



RELEASED ITEMS

**MATHEMATICS
GRADE 8**

FALL 2005

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**MEAP GRADE 8 MATHEMATICS TEST
Reference Sheet**

Use this information as needed to answer questions on the MEAP Grade 8 Test.

Miscellaneous

Distance = rate × time

Interest = principal × rate × time

$\pi \approx 3.14$

Algebra

Straight Line: $y = mx + b$

If (x_1, y_1) and (x_2, y_2) are on a line,

then

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Area



Triangle: $A = \frac{1}{2}$ (base) × height



Rectangle: $A = \text{base} \times \text{height}$



Trapezoid: $A = \frac{1}{2}$ (sum of the bases) × height

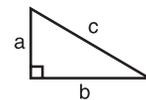


Parallelogram: $A = \text{base} \times \text{height}$



Circle: $A = \pi r^2$ Circumference = $2\pi r = \pi d$

Right Triangles



$a^2 + b^2 = c^2$

Total Surface Area

Cylinder: $SA = \text{circumference of the base} \times \text{height} + 2\pi r^2$

Cube: $SA = 6 \times (\text{length of edge})^2$

Pyramid: $SA = \frac{1}{2}$ (perimeter of base) × (slant height) + area of the base

Sphere: $SA = 4\pi r^2$

Cone: $SA = \frac{1}{2}$ (circumference of base) × (slant height) + πr^2

Prism: $SA = \text{sum of the area of the faces}$

Volume



$V = \pi r^2 \times \text{height}$



$V = (\text{length of edge})^3$



$V = \frac{1}{3}$ (area of base) × (altitude)



$V = \frac{4}{3} \pi r^3$



$V = \frac{1}{3} \pi r^2 \times \text{height}$



$V = \text{area of base} \times \text{height}$

PART 1

DIRECTIONS

This test has three parts. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional sheets may be used.

If you finish early, you may check your work for Part 1 **ONLY**.

Do **NOT** look at items in other parts of this test.

You will have at least 50 minutes to finish Part 1 of this test.

There is one type of item on this test: multiple-choice.

1. Multiple-choice items will require you to choose the best answer from among four answer choices. For these items, use only a No. 2 pencil to mark your answer in your **Answer Folder**. If you erase an answer, be sure to erase it completely. If you skip an item, be sure to mark the answer to the next item in the correct place in your **Answer Folder**.

Sample Multiple-Choice Item:

How much sales tax is charged when you buy a shirt that costs \$12?

<u>PRICE OF ITEM</u>	<u>SALES TAX</u>
\$1	\$0.06
\$2	\$0.12
\$3	\$0.18
\$4	\$0.24

- A \$0.60
- B \$0.66
- C \$0.72
- D \$0.78

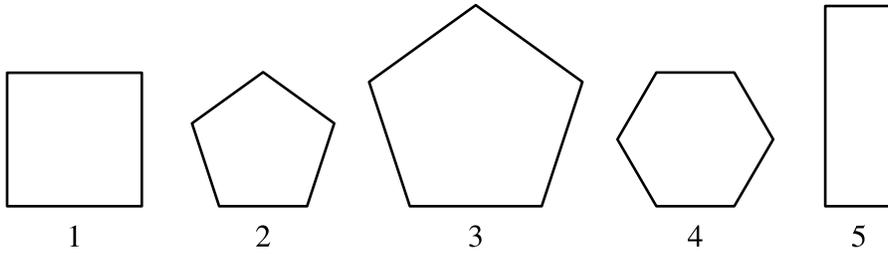
For this sample item, the correct answer is **C**. Circle **C** is filled in on the sample item in your **Answer Folder**.

You will have at least 30 minutes to finish Part 1 of this test. You will be given additional time if necessary.

1. Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page.
2. If you finish early, you may check your work in Part 1 of the test **ONLY**. Do **NOT** look at items in other parts of the test.

If you do not understand any of these directions, please raise your hand.

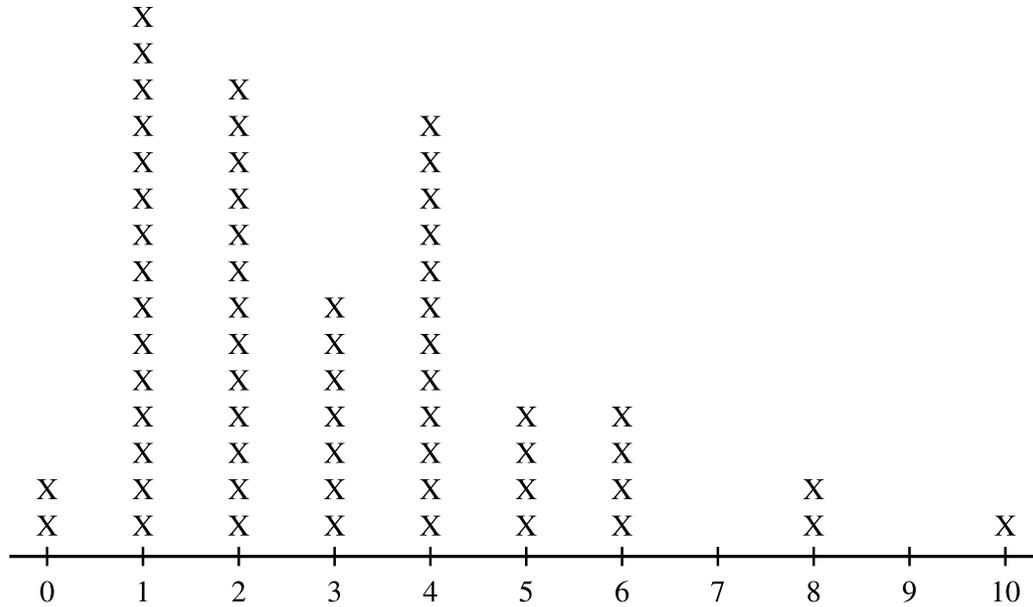
1 Which shapes in this group are similar?



- A 1 and 5
- B 2 and 3
- C 3 and 4
- D 2 and 4

- 2 Omar asked 60 people at the local mall how many movies they had rented in the past month. The line plot below displays the data he collected.

Movie Rental Survey



What is the mean number of movies rented by the people in Omar’s survey?

- A 1
- B 2.5
- C 3
- D 4

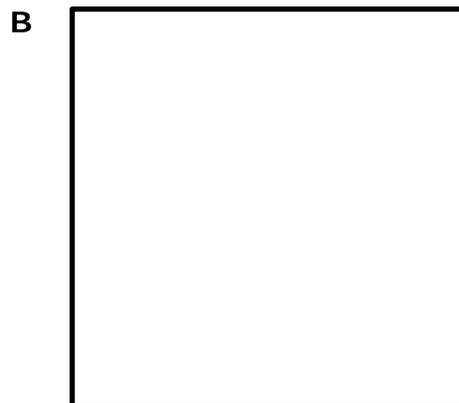
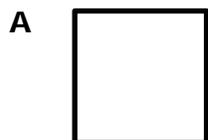
3 Alicia owes Kiara \$4. She gets \$10 from her father, pays Kiara back, and buys a ticket for the school talent show for \$3. How much money does Alicia have now?

- A \$ 3
- B \$ 7
- C \$11
- D \$17

4 Jennifer swims 10 laps. Each lap is 50 meters. How many meters does Jennifer swim?

- A 50 m
- B 100 m
- C 250 m
- D 500 m

5 Which of the following figures is similar to the given figure?



- 6 Five high school students go to a baseball game. The tickets normally cost \$8 each, but students can buy tickets for half price. How much did they pay for the five tickets?
- A \$20
- B \$25
- C \$32
- D \$40
- 7 Jefferson Middle School opened in 1998 with 42 eighth grade students. The table below shows the increase in the number of eighth graders.

Eighth Grade Enrollment

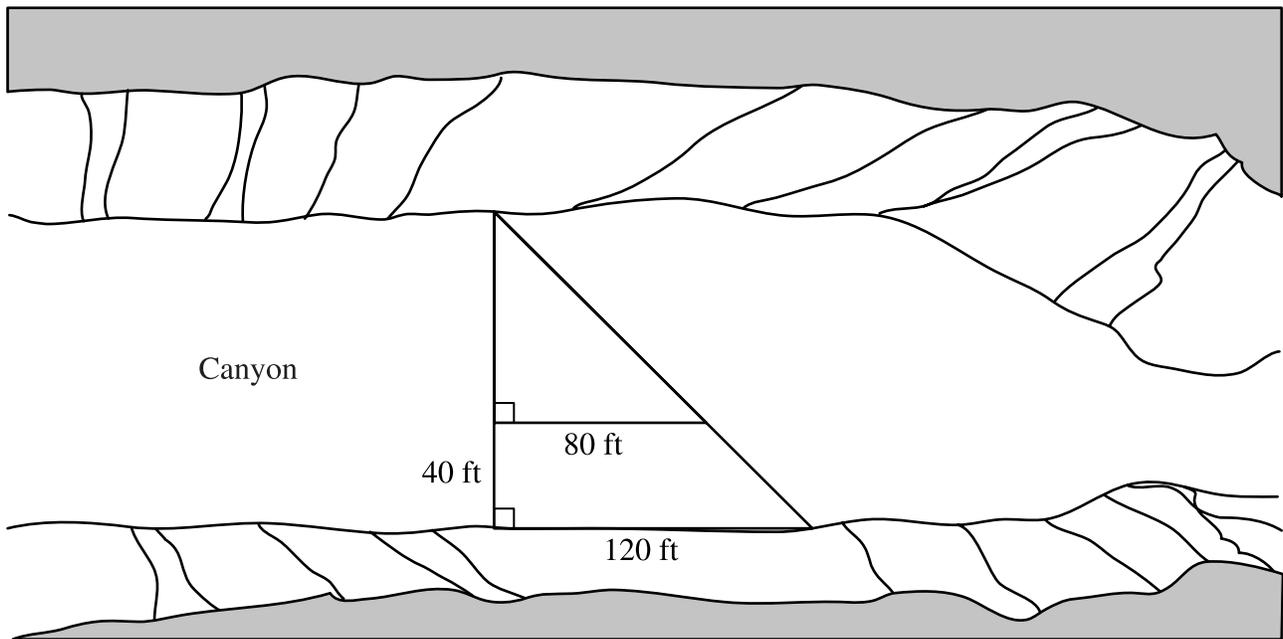
Year	Number of Students
1998	42
1999	59
2000	76
2001	93

What is the rate of increase in the number of eighth graders at Jefferson Middle School?

- A 17 students/year
- B 23 students/year
- C 42 students/year
- D 51 students/year

- 8 Erika bought 24 folders and 24 bottles of glue at the office supply store. The folders cost \$1.09 each and the bottles of glue cost \$1.29 each. Which amount is *closest* to the amount Erika spent?
- A \$ 48
- B \$ 60
- C \$ 72
- D \$120
- 9 Mrs. Flynn needs to take a taxi to the doctor's office. The taxi ride costs \$6.00 for the first mile and \$0.25 for each $\frac{1}{10}$ mile thereafter. How much does Mrs. Flynn pay for a 2.3-mile taxi ride?
- A \$ 5.75
- B \$ 9.25
- C \$11.75
- D \$12.75

- 10 A surveyor is trying to find the distance across a canyon. The measurements he takes are pictured below.



What is the *approximate* distance across the canyon?

- A 20 feet
 - B 27 feet
 - C 80 feet
 - D 120 feet
- 11 Which is the *best* approximation of $\sqrt{17}$?
- A 4.1
 - B 4.5
 - C 4.8
 - D 4.9

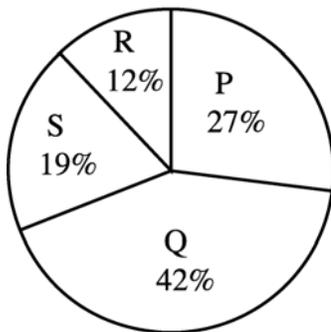
- 12 There were four candidates, P, Q, R, and S, in a local election. Each received a percentage of the total votes cast, as shown in the chart.

Votes for Candidates

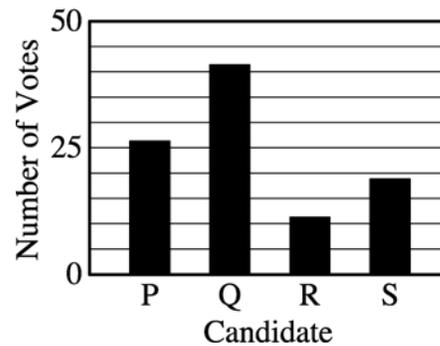
Candidate	Percent of Votes
P	27%
Q	42%
R	12%
S	19%

Which type of graph *best* illustrates the data?

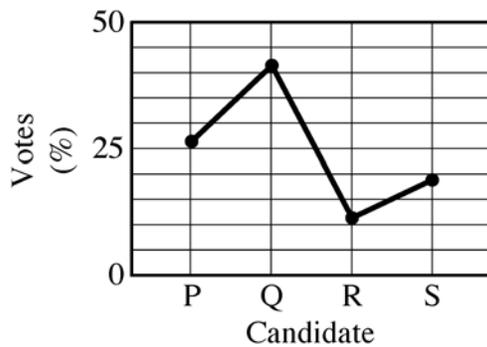
A Election Results



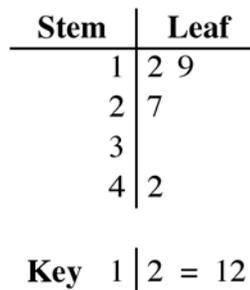
B Election Results



C Election Results



D Election Results



- 13 Which of the following numbers does **NOT** have a multiplicative inverse?
- A $-\frac{1}{3}$
 - B 0
 - C 1
 - D 3
- 14 The height of a horse is often measured in *hands*. A *hand* is the approximate length of the palm of a man's hand, or 4 inches. If a horse is 18 *hands* tall, how tall is the horse?
- A 4 feet
 - B 6 feet
 - C 8 feet
 - D 18 feet

PART 2

DIRECTIONS

You will now begin Part 2 of this test. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional sheets may be used.

If you finish early, you may check your work for Part 2 **ONLY**.

Do **NOT** look at items in other parts of this test.

You will have at least 50 minutes to finish Part 2 of this test.

15 A class of 25 students got the following scores on a test:

73, 68, 91, 85, 88, 77, 94, 62, 68, 74, 77, 85, 82,
78, 61, 66, 72, 77, 81, 93, 99, 84, 64, 75, 82.

The teacher did a tally of the grades and made a frequency table.

Interval	Tally	Frequency
60-69	I	6
70-79	III	8
80-89	II	7
90-99		5
Sum = 26		

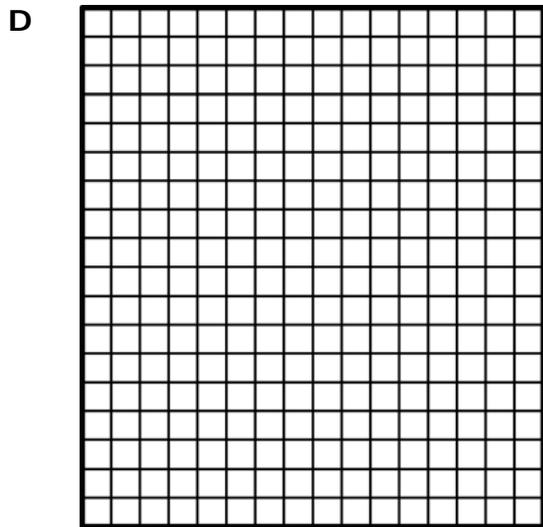
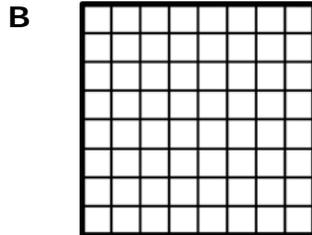
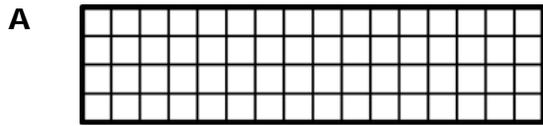
When the teacher added the frequencies, he realized he had made an error. In which interval is the error?

- A 60-69
- B 70-79
- C 80-89
- D 90-99

16 Linda is on the fourth floor of a building. Her car is in the parking garage three levels below the ground floor. She gets in the elevator and travels from the fourth floor above ground level to the third floor below ground level. How many floors did she travel?

- A -3
- B 1
- C 4
- D 7

17 Which of the choices below *best* illustrates 8^2 ?



18 Which is equivalent to -4 times -7 ?

A 4×7

B -4×7

C $\frac{4}{7}$

D $-4 \times \frac{1}{7}$

19 Jeremiah made a data table of all his grades last quarter. Which statement about this data is true?

Jeremiah's Quarter Averages

Course	Grade
Art	85
Music	95
History	90
Math	96
English	87
Science	89

- A The mean is greater than the median, so there are more data points above the mean than below.
- B The mean is greater than the median, so there are more data points below the mean than above.
- C The mean is greater than the median, so there are more data points below the median than above.
- D The mean is less than the median, so there are more data points above the mean than below.

- 20** Matt is playing a video game that uses numbers to move the characters. Negative numbers move the characters to the left and positive numbers move the characters to the right. His character is at the starting point. Which of the following combinations of numbers will move his character around and then back to the starting point?
- A** $(20) + (-10) + (5) + (-13) + (-7)$
- B** $(-7) + (12) + (-6) + (2) + (2)$
- C** $(-2) + (13) + (6) + (-9) + (-8)$
- D** $(18) + (-22) + (4) + (-4) + (-1)$
- 21** Huyen is helping her friend Ida with math homework. She wants to explain the identity property of addition to Ida. Which of these equations should Huyen use as an example?
- A** $1 + (2 + 3) = (1 + 2) + 3$
- B** $15 + -15 = 0$
- C** $8 + 12 = 12 + 8$
- D** $11 + 0 = 11$
- 22** Danielle is drawing two similar triangles in the sand. The smaller triangle has side lengths of 3 feet, 2 feet, and 4 feet. Two corresponding sides of the second triangle are 6 feet and 4 feet in length. What is the length of the third side of the larger triangle?
- A** 4 feet
- B** 5 feet
- C** 6 feet
- D** 8 feet

- 23** A swimming pool is being filled with water at a rate of 1 inch/minute. The owners started filling the pool at 6:00 a.m. What time was it when the water was 6 feet deep?
- A** 6:06 a.m.
 - B** 7:06 a.m.
 - C** 7:00 a.m.
 - D** 7:12 a.m.
- 24** In a football game, a team lost 13 yards on one play, gained 7 on the next, and lost 3 on the third. What is their position (gain or loss) from their original location?
- A** loss of 3 yards
 - B** loss of 9 yards
 - C** gain of 3 yards
 - D** gain of 17 yards
- 25** Max ran 1.5 miles in 12 minutes. What was his average speed in miles per hour (mph)?
- A** 7.5 mph
 - B** 10.5 mph
 - C** 12 mph
 - D** 21 mph

- 26 Mr. Perez’s and Mr. Lewis’s classes collected data about how many CDs each student owns.

Mr. Perez		Mr. Lewis
7620	0	155
320	1	0117
521100	2	566
	3	009
655000	4	
930	5	278
	6	5556
521	7	5
52	8	0
	9	02
9	10	5

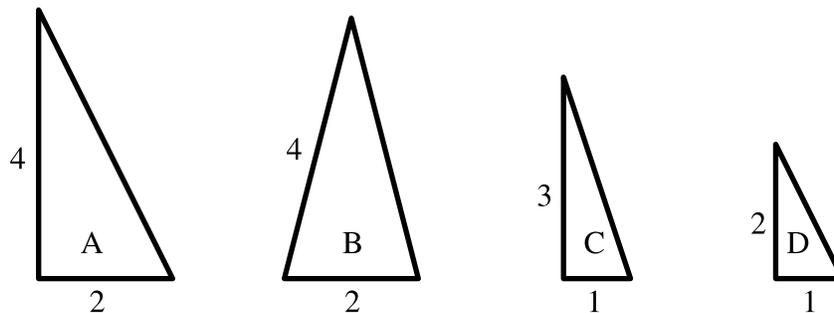
How many students are in Mr. Lewis’s class?

- A 11
 - B 25
 - C 53
 - D 64
- 27 A company is selling a new book in two sizes. The dimensions of the bigger book will be 18 inches by 12 inches. The ratio of the dimensions of the two books will be 3:1. What will be the dimensions of the smaller book?
- A 54 inches × 36 inches
 - B 15 inches × 9 inches
 - C 6 inches × 4 inches
 - D 3 inches × 1 inch

28 Tran saves \$0.25 each day during the month of December. Let d represent the date in December and m represent the money Tran saved. Which equation can be used to find the total amount of money Tran saved by any date in December?

- A $m = 0.25d$
- B $m = d \div 0.25$
- C $m = d + 0.25$
- D $m = d - 0.25$

29 Which two triangles are similar?

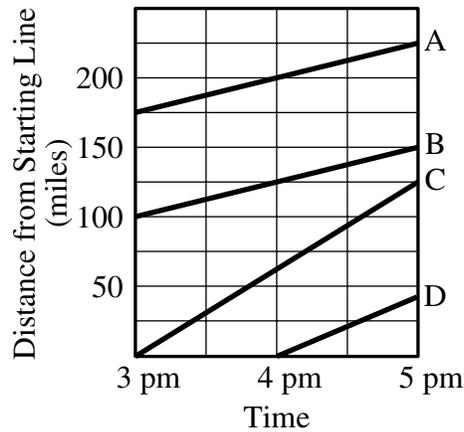


- A triangle A and triangle B
- B triangle B and triangle D
- C triangle C and triangle A
- D triangle D and triangle A

30 Eric swam 200 meters in 2 minutes 5 seconds. What was his speed in meters per second?

- A 0.9 m/sec
- B 1.6 m/sec
- C 20 m/sec
- D 40 m/sec

- 31 Four experimental cars, A, B, C, and D, are competing in a 500-mile race. Each car starts the course at a different time. Race officials record each car's distance from the starting line each hour. The following graph shows the location of each car from 3 p.m. to 5 p.m.



Which car was traveling at the *greatest* speed during the times observed?

- A Car A
 - B Car B
 - C Car C
 - D Car D
- 32 Which of the following is another way to represent this expression?

$$3a(b + 5c)$$

- A $3a(5bc)$
- B $3a(b) + 5c$
- C $3a(b) + 3a(5c)$
- D $(3a + b)(3a + 5c)$

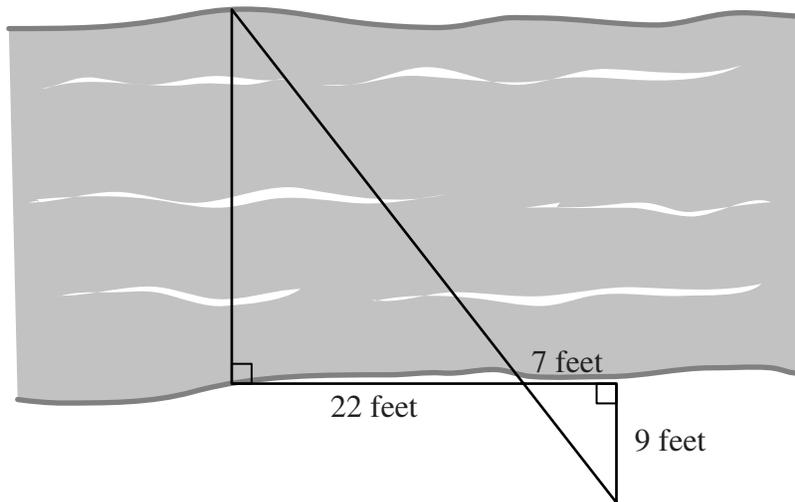
33 The distribution of grades in the eighth grade is shown below.

Grade Range	Number of Grades
91–100	49
81–90	152
71–80	206
61–70	50
51–60	33

What is the relative frequency of grades in the 91–100 range?

- A 1%
- B 10%
- C 20%
- D 49%

- 34 A scout troop marked off similar triangles on the ground in order to find the distance across a river.



What is the approximate distance across the river?

- A 17.1 feet
 - B 20 feet
 - C 24 feet
 - D 28.3 feet
- 35 Peter bought a suit on sale. The original price of the suit was \$149.50. The price of the suit was reduced by 20%. Approximately how much did Peter pay for the suit, including 5% sales tax?
- A \$120
 - B \$125
 - C \$135
 - D \$140

36 What is equivalent to the value of $3.1(5 - 4)$?

A $15.5 - 12.4$

B $3.1(-20)$

C $-15.5 + 12.4$

D $15.5 - 4$

37 What is the value of $\frac{32}{-8} - 4$?

A -16

B -8

C 0

D 16

PART 3

DIRECTIONS

You will now begin Part 3 of this test. You may use a calculator on this part of the test, and you may use open space in this test booklet for scratch paper. No additional sheets may be used.

If you finish early, you may check your work for Part 3 **ONLY**.

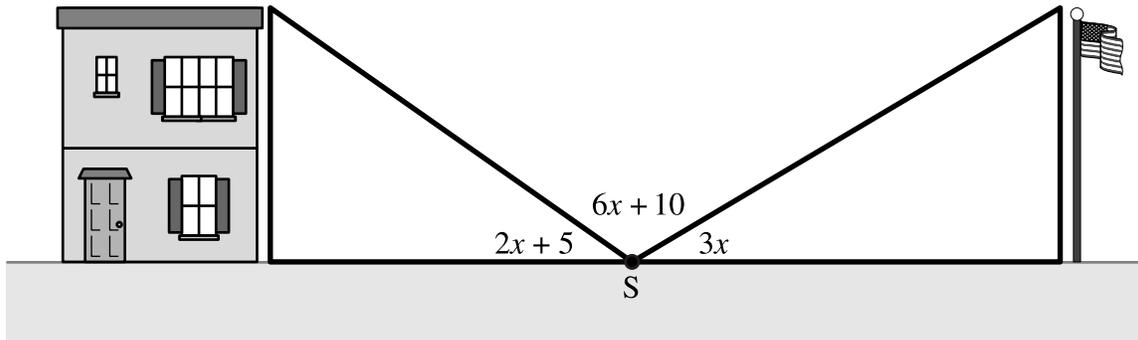
Do **NOT** look at items in other parts of this test.

You will have at least 50 minutes to finish Part 3 of this test.

- 38** Javier recorded the amount he spent on lunch each day for a month. If he wants to find the mode of the data, which of the following must he find?
- A** the average amount spent
 - B** the middle amount spent, when the amounts are ordered from least to greatest
 - C** the amount he spent most often
 - D** the difference between the greatest amount he spent and the least amount
- 39** An elevator can hold a maximum of 10 people who weigh an average of 180 pounds each. If a box of freight weighing 275 pounds is placed on the elevator, what strategy can be used to determine the number of people of average weight who can safely get on the elevator?
- A** Solve $275 + 180x = 1800$ and round down to the next whole number.
 - B** Solve $180x = 1800 + 275$ and round up to the next whole number.
 - C** Solve $275 + 180x = 1800$ and do not round.
 - D** Solve $1800 + 180x = 275$ and do not round.
- 40** Which of the following is another way to represent this expression?
- $$3x + (2x - 1) + 5(x + 2)$$
- A** $10x + 4$
 - B** $10x + 6$
 - C** $10x + 9$
 - D** $11x + 4$

- 41 Michael is mixing concrete. The directions say to add 1 quart of water per pound of concrete mix. The concrete mix comes in 30-pound bags. What is the ratio of gallons of water per bag of concrete mix?
- A 3.8 gallons/bag
 - B 7.5 gallons/bag
 - C 30 gallons/bag
 - D 120 gallons/bag
- 42 Which is the *best* approximation of the cube root of 31?
- A 3.1
 - B 3.5
 - C 5.5
 - D 10
- 43 Jill is putting a tile floor in her kitchen. She needs 52 tiles to cover the whole floor. There are 24 tiles in a box. A box costs \$23.95. Individual tiles cost \$2.95. Sales tax is 5%. Approximately how much will 52 tiles cost, including sales tax?
- A \$50
 - B \$57
 - C \$60
 - D \$63

44 A surveyor stood at point S and measured the angles indicated below.

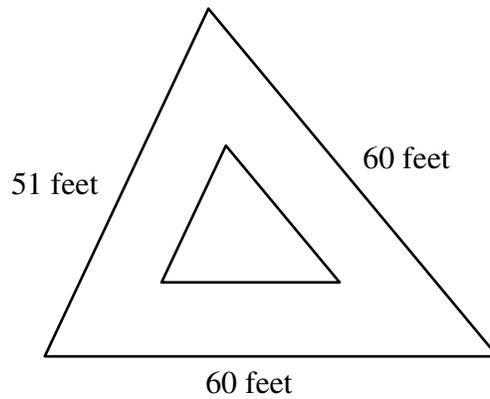


Which of the following equations could be used to find the number of degrees in each of these three angles?

Number of degrees in a straight line = 180 degrees.

- A $11x + 15 = 180$
- B $11x + 50 = 180$
- C $12x + 15 = 180$
- D $36x + 50 = 180$

- 45 Mr. Stephens races pigs at the county fair. He is designing a new race track and has built the exterior rails with the dimensions shown below.



The interior rails of the track need to form a smaller triangle similar to the exterior rails. Which of the following length rails can he use?

- A 20 feet, 20 feet, 11 feet
- B 17 feet, 20 feet, 20 feet
- C 120 feet, 120 feet, 102 feet
- D 6 feet, 6 feet, 5 feet

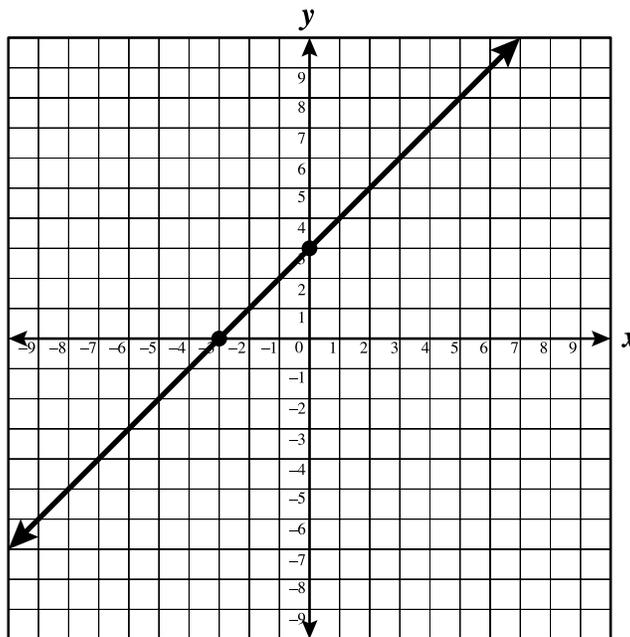
- 46 Mrs. Hong took her grandchildren fishing every day when they visited her during the summer. The number of fish they caught each day is recorded in the table below.

Day	Number of Fish Caught
Tuesday	8
Wednesday	10
Thursday	2
Friday	5
Saturday	8
Sunday	12

What is the range of the data?

- A 7.5
- B 8
- C 10
- D 12

47 What is the correct equation to find the points on the line in the graph below?



- A $y = x + 3$
- B $y = x - 3$
- C $y = 2x + 3$
- D $x = y + 3$

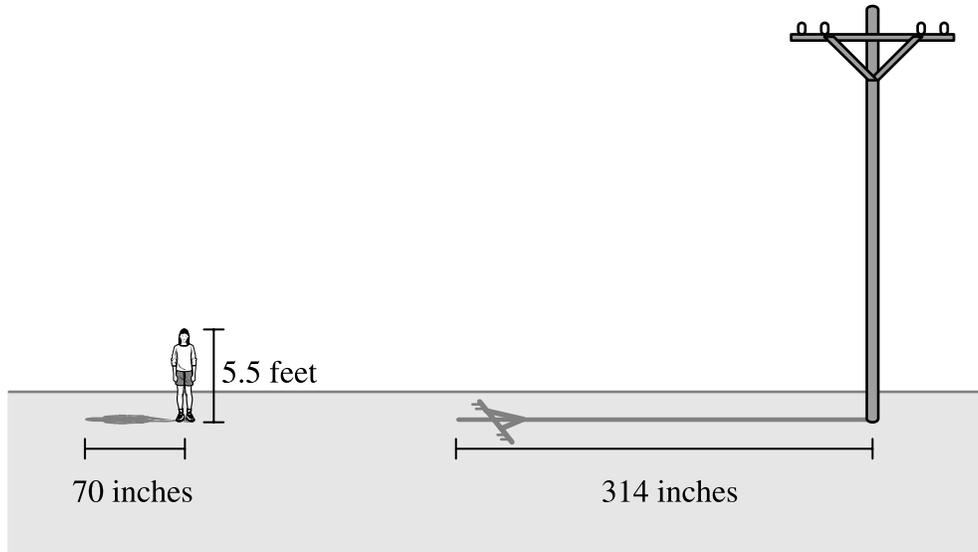
48 Four friends ride their bicycles at the speeds shown below.

- Jacob 9 feet per second
- Kendra 170 yards per minute
- Larry 500 feet per minute
- Selena 5 miles per hour

Who is riding his or her bicycle the fastest?

- A Jacob
- B Kendra
- C Larry
- D Selena

- 49 A girl 5.5 feet tall casts a shadow 70 inches long at the same time that a telephone pole casts a 314-inch shadow. Which proportion **CANNOT** be used to find the height of the telephone pole?



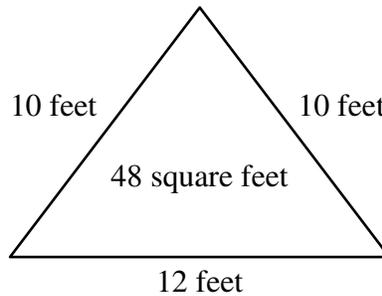
- A $\left(\frac{70}{5.5}\right) = \left(\frac{314}{x}\right)$
- B $\left(\frac{70}{314}\right) = \left(\frac{5.5}{x}\right)$
- C $\left(\frac{x}{5.5}\right) = \left(\frac{314}{70}\right)$
- D $\left(\frac{70}{x}\right) = \left(\frac{5.5}{314}\right)$
- 50 Marcus is making a sailboat with two similar triangular sails. The side lengths of the larger sail are 3 times the dimensions of the smaller sail. How do the areas of the sails compare?
- A The area of the larger sail is 3 times the area of the smaller sail.
- B The area of the larger sail is 6 times the area of the smaller sail.
- C The area of the larger sail is 9 times the area of the smaller sail.
- D The area of the larger sail is 27 times the area of the smaller sail.

- 51 India counted the number of pages she wrote in her journal each week during her stay at her grandparents' house.

Week	Number of Pages Written
1	12
2	30
3	28
4	18

What is the median number of pages she wrote per week?

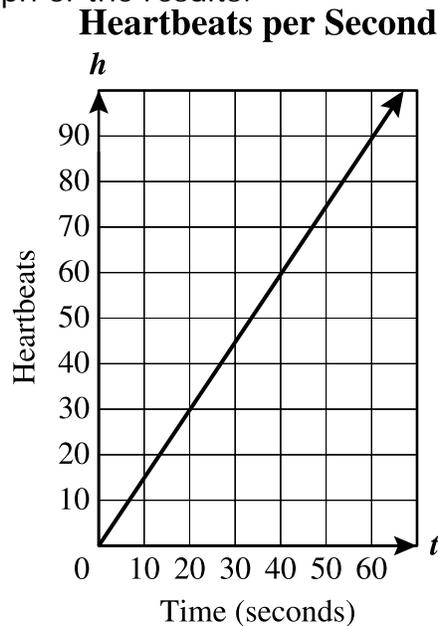
- A 0
 - B 18
 - C 22
 - D 23
- 52 Micajah is landscaping his backyard. The first flower bed he created is pictured below:



The second flower bed will be a similar triangle with an area of 12 square feet. What is the perimeter of the second flower bed?

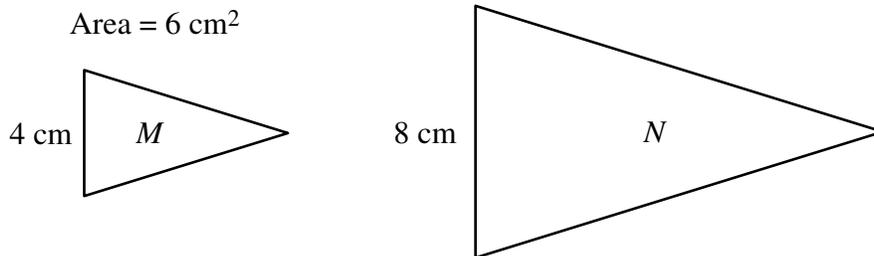
- A 11 feet
- B 16 feet
- C 26 feet
- D 64 feet

- 53 Sharona found the number of times her heart beat in 10, 20, 30, 40, 50, and 60 seconds. She made a graph of the results.



Which equation does Sharona’s graph represent? Use h to represent “heartbeats” and t to represent “time in seconds.”

- A $t = 1.5h$
 - B $t = h + 10$
 - C $h = 1.5t$
 - D $h = t + 10$
- 54 Triangles M and N are similar. What is the area of triangle N?



- A 10 square centimeters
- B 12 square centimeters
- C 24 square centimeters
- D 36 square centimeters



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Scoring Key

Part 1:

Item #	Answer Key
1	B
2	C
3	A
4	D
5	D
6	A
7	A
8	B
9	B
10	D
11	A
12	A
13	B
14	B

Part 2:

Item #	Answer Key
15	D
16	D
17	B
18	A
19	B
20	C
21	D
22	D
23	D
24	B
25	A
26	B
27	C
28	A
29	D
30	B
31	C
32	C
33	B
34	D
35	B
36	A
37	B

Part 3

Item #	Answer Key
38	C
39	A
40	C
41	B
42	A
43	D
44	A
45	B
46	C
47	A
48	A
49	D
50	C
51	D
52	B
53	C
54	C