
	☐ 13	Understand that a function is a rule that assigns to each input exactly one output.
	☐ 14	Understand that a function is a rule that assigns to each input exactly one output.
	☐ 15	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line.
	☐ 16	Describe qualitatively the functional relationship between two quantities by analyzing a graph.
	☐ 17	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

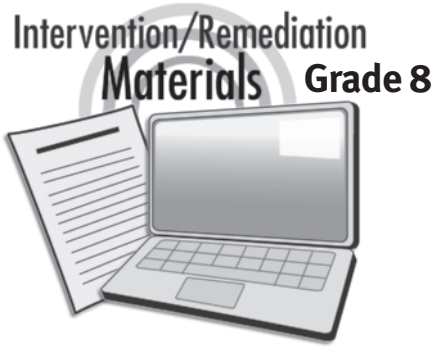
Domain	Question Number	Objective
Geometry	☐ 18	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
	☐ 19	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
	☐ 20	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
	☐ 21	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
	☐ 22	Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
	☐ 23	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
	☐ 24	Use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal.
	☐ 25	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
	☐ 26	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
	☐ 27	Given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
Statistics and Probability	☐ 28	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.
	☐ 29	Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
	☐ 30	Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.



Student Performance Level	Number of Questions Correct	Suggestions for Intervention and Remediation
Intensive Intervention	**0–17**	Use *Math Triumphs* to accelerate the achievement of students who are two or more years below grade level. Students should follow a personalized remediation plan. A variety of materials and instructional methods are recommended. For example, instruction and practice should be provided in print, technology, and hands-on lessons.
Strategic Intervention	**18–23**	Use the additional Intervention and Remediation materials listed on the next page. This list of materials can provide helpful resources for students who struggle in the traditional mathematics program. Strategic intervention allows students to continue to remain in the *Glencoe Math* program, while receiving the differentiated instruction they need. Teaching Tips and other resources are also listed in the Teacher Edition.
Grade 8	**24 or more**	Use *Glencoe Math*. This student does not require overall intervention. However, based on the student's performance on the different sections, intervention may be required. For example, a student who missed 1 or more questions in the Function section may require extra assistance as you cover these skills throughout the year.

A Special Note About Intervention

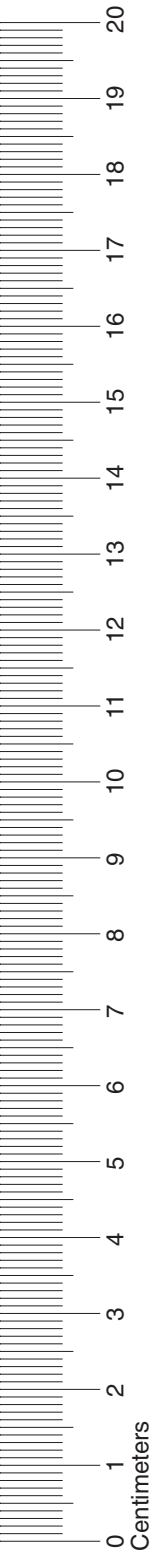
When using diagnostic tests, teachers should always question the reason behind the students' scores. Students can struggle with mathematics concepts for a variety of reasons. Personalized instruction is recommended for English language learners, students with specific learning disabilities, students with certain medical conditions, or for those who struggle with traditional instructional practice. Teachers should always consider the needs of the individual student when determining the best approach for instruction and program placement.



Get ConnectED	*Find these materials at* www.connectED.mcgraw-hill.com.
Reteach Masters	A brief explanation, along with examples and exercises, for every lesson in the Student Edition (Two pages for Problem-Solving Lessons and one page per lesson for all other lessons) and included in the Chapter Resource Masters
Skills Practice Masters	Additional practice in computational and application exercises for each lesson in the Student Edition and included in the Chapter Resource Masters
Homework Practice Masters	Additional practice in computational and spiral review exercises for each lesson in the Student Edition and included in the Chapter Resource Masters
Self-Check Quizzes	Students can check their understanding for each lesson and email their results to the teacher
Chapter Readiness Quizzes	Online assessment to use at the beginning of each chapter in the Student Edition
Personal Tutor	Online instructions for step-by-step solutions for the examples of each lesson in the student textbook
Quick Review Skills Workbook	Additional computational practice in basic skills

Additional Technology	
ExamView® Assessment Suite	Networkable software includes a Worksheet Builder to make worksheets and tests, a Student Module to take tests on-screen, and a Management System to keep student records

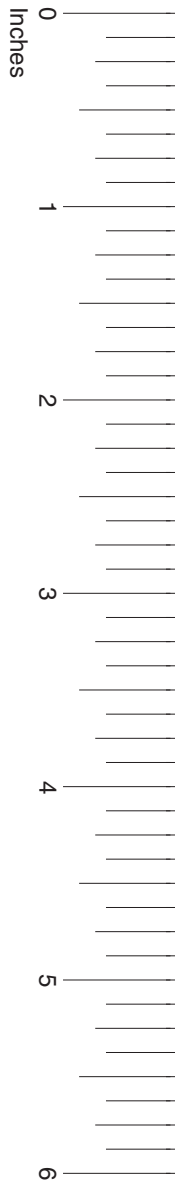
Mathematics Chart



LENGTH	CAPACITY AND VOLUME
Metric 1 kilometer = 1,000 meters 1 meter = 100 centimeters 1 centimeter = 10 millimeters **Customary** 1 mile = 1,760 yards 1 mile = 5,280 feet 1 yard = 3 feet 1 foot = 12 inches	**Metric** 1 liter = 1,000 milliliters **Customary** 1 gallon = 4 quarts 1 gallon = 128 ounces 1 quart = 2 pints 1 pint = 2 cups 1 cup = 8 ounces
MASS AND WEIGHT	**TIME**
Metric 1 kilogram = 1,000 grams 1 gram = 1000 milligrams **Customary** 1 ton = 2,000 pounds 1 pound = 16 ounces	1 year = 365 days 1 year = 12 months 1 year = 52 weeks 1 week = 7 days 1 day = 24 hours 1 hour = 60 minutes 1 minute = 60 seconds

Mathematics Chart

PERIMETER		AREA	
square	$P = 4s$	square	$A = s^2$
rectangle	$P = 2\ell + 2w$ or $P = 2(\ell + w)$	rectangle	$A = \ell w$ or $A = bh$
		triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
		trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
		circle	$A = \pi r^2$
CIRCUMFERENCE		**VOLUME**	
circle	$C = 2\pi r$ or $C = \pi d$	cube	$V = s^3$
		retangular prism	$V = \ell wh$ or $V = Bh$*
		triangular prism	$V = Bh$*
		cylinder	$V = \pi r^2 h$ or $V = Bh$*
		cone	$V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$*
		sphere	$V = \frac{4}{3}\pi r^3$
		*B represents the area of the base of a solid figure.	
PI		**PYTHAGOREAN THEOREM**	
$\pi \approx 3.14$ or $\pi \approx \frac{22}{7}$		$a^2 + b^2 = c^2$	



Diagnostic and Placement Grade 8

Name _____

Date _____

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1 Which set of numbers is ordered from least to greatest? **1** _____

A $\frac{3}{8}; \frac{1}{2}; 1; \sqrt{2}; 4$

B $\frac{3}{8}; \frac{1}{2}; \sqrt{2}; 1; 4$

C $4; \sqrt{2}; 1; \frac{1}{2}; \frac{3}{8}$

D $\frac{1}{2}; \frac{3}{8}; 1; 4; \sqrt{2}$

2 The area of a square is 8 square meters. Which of these is closest to the length of one side of the square? **2** _____

F 2 meters
G 2.8 meters
J 4 meters
H 3.5 meters

3 Which of the following sets of numbers does $\sqrt{49}$ NOT belong? **3** _____

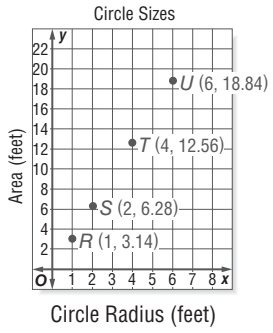
A integer
B real number
C rational number
D irrational number

4 The table shows circles and their corresponding diameters. Which of the following graphs show the correct relationship between the radius and the area of each circle?

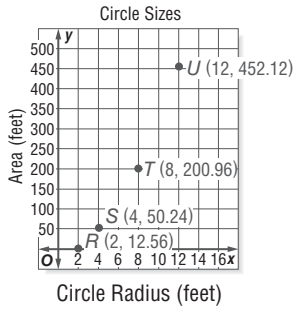
Circles	
Circle	**Diameter (feet)**
R	2
S	4
T	8
U	12

4 _____

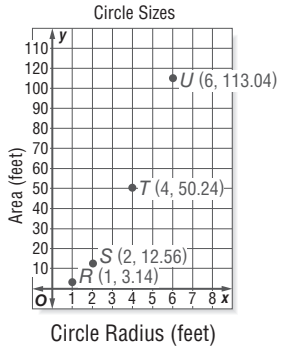
F



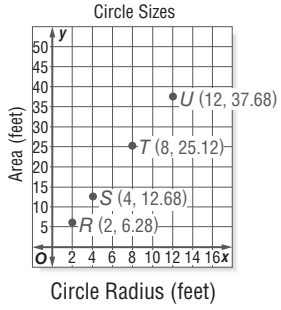
H



G

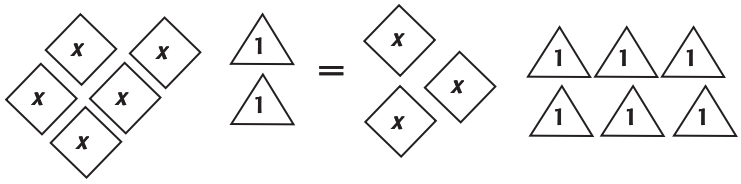


J



5 The picture models the equation $5x + 2 = 3x + 6$.

5 _____



What value of x makes the equation true?

A $x = 1$ **C** $x = 4$

B $x = 2$ **D** $x = 6$

6 In $\triangle ABC$, the measure of $\angle A$ is 33° and the measure of $\angle C$ is 90°. What is the measure of $\angle B$?

6 _____

F 17° **G** 57° **H** 137° **J** 147°

7 Light travels at a speed of about 2.998×10^8 meters per second. Express this number in standard notation. **7** _____

A 299,800,000 **C** 0.0000002998
B 0.00002998 **D** 29,980,000

8 A thunderstorm cloud holds about 6,200,000,000 raindrops. Which of the following shows this number in scientific notation? **8** _____

F 0.62×10^{10} **H** 6.2×10^8
G 6.2×10^9 **J** 62.0×10^8

9 Which of the following is equivalent to the expression $4^4 \times 4^{-6}$? **9** _____

A $\frac{1}{4^2}$ **B** $\frac{1}{4^{10}}$ **C** 4^{10} **D** 4^2

10 What is true concerning the lines graphed by the system of equations shown below? **10** _____

$$\begin{cases} 8x + 6 = 2y \\ 12x - 3 = 3y \end{cases}$$

F The lines intersect. **H** The lines are parallel.
G The lines are perpendicular. **J** The lines are the same.

11 What is the solution of the equation? **11** _____

$$\frac{1}{3}(x + 15) = 7$$

A $x = \frac{2}{3}$ **B** $x = 2$ **C** $x = 6$ **D** $x = 36$

12 What function is represented in the table? **12** _____

n	*f(n)*
1	3
2	7
3	11
4	15
5	19
n	

F $f(n) = n + 3$ **H** $f(n) = 4n + 2$
G $f(n) = 4n - 1$ **J** $f(n) = 3n - 2$

13 Mr. Wilson wrote the function $f(x) = 7x - 15$ on the chalkboard. What is the value of this function for $f(6)$? **13** _____

A 27 **B** 37 **C** 42 **D** 57

14 On average, a dog runs 5.5 times faster than a child. Which function can be used to find the speed of a dog, given the speed of the child? **14** _____

F $f(c) = 5.5c$

G $f(c) = \frac{5.5}{c}$

H $f(c) = c + 5.5$

J $f(c) = \frac{c}{5.5}$

15 What is the slope and y-intercept of the equation $6x - 1 = 3y - 10$? **15** _____

A $m = 2, b = 3$

B $m = 2, b = -3$

C $m = 3, b = 4$

D $m = 6, b = 9$

16 Which best describes the graph of the function $f(x) = 4x$? **16** _____

F A straight line through the origin with a steep slope upward to the right.

G A straight line through the origin with a steep slope downward to the right.

H A straight line through 4 on the x-axis with a slope downward to the right.

J A straight line through 4 on the y-axis with a slope upward to the right.

17 Which function described below has the greatest rate of change? **17** _____

I $f(x) = 4x - 3$

II $f(x) = \frac{1}{2}x + 5$

III

x	*f(x)*
1	6
2	12
3	18
4	24

A I

B II

C III

D They all have the same rate of change.

18 The delivery ramp at the Corner Café is a right triangle. The hypotenuse is 4 meters long. One leg is 3 meters long. What is the length of the other leg? **18** _____

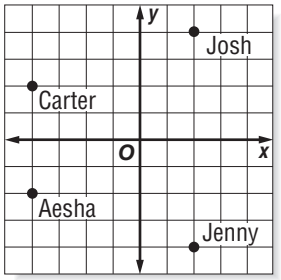
F $\sqrt{7}$ meters

G $\sqrt{12}$ meters

H 3.5 meters

J 5 meters

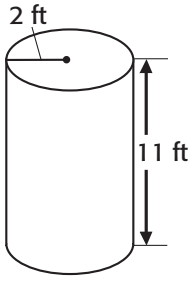
19 The map below shows where four of Nahimana's friends live. Each unit on the map represents 1 mile. **19** _____



About how far apart do Aesha and Josh live?

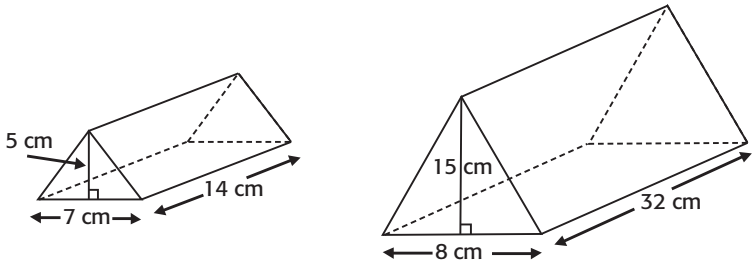
A about 5 mi **B** about 6 mi **C** about 7.5 mi **D** about 8.5 mi

20 What is the volume of the cylinder shown below? **20** _____



F 44 ft^3
G 69.08 ft^3
H 138.16 ft^3
J 276.32 ft^3

21 What is the difference in the volume of the two triangular prisms shown below? **21** _____

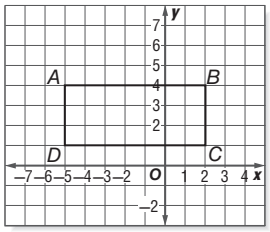


A 32 cm^3
B 158 cm^3
C 1,675 cm^3
D 3,350 cm^3

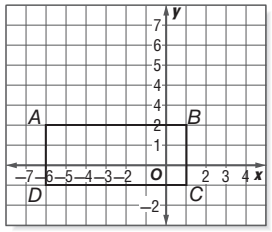
22 A photo with a length of 3 inches and a width of 5 inches is enlarged to poster size. The poster and the photo are similar. The length of the poster is 21 inches. What is the width of the poster? **22** _____

F 7.2 inches
G 12.6 inches
H 19 inches
J 35 inches

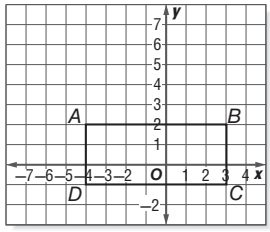
23 Rectangle *ABCD* is shown on the coordinate grid below. Which of the following graphs represent the translation of Rectangle *ABCD* over the following: $(x, y) \rightarrow (x+1, y-2)$? **23** _____



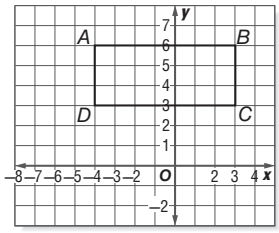
A



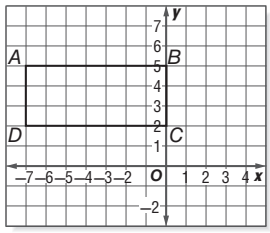
C



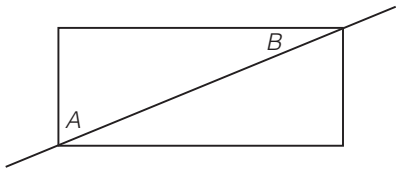
B



D

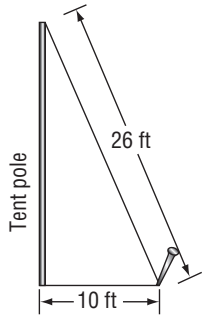


24 A rectangle is cut along its diagonal. The measure of $\angle A$ is 55°. What is the measure of $\angle B$? **24** _____



F 125° **G** 105° **H** 45° **J** 35°

25 A 26-foot rope is used to brace a tent pole at the county fair. The rope is anchored 10 feet from the box of the pole. **25** _____



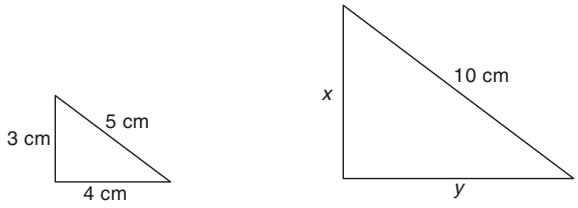
How tall is the tent pole?

A 21.8ft **B** 24ft **C** 28ft **D** 30ft

26 A cylindrical water tower is 24 feet high and has a diameter of 20 feet. Approximately how many cubic feet of water could the tower hold? **26** _____

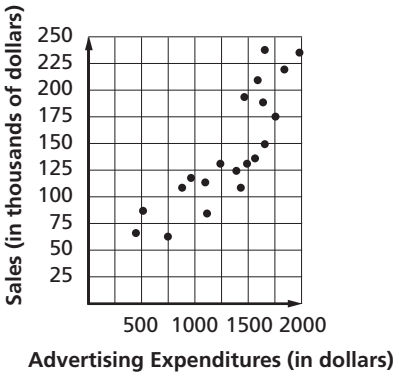
F 2,400 cubic feet
G 7,500 cubic feet
H 9,600 cubic feet
J 30,200 cubic feet

27 The triangles below are similar triangles. Find the value of x and y. **27** _____



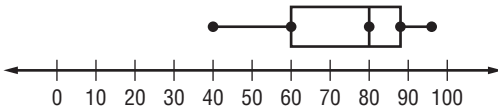
A $x = 6, y = 8$
B $x = 3, y = 4$
C $x = 1.5, y = 2$
D $x = 12, y = 16$

28 The scatter plot below shows the yearly advertising expenditures and the relative sales for a small company. What can be concluded from this data? **28** _____



F As advertising increases, sales tend to decrease.
G As advertising increases, sales tend to increase.
H As advertising increases, sales remain the same.
J As advertising increases, sales always increase.

29 The box plot shows a set of test scores. Which statement is correct? **29** _____



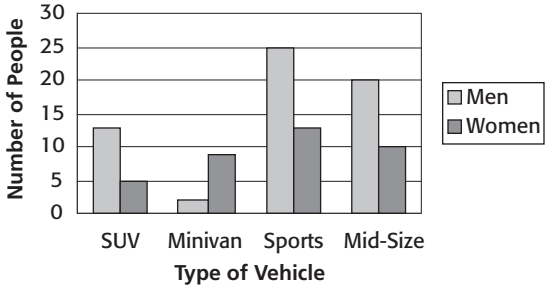
A More students scored between 40 and 60 points than between 88 and 96 points.

B An equal number of students scored from 40 to 60 as from 88 to 96.

C The lowest score was 60.

D The highest score was 88.

30 A survey is taken to determine which type of vehicle is most popular. The data is shown in the bar graph below. **30** _____



What can you conclude about the survey?

F The survey is biased because most men do not favor sports vehicles.

G The survey is biased because there are more men surveyed than women.

H The survey is not biased because sports cars are most popular among both men and women.

J The survey is not biased because all car types are favored by both men and women.

Diagnostic and Placement Grade 8

Name _____

Date _____

This test contains 30 multiple-choice questions. Work each problem in the space on this page. Select the best answer. Write the letter of the answer on the blank at the right.

1 Which set of numbers is ordered from least to greatest? **1** A

A $\frac{3}{8}; \frac{1}{2}; 1; \sqrt{2}; 4$

B $\frac{3}{8}; \frac{1}{2}; \sqrt{2}; 1; 4$

C $4; \sqrt{2}; 1; \frac{1}{2}; \frac{3}{8}$

D $\frac{1}{2}; \frac{3}{8}; 1; 4; \sqrt{2}$

2 The area of a square is 8 square meters. Which of these is closest to the length of one side of the square? **2** G

F 2 meters
G 2.8 meters
J 4 meters
H 3.5 meters

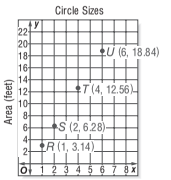
3 Which of the following sets of numbers does $\sqrt{49}$ NOT belong? **3** D

A integer
B real number
C rational number
D irrational number

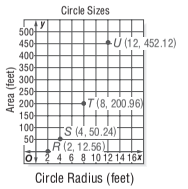
4 The table shows circles and their corresponding diameters. Which of the following graphs show the correct relationship between the radius and the area of each circle? **4** G

Circles	
Circle	Diameter (feet)
R	2
S	4
T	8
U	12

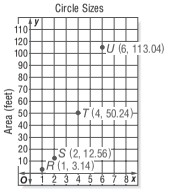
F



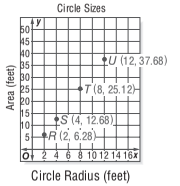
H



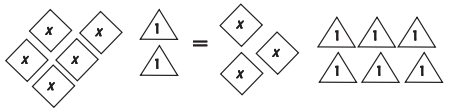
G



J



5 The picture models the equation $5x + 2 = 3x + 6$. **5** B



What value of x makes the equation true?

A $x = 1$ **C** $x = 4$
B $x = 2$ **D** $x = 6$

6 In $\triangle ABC$, the measure of $\angle A$ is 33° and the measure of $\angle C$ is 90°. What is the measure of $\angle B$? **6** G

F 17° **G** 57° **H** 137° **J** 147°

7 Light travels at a speed of about 2.998×10^8 meters per second. Express this number in standard notation. **7** A

A 299,800,000 **C** 0.0000002998
B 0.00002998 **D** 29,980,000

8 A thunderstorm cloud holds about 6,200,000,000 raindrops. Which of the following shows this number in scientific notation? **8** G

F 0.62×10^{10} **H** 6.2×10^8
G 6.2×10^9 **J** 62.0×10^8

9 Which of the following is equivalent to the expression $4^4 \times 4^{-6}$? **9** A

A $\frac{1}{4^2}$ **B** $\frac{1}{4^{10}}$ **C** 4^{10} **D** 4^2

10 What is true concerning the lines graphed by the system of equations shown below? **10** H

$$\begin{cases} 8x + 6 = 2y \\ 12x - 3 = 3y \end{cases}$$

F The lines intersect. **H** The lines are parallel.
G The lines are perpendicular. **J** The lines are the same.

11 What is the solution of the equation? **11** C

$$\frac{1}{3}(x + 15) = 7$$

A $x = \frac{2}{3}$ **B** $x = 2$ **C** $x = 6$ **D** $x = 36$

12 What function is represented in the table? **12** G

n	*f(n)*
1	3
2	7
3	11
4	15
5	19
n	

F $f(n) = n + 3$ **H** $f(n) = 4n + 2$
G $f(n) = 4n - 1$ **J** $f(n) = 3n - 2$

13 Mr. Wilson wrote the function $f(x) = 7x - 15$ on the chalkboard. What is the value of this function for $f(6)$? **13** A

A 27 **B** 37 **C** 42 **D** 57

14 On average, a dog runs 5.5 times faster than a child. Which function can be used to find the speed of a dog, given the speed of the child? **14** F

F $f(c) = 5.5c$ **H** $f(c) = c + 5.5$
G $f(c) = \frac{5.5}{c}$ **J** $f(c) = \frac{c}{5.5}$

15 What is the slope and *y*-intercept of the equation $6x - 1 = 3y - 10$? **15** A

A $m = 2, b = 3$ **C** $m = 3, b = 4$
B $m = 2, b = -3$ **D** $m = 6, b = 9$

16 Which best describes the graph of the function $f(x) = 4x$? **16** F

F A straight line through the origin with a steep slope upward to the right.
G A straight line through the origin with a steep slope downward to the right.
H A straight line through 4 on the *x*-axis with a slope downward to the right.
J A straight line through 4 on the *y*-axis with a slope upward to the right.

17 Which function described below has the greatest rate of change? **17** C

I $f(x) = 4x - 3$
II $f(x) = \frac{1}{2}x + 5$
III

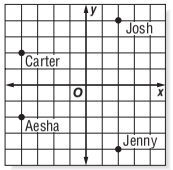
x	*f(x)*
1	6
2	12
3	18
4	24

A I
B II
C III
D They all have the same rate of change.

18 The delivery ramp at the Corner Café is a right triangle. The hypotenuse is 4 meters long. One leg is 3 meters long. What is the length of the other leg? **18** F

F $\sqrt{7}$ meters **H** 3.5 meters
G $\sqrt{12}$ meters **J** 5 meters

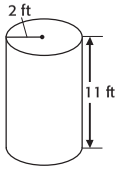
19 The map below shows where four of Nahimana's friends live. Each unit on the map represents 1 mile. **19** D



About how far apart do Aesha and Josh live?

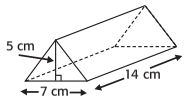
A about 5 mi **B** about 6 mi **C** about 7.5 mi **D** about 8.5 mi

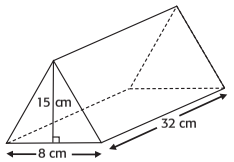
20 What is the volume of the cylinder shown below? **20** H



F 44 ft^3 **H** 138.16 ft^3
G 69.08 ft^3 **J** 276.32 ft^3

21 What is the difference in the volume of the two triangular prisms shown below? **21** C



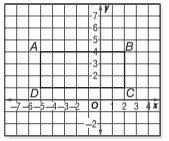


A 32 cm^3 **C** 1,675 cm^3
B 158 cm^3 **D** 3,350 cm^3

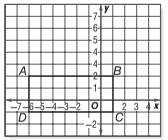
22 A photo with a length of 3 inches and a width of 5 inches is enlarged to poster size. The poster and the photo are similar. The length of the poster is 21 inches. What is the width of the poster? **22** J

F 7.2 inches **H** 19 inches
G 12.6 inches **J** 35 inches

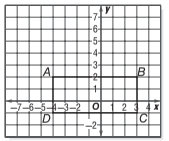
23 Rectangle *ABCD* is shown on the coordinate grid below. Which of the following graphs represent the translation of Rectangle *ABCD* over the following: $(x, y) \rightarrow (x+1, y-2)$? **23** C



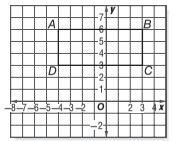
A



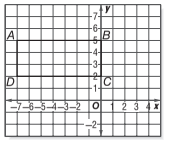
C



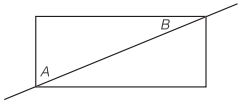
B



D

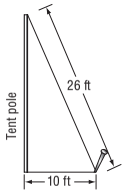


24 A rectangle is cut along its diagonal. The measure of $\angle A$ is 55°. What is the measure of $\angle B$? **24** J



F 125° **G** 105° **H** 45° **J** 35°

25 A 26-foot rope is used to brace a tent pole at the county fair. The rope is anchored 10 feet from the box of the pole. **25** B



How tall is the tent pole?

A 21.8ft **B** 24ft **C** 28ft **D** 30ft

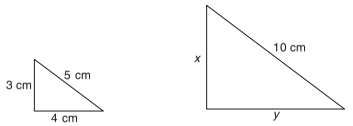
26 A cylindrical water tower is 24 feet high and has a diameter of 20 feet. Approximately how many cubic feet of water could the tower hold?

26 G

F 2,400 cubic feet
G 7,500 cubic feet
H 9,600 cubic feet
J 30,200 cubic feet

27 The triangles below are similar triangles. Find the value of *x* and *y*.

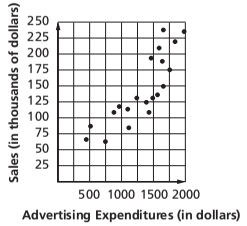
27 A



A $x = 6, y = 8$
B $x = 3, y = 4$
C $x = 1.5, y = 2$
D $x = 12, y = 16$

28 The scatter plot below shows the yearly advertising expenditures and the relative sales for a small company. What can be concluded from this data?

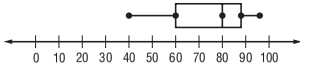
28 G



F As advertising increases, sales tend to decrease.
G As advertising increases, sales tend to increase.
H As advertising increases, sales remain the same.
J As advertising increases, sales always increase.

29 The box plot shows a set of test scores. Which statement is correct?

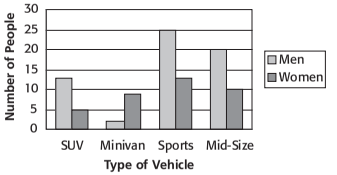
29 B



A More students scored between 40 and 60 points than between 88 and 96 points.
B An equal number of students scored from 40 to 60 as from 88 to 96.
C The lowest score was 60.
D The highest score was 88.

30 A survey is taken to determine which type of vehicle is most popular. The data is shown in the bar graph below.

30 G



What can you conclude about the survey?

F The survey is biased because most men do not favor sports vehicles.
G The survey is biased because there are more men surveyed than women.
H The survey is not biased because sports cars are most popular among both men and women.
J The survey is not biased because all car types are favored by both men and women.