

AIMS Grade 8 Mathematics Sample Test and Think-Throughs

FOR STUDENTS

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GRADE 8

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Directions:**Read each problem and select the best answer.**

- 1** There are 6 books on a reading list. Students must read 3 of the books on the list. In how many different ways can a student select 3 books?

A 20
B 60
C 120
D 360

- 2** Cece scored a 78 on her first math test. She scored an 84 on her second test. What is the percent increase, rounded to the nearest tenth, from Cece's first score to her second score?

A 6.0%
B 7.6%
C 7.7%
D 8.0%

- 3** How many square feet are there in 288 square inches?

Scale
1 foot = 12 inches

A 2
B 24
C 93
D 144

- 4** Gary has 10 coins in his pocket.

- 2 quarters
- 5 dimes
- 3 nickels

Without looking, Gary pulls one coin from his pocket and puts it on a table. Then, he pulls one more coin from his pocket. What is the probability that the first coin is a dime and the second coin is a nickel?

A $\frac{1}{8}$
B $\frac{1}{6}$
C $\frac{1}{5}$
D $\frac{1}{2}$

- 5** A tower is 160 feet tall and casts a shadow 34 feet long. A person standing next to the tower casts a shadow 1.5 feet long. Which equation will find the height of the person, x ?

A $\frac{160}{34} = \frac{1.5}{x}$
B $\frac{x}{160} = \frac{34}{1.5}$
C $1.5x = 34 \cdot 160$
D $34x = 1.5 \cdot 160$

- 6** Melissa earned a score of 75% on her first test. She wants to earn an 85% on her second test. What is the percent increase, rounded to the nearest whole number, from 75% to 85%?

A 10%
B 12%
C 13%
D 14%

- 7** Which shape will create a tessellation using only translations?

A scalene triangle
B regular hexagon
C equilateral triangle
D isosceles trapezoid

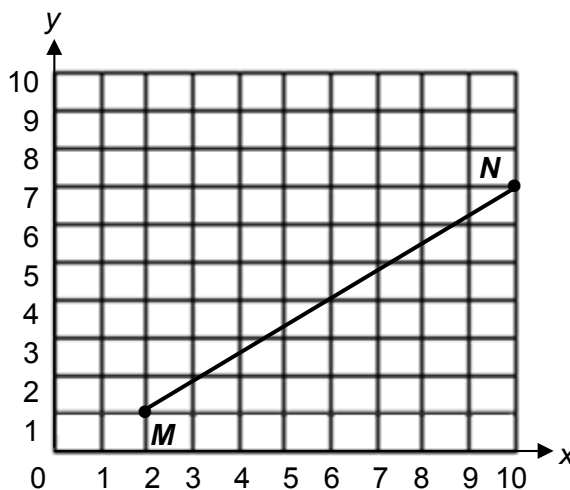
- 8** A box contains 4 red pencils, 3 blue pencils, and 3 yellow pencils. What is the probability that a student randomly selects a blue pencil, keeps it, and then a second student randomly selects a yellow pencil?

A $\frac{1}{10}$
B $\frac{3}{10}$
C $\frac{6}{10}$
D $\frac{9}{10}$

- 9** Which statement is true?

A All vertical lines have a slope of zero.
B All vertical lines have a positive slope.
C All vertical lines have a negative slope.
D All vertical lines have an undefined slope.

- 10** Look at \overline{MN} on the coordinate plane.



What is the distance between the endpoints of \overline{MN} ?

A 5 units
B 6 units
C 8 units
D 10 units

- 11** Emily, Zeke, Harry, and Brook each conducted surveys on the number of books people have in their homes. Then they each answered the question below.

“Must all measures of central tendency appear as a number in the set of data collected?”

Which student’s statement is true?

- A** Emily says this is always true because all the measures of central tendency also have to be numbers in the set of data.
- B** Zeke says this is never true because all the measures of central tendency are never numbers in the set of data.
- C** Harry says this is sometimes true because the mean and median may or may not be in the set of data, but the mode is always in the set of data.
- D** Brook says this is sometime true because the mean and mode may or may not be in the set of data, but the median is always in the set of data.

- 12** The stem-and-leaf plot represents test scores from two science classes.

Mr. Vega		Ms. Watson	
	10		0
4, 3, 1	9		1, 4
8, 5, 4	8		2, 4, 5, 6, 7
8, 7, 6, 0	7		0, 0, 2, 9
9, 6, 6	6		3, 6, 8
4, 2	5		

Key	
10	0 means 100

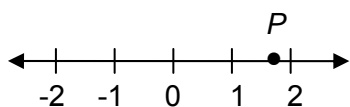
Which statement about the data is true?

- A** The median of Ms. Watson’s scores is less than the median of Mr. Vega’s scores.
 - B** The mode of Ms. Watson’s scores is less than the mode of Mr. Vega’s scores.
 - C** The mean of Mr. Vega’s scores is greater than the mean of Ms. Watson’s scores.
 - D** The range of Mr. Vega’s scores is greater than the range of Ms. Watson’s scores.
- 13** Students submitted pictures for the school yearbook. Only $\frac{4}{5}$ of the submitted pictures fit in the yearbook. There were 105 pictures that did not fit. Approximately how many total pictures were submitted for the yearbook?

- A** 105
- B** 210
- C** 420
- D** 500

Go On ►

- 14 Look at the number line.



Which value does P **best** represent?

- A $1\frac{1}{3}$
- B $1\frac{1}{2}$
- C $1\frac{2}{3}$
- D $2\frac{1}{3}$

- 15 Three linear equations are shown below.

$$y_1 = -2x - 5$$

$$y_2 = -\frac{1}{2}x - 5$$

$$y_3 = 3x - 5$$

Which statement about the three linear equations is incorrect?

- A All three equations have the same slope.
 - B Equations y_1 and y_2 have negative slopes.
 - C All three equations have the same y -intercept.
 - D Equations y_2 and y_3 have the same y -intercept.
- 16 A go-cart has a maximum weight limit of 240 pounds. Which inequality correctly represents this weight limit, w ?
- A $w \leq 240$ pounds
 - B $w < 240$ pounds
 - C $w \geq 240$ pounds
 - D $w > 240$ pounds

- 17 Joe is creating a number pattern. He begins the pattern with the number 3. Each number after 3 is twice the number before it, plus 1. Which pattern fits Joe's rule?

- A 3, 6, 9, 12, 15
- B 3, 6, 13, 27, 55
- C 3, 7, 14, 28, 56
- D 3, 7, 15, 31, 63

- 18 Which number is irrational?

- A $(1.5)^2$
- B $\sqrt{41}$
- C $\sqrt{49}$
- D $(15)^2$

- 19 What is the value of the expression?

$$|-5 + (-3)^2|$$

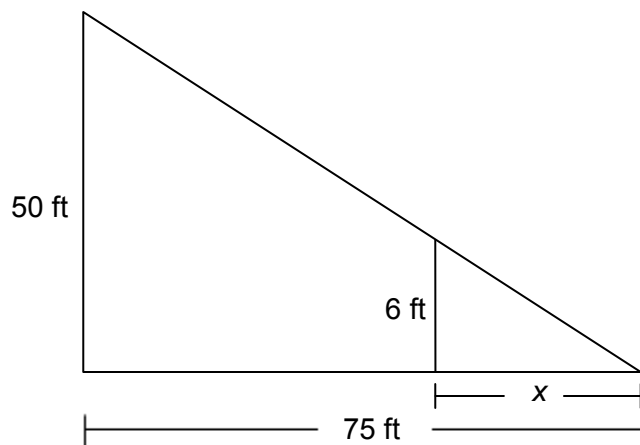
- A -14
- B -4
- C 4
- D 14

- 20 Santos has a job after school. He earns \$8 per hour. Which equation will determine h , the number of hours he needs to work to earn \$44?

- A $h - 8 = 44$
- B $8h = 44$
- C $8 + h = 44$
- D $\frac{h}{2} = 44$

Go On ►

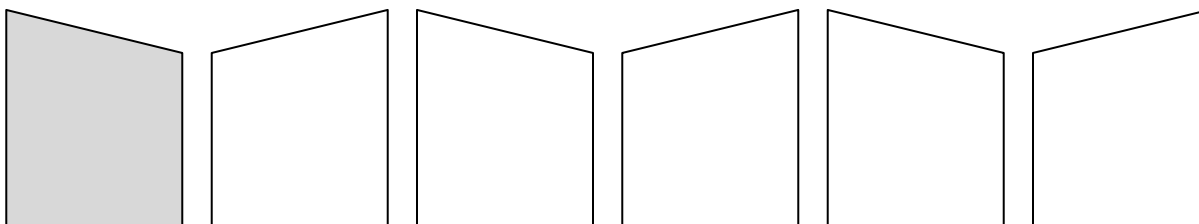
21 Look at the figure.



Based on the figure, which equation is **not** true?

- A $\frac{50}{75} = \frac{6}{x}$
- B $\frac{50}{6} = \frac{75}{x}$
- C $300 = 75x$
- D $450 = 50x$

22 The shaded piece has been transformed into a frieze pattern.



Which transformations **best** describe how the pattern was created?

- A reflections
- B translations
- C reflections and rotations
- D translations and rotations

Go On ►

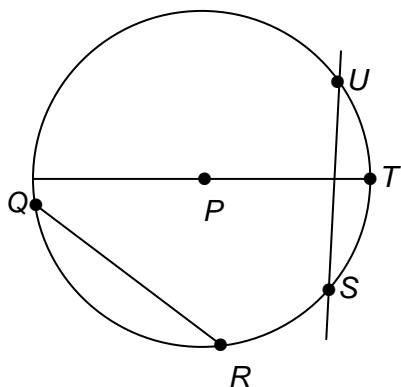
- 23** What is the value of the expression when

$$x = 7.2, y = \frac{3}{4}, \text{ and } z = -3?$$

$$2x + \frac{2}{3}z - 8y$$

- A 6.2
- B 6.4
- C 10.4
- D 38.9

- 24** In circle P , which of the following create a secant?



- A \overline{QR}
- B \overline{PT}
- C \overline{US}
- D \widehat{RT}

- 25** A right cylinder has a height of 5 inches and a radius of 7 inches. What is its volume in terms of π ?

- A 70π cubic inches
- B 168π cubic inches
- C 175π cubic inches
- D 245π cubic inches

- 26** The student council is making gift bags for a fund raiser. They have 105 bags, 150 pens, 115 notebooks, 330 pencils, and 190 highlighters. If each gift bag consists of one bag, 2 pens, 1 notebook, 3 pencils, and 2 highlighters, what is the greatest number of gift bags that can be made?

- A 75
- B 95
- C 105
- D 110

- 27** What is the value of the expression?

$$\frac{2+2(3+7)^2 - \sqrt[3]{73-9}}{3}$$

- A 34
- B 64
- C 66
- D 132

- 28** John is comparing his quiz scores from two weeks in math class.

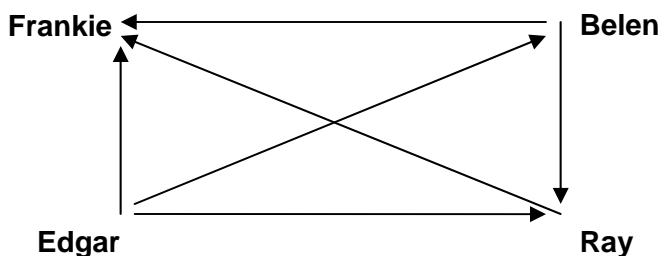
Week 1: 78, 81, 86, 86, 89

Week 2: 79, 85, 86, 88, 92

Which summary statistic is the same for both weeks?

- A mean
- B median
- C mode
- D range

- 29** The directed graph shows the results of a chess tournament among 4 players. Edgar won his match against Frankie.



Who won the least number of games?

- A** Frankie
 - B** Belen
 - C** Ray
 - D** Edgar
- 30** What equation is the rule for the function illustrated by the table of values?

x	-2	-1	0	1	2
y	-4	-1	2	5	8

- A** $y = -3x + 2$
 - B** $y = 3x + 2$
 - C** $y = 2x$
 - D** $y = -2x$
- 31** What is the value of the expression when $a = 5$, $b = \frac{1}{3}$, and $c = 2$?

$$a^2 - 9bc$$

- A** -29
- B** 4
- C** 14
- D** 19

32 Which situation is **best** represented by the graph?



- A** the height of a person growing from child to adult
 - B** the amount of gasoline in a car tank, from fill-up to empty
 - C** the altitude of a plane during a trip, from take-off to landing
 - D** the temperature of a pizza after it has been taken out of the oven
- 33** Joe needs to find the midpoint of a line segment on a coordinate plane. Given the coordinates of the endpoints, what is the **best** way for him to find the midpoint of the line segment?
- A** substitute the coordinates into the midpoint formula
 - B** substitute the coordinates into the point-slope formula
 - C** plot them on graph paper, draw the line, and count the squares to the middle
 - D** plot them on graph paper, create a right triangle, and use the Pythagorean Theorem
- 34** Martin is buying a fish tank. For the tank, he wants 10 clownfish, a few plants, and some stones for the bottom. He wants to make sure that the tank is large enough for the fish to swim comfortably. What does he need to ask the salesman in order to make sure he buys a large enough tank?
- A** What type of food do clownfish eat?
 - B** How long do clownfish typically live?
 - C** What kind of plants do clownfish like?
 - D** How much space do clownfish need to swim?



AIMS Grade 8 Mathematics Sample Test Answer Key

The answer key below shows you the Strand, Concept, and Performance Objective that each item is addressing. This will help you to identify which Concepts from the AZ Academic Mathematics Standards that you may need to study more.

1	2.3.2	A
2	3.4.2	C
3	4.4.1	A
4	2.2.1	B
5	5.1.1	D
6	3.4.2	C
7	4.2.2	B
8	2.2.3	A
9	5.2.12	D
10	4.3.2	D
11	5.2.9	C
12	2.1.2	D
13	1.3.1	D
14	1.3.2	C
15	5.2.12	A
16	3.3.1	A
17	3.1.1	D

18	1.1.2	B
19	1.1.4	C
20	3.3.1	B
21	4.1.3	C
22	4.2.2	A
23	3.3.2	B
24	4.1.1	C
25	4.4.3	D
26	1.2.1	A
27	1.2.5	C
28	2.1.2	B
29	2.4.1	A
30	3.2.3	B
31	3.3.2	D
32	3.2.1	C
33	4.3.1	A
34	5.2.3	D