



RELEASED ITEMS

**MATHEMATICS
GRADE 8**

Fall 2008

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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:

$$A = \frac{1}{2}(\text{base}) \times \text{height}$$



Rectangle:

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



Trapezoid:

$$A = \frac{1}{2}(\text{sum of the bases}) \times \text{height}$$



Parallelogram:

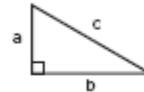
$$A = \text{base} \times \text{height}$$



Circle:

$$A = \pi r^2 \quad \text{Circumference} = 2\pi r = \pi d$$

Right Triangles



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

Total Surface Area		Volume	
Cylinder:	SA = circumference of the base × height + $2\pi r^2$		$V = \pi r^2 \times \text{height}$
Cube:	SA = $6 \times (\text{length of edge})^2$		$V = (\text{length of edge})^3$
Pyramid:	SA = $\frac{1}{2}$ (perimeter of base) × (slant height) + area of the base		$V = \frac{1}{3}$ (area of base) × (altitude)
Sphere:	SA = $4\pi r^2$		$V = \frac{4}{3} \pi r^3$
Cone:	SA = $\frac{1}{2}$ (circumference of base) × (slant height) + πr^2		$V = \frac{1}{3} \pi r^2 \times \text{height}$
Prism:	SA = sum of the area of the faces		$V = \text{area of base} \times \text{height}$

PART 1

DIRECTIONS

This test has two parts. You may **NOT** use a calculator on Part 1. You may use open space in this test booklet for scratch paper. No additional paper may be used.

Part 1 has only multiple-choice questions. You must choose the *best* answer from among four answer choices.

- Use only a No. 2 pencil to mark your answer in your **Answer Document**.
- If you erase an answer, be sure to erase it completely.
- If you skip a question, be sure to mark the answer to the next question in the correct place in your **Answer Document**.

Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the *least* number of cases that Marty will need to hold all his CDs?

- A 8
- B 9
- C 10
- D 11

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

You will have at least 25 minutes to finish Part 1 of this test. You will be given additional time if necessary.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page.

If you finish early, you may check your work in Part 1 of the test **ONLY**. Do **NOT** look at questions in Part 2 of the test.

1 Add, subtract, multiply & divide rational numbers

- A made positive fraction negative, then added
- B additive inverse of solution
- C correct
- D made negative fraction positive, then added

2 What is the value of the expression below?

$$6 \times (-2) \div -3$$

- A -9
- B -4
- C 1
- D 4

3 Estimate results of computations with rationals

- A underestimate
- B underestimate
- C correct
- D overestimate

- 4 Which is closest to the value of the following expression?

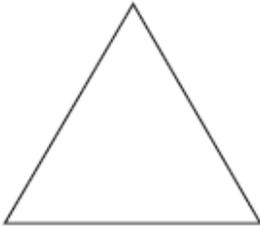
$$-\frac{1}{6} + \frac{4}{3} + \left(\frac{1}{2} - \frac{5}{6}\right) + \frac{7}{2}$$

- A 6
 - B 5
 - C 4
 - D 3
- 5 Use ruler, other tools to draw polygons
- A incorrect measurement
 - B incorrect measurement
 - C incorrect measurement
 - D correct

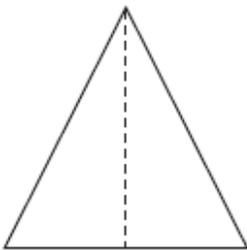
6 Which of the following appears to be a triangle with sides that each measure $3\frac{1}{2}$ centimeters?

A 

B



C



D 

7 Show linear relats. w/ tables, graphs, formulas

A correct

B reciprocal of slope, incorrect y-intercept

C additive inverse of slope, correct y-intercept

D additive inverse of reciprocal of slope, incorrect y-int

- 8 Which equation shows the relationship between values of x and y in the table below?

x	y
-3	4
-1	$\frac{4}{3}$
1	$-\frac{4}{3}$
3	-4

A $y = -\frac{4}{3}x$

B $y = x + 7$

C $y = x - 7$

D $y = \frac{4}{3}x$

9 In which table does the data represent a linear relationship between x and y ?

A

x	y
-2	1
-1	3
0	7
1	15

B

x	y
0	0
1	2
2	4
3	9

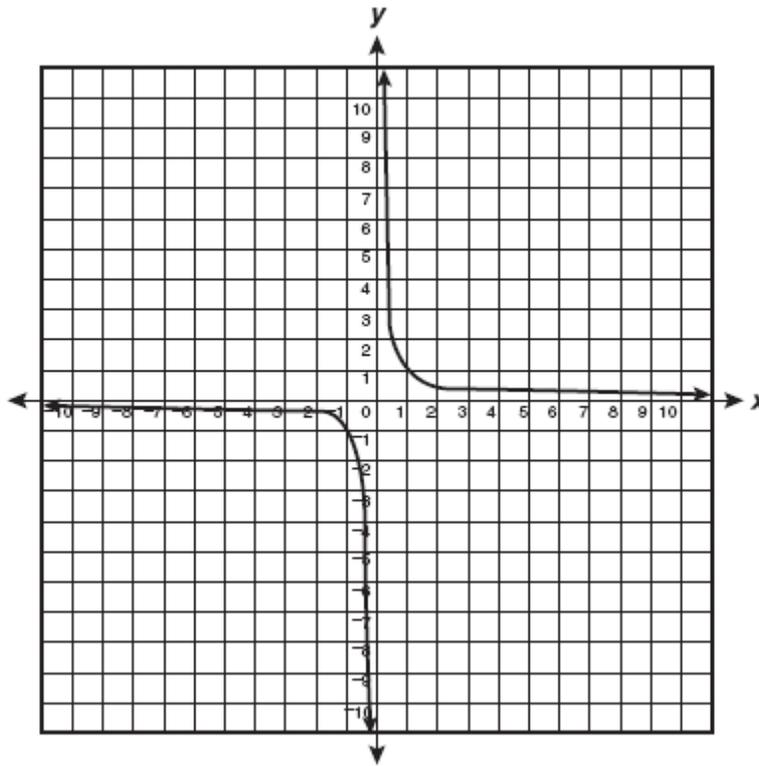
C

x	y
0	0
1	2
2	4
3	6

D

x	y
-2	1
0	2
1	3
2	4

10 Which equation *best* represents the graph on the coordinate plane shown below?



- A $y = \frac{x}{2}$
- B $y = -4x + 2$
- C $y = x$
- D $y = \frac{1}{x}$

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 paper may be used.

This part of the test has both multiple-choice questions and a constructed-response question.

Multiple-choice questions will require you to choose the *best* answer from among four answer choices.

- Use only a No. 2 pencil to mark your answer in your **Answer Document**.
- If you erase an answer, be sure to erase it completely.
- If you skip a question, be sure to mark the answer to the next question in the correct place in your **Answer Document**.

Sample Multiple-Choice Question:

Marty wants to put 75 CDs into cases. Each case holds exactly 8 CDs. What is the *least* number of cases that Marty will need to hold all his CDs?

- A 8
- B 9
- C 10
- D 11

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

You will have at least 50 minutes to finish Part 2 of this test. You will be given additional time if needed.

Once you have reached the word **STOP** in your test booklet, do **NOT** go on to the next page.

If you finish early, you may check your work in Part 2 of the test **ONLY**. Do **NOT** look at questions in Part 1 of the test.

- 11 Calculate rates of change, including speed
- A too fast
 - B reciprocal
 - C correct
 - D too slow
- 12 While taking Gina's pulse rate on her wrist, Jeff counted 9 beats in 10 seconds. Which best represents Gina's pulse rate?
- A 9 beats per minute
 - B 54 beats per minute
 - C 90 beats per minute
 - D 540 beats per minute
- 13 Convert ratio quantities between systems of units
- A used reciprocals of conversion ratios
 - B incorrect conversion
 - C incorrect conversion
 - D correct
- 14 Raul rides his bicycle at a rate of 8 inches per second. What is the rate in feet per minute?
- (1 foot = 12 inches)
(1 minute = 60 seconds)
- A 7.5
 - B 40.0
 - C 96.0
 - D 480.0

15 Solve proportion problems

- A incorrect proportion
- B incorrect proportion
- C correct
- D incorrect proportion

16 What value of x makes the equation below true?

$$\frac{x}{4} = \frac{6}{48}$$

- A 0.50
 - B 0.03
 - C 2
 - D 3
- 17 Understand the concept of square root and cube root
- A correct
 - B square root means divide by 4
 - C square root means divide by 3
 - D square root means divide by 2

18 Which is *closest* to the square root of 11?

- A 3
- B 6
- C 44
- D 121

19 Solve problems involving operations with integers

- A additive inverse
- B added, instead of subtracted
- C additive inverse of adding
- D correct

20 A scientist was tracking a whale. At noon, the whale was 5 feet below the surface of a body of water. The following are the whale's movements over the next several hours.

- Dove down 3 more feet
- Rose up 8 feet
- Dove down 15 feet
- Rose up 3 feet

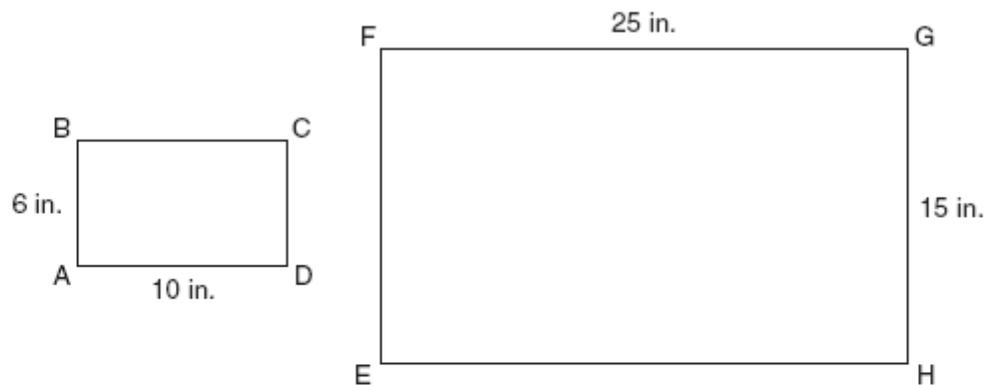
After all of the movements described above, which statement best describes the position of the whale in relation to the surface of the water?

- A 12 feet above the surface of the water
- B 2 feet below the surface of the water
- C 2 feet above the surface of the water
- D 12 feet below the surface of the water

21 Know properties of similar figures and scale factor

- A incorrect conclusion about side lengths
- B incorrect conclusion about side lengths
- C incorrect conclusion about angle measures
- D correct

22 Rectangle ABCD is similar to rectangle EFGH.



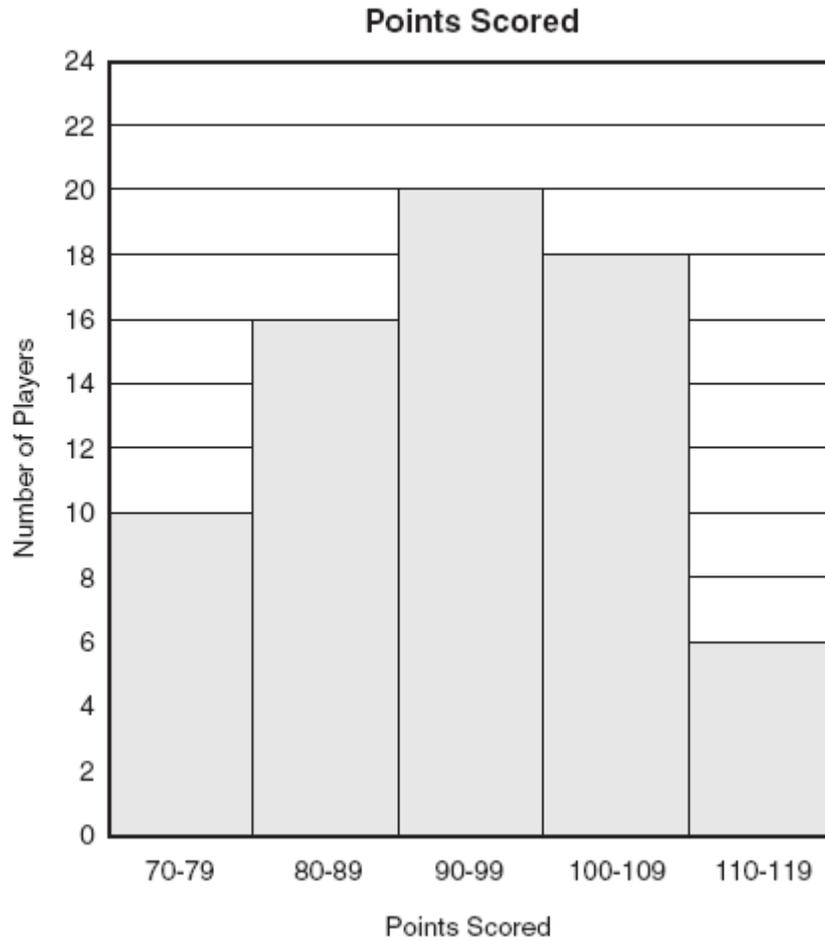
What is the scale factor from rectangle ABCD to rectangle EFGH?

- A 1.5
 - B 2.5
 - C 5.0
 - D 19.0
- 23 Solve problems of similar figures, scale drawings
- A incorrect length
 - B incorrect length
 - C correct
 - D incorrect length

- 24 A scale drawing of a house uses 0.5 inch to represent 3 feet. If the floor of a room in the house is 24 feet long, what is its length in the drawing?
- A 48 inches
 - B 12 inches
 - C 8 inches
 - D 4 inches
- 25 Show similarity of triangles using properties
- A incorrect conclusion about angles
 - B incorrect conclusion about angles
 - C incorrect conclusion about side lengths
 - D correct
- 26 If $\triangle LMN$ is similar to $\triangle XYZ$, which of the following must be true?
- A $\frac{LM}{XY} = \frac{MN}{YZ} = \frac{NL}{ZX}$
 - B $\frac{LM}{XY} = \frac{MN}{ZX} = \frac{NL}{YZ}$
 - C $\frac{LM}{XY} > \frac{MN}{YZ}$ and $m\angle L = m\angle X$
 - D $\frac{LM}{XY} > \frac{NL}{ZX}$ and $m\angle M > m\angle Y$

- 27 Use similarity of triangles and scale factor
- A did not apply scale factor
 - B divided area by scale factor
 - C multiplied area by scale factor
 - D correct
- 28 Triangles ABC and DEF are similar. The length of each side of triangle ABC is 8 times the length of each corresponding side of triangle DEF. How many times greater is the area of triangle ABC than the area of triangle DEF?
- A 4
 - B 8
 - C 16
 - D 64
- 29 Create, select, interpret graphical representations
- A percent = count
 - B correct
 - C incorrect count
 - D added 100 to percent given in circle graph

- 30 The histogram below represents the total points scored by the players during a basketball tournament.



According to the graph, what number of players scored in the interval of 100 to 119 points?

- A 6
- B 18
- C 19
- D 24

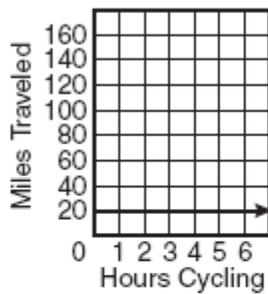
- 31 Create, select, interpret graphical representations
- A complement of solution in D
 - B complement of relative frequency
 - C correct
 - D less than or equal to, instead of less than
- 32 A survey was given to 250 women. Each woman was asked how many children she had. The results showed that 0.28 of the women had 3 or more children. How many of the women surveyed had fewer than 3 children?
- A 28
 - B 70
 - C 72
 - D 180
- 33 Find, interpret the median, quartiles, and IQR
- A minimum
 - B correct
 - C mean
 - D middle number of unordered list
- 34 The range of a set of numbers is 28. The number with the greatest value in the set is 114. What is the number with the least value in the set of numbers?
- A 43
 - B 57
 - C 71
 - D 86

35 Solve applied linear problems w/ graphs, equations

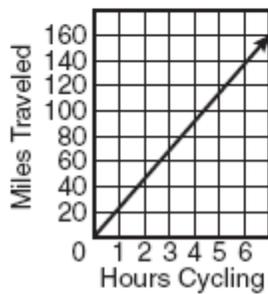
- A** correct
- B** incorrect y-intercept, incorrect slope
- C** incorrect y-intercept, correct slope
- D** incorrect y-intercept, incorrect slope

- 36 Michael cycled at a constant speed of 20 miles per hour. Which graph best shows the relationship between the number of miles he traveled and the number of hours he cycled?

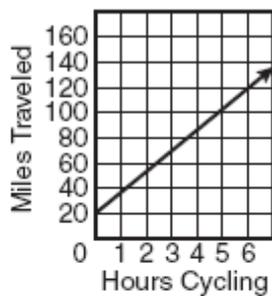
A Michael Cycling



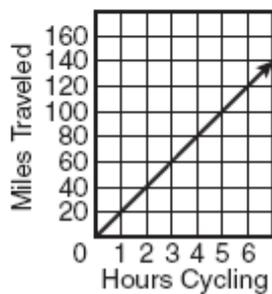
B Michael Cycling



C Michael Cycling



D Michael Cycling



37 Understand & use basic properties of real numbers

- A distributive property
- B multiplicative identity
- C associative property
- D correct

38 Which is equivalent to the following expression?

$$7(x + 4)$$

- A $7x + 28$
- B $28x$
- C $x + 11$
- D $7x + 4$

39 Compute simple linear algebraic expressions

- A correct
- B $a(bx - cy) = abx - cy$
- C $a(bx - cy) = (ab - c)xy$
- D $a(bx - cy) = a(b - c)xy$

40 Which is equivalent to the expression below?

$$8x - 2y + 4y$$

- A $8x - 2y$
- B $8x + 2y$
- C $10x + y$
- D $10xy$

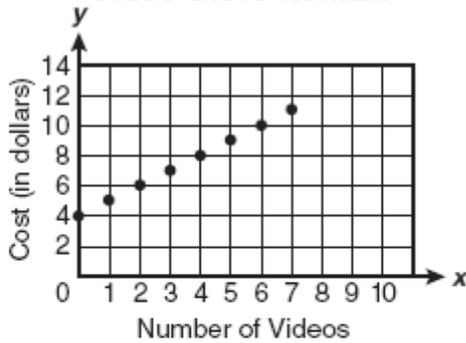
- 41 Which ordered pair represents the point where the graph of the following equation intersects the x-axis?

$$y = 5x - 10$$

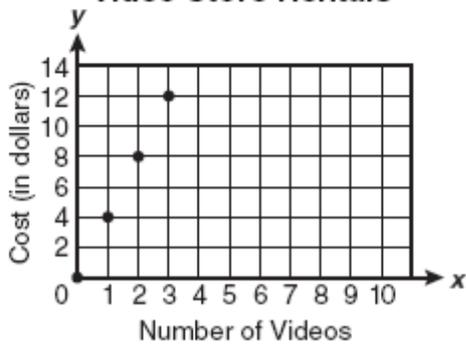
- A (0, -10)
 - B (0, 10)
 - C (-2, 0)
 - D (2, 0)
- 42 Claire needs a total of \$24 to pay for a school field trip. She has saved \$9. She is selling ribbons for \$0.75 to raise the rest of the money she needs. What is the least number of ribbons Claire must sell to raise the money she still needs?
- A 12
 - B 20
 - C 32
 - D 44

- 43 In addition to a one-time \$4.00 membership fee, a video store charges \$1.00 for every video rented. Which graph below *best* represents this situation?

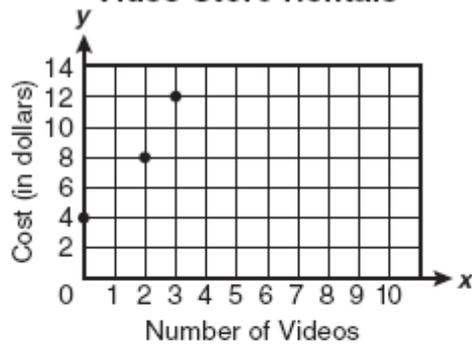
A Video Store Rentals



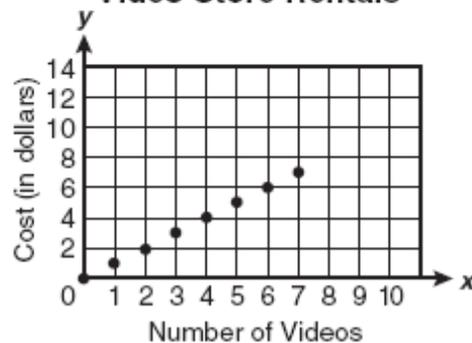
B Video Store Rentals



C Video Store Rentals



D Video Store Rentals

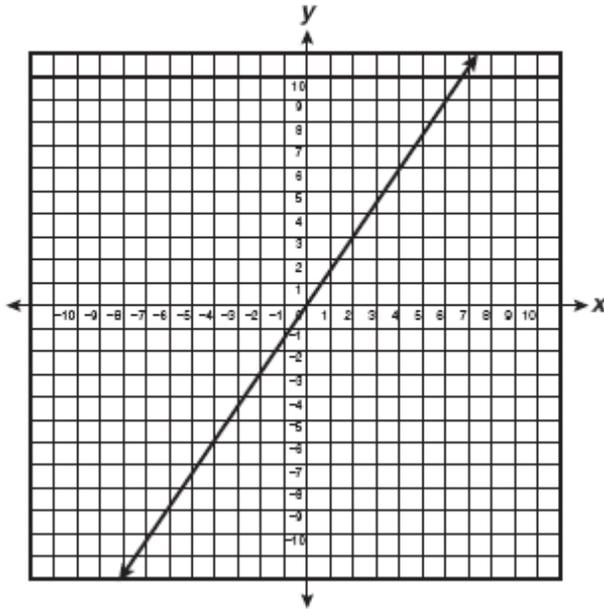


- 44 For the following equation, what is the value of y when $x = 18$?

$$y = \frac{1}{6}x$$

- A $\frac{1}{3}$
- B 3
- C $\frac{1}{108}$
- D 108

45 Which appears to be the slope of the line graphed below?



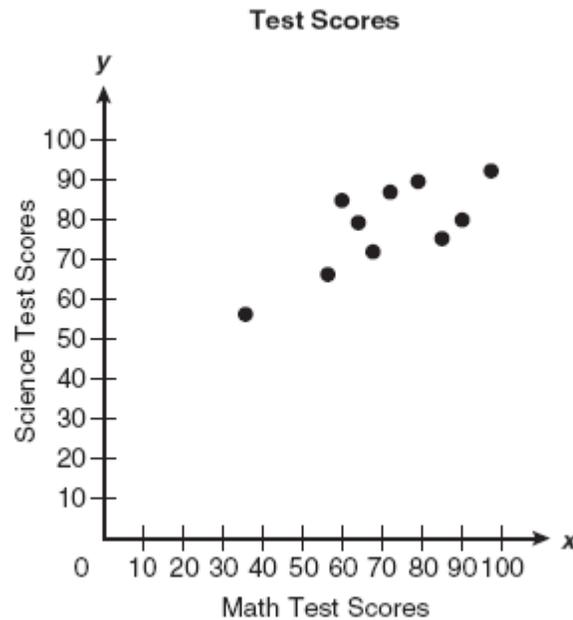
- A $\frac{1}{3}$
- B $\frac{2}{3}$
- C $\frac{3}{2}$
- D $\frac{3}{1}$

- 46 Which equation represents the data in the following table?

x	y
0	2
4	-1
8	-4
12	-7

- A $y = -\frac{3}{4}x$
- B $y = -\frac{4}{3}x$
- C $y = -\frac{3}{4}x + 2$
- D $y = -\frac{4}{3}x + 2$
- 47 A lawn mowing company contracts to mow 60 lawns per day. Currently the company employs 6 people to mow lawns but will double the number of employees. If each current and new employee mows the same number of lawns per day, how many would they each mow?
- A 5
- B 6
- C 10
- D 12

- 48 The scatterplot below shows some students' science and math test scores.



Which equation would *most accurately* represent the line of best fit for this set of data?

- A $y = \frac{2}{3}x + 30$
- B $y = \frac{1}{2}x + 70$
- C $y = -\frac{2}{3}x + 70$
- D $y = -\frac{1}{2}x + 10$

- 49 A bus used 23 gallons of gasoline to travel a distance of 207 miles. Which is closest to the number of miles the bus traveled for each gallon of gasoline?
- A 9
 - B 184
 - C 230
 - D 4,761

Scoring Key: Part 1

Item No.	Correct Answer	GLCE	Type	Description
1	C	N.FL.07.08	Core	Add, subtract, multiply & divide rational numbers
2	D	N.FL.07.08	Core	Add, subtract, multiply & divide rational numbers
3	C	N.FL.07.09	Core	Estimate results of computations with rationals
4	C	N.FL.07.09	Core	Estimate results of computations with rationals
5	D	G.SR.07.01	Core	Use ruler, other tools to draw polygons
6	B	G.SR.07.01	Core	Use ruler, other tools to draw polygons
7	A	A.RP.07.02	Core	Show linear relats. w/ tables, graphs, formulas
8	A	A.RP.07.02	Core	Show linear relats. w/ tables, graphs, formulas
9	C	A.PA.07.01	Future	Recognize proportional or linear relationships
10	D	A.RP.07.10	Future	Know properties of the graph of $y = k/x$

Scoring Key: Part 2

Item No.	Correct Answer	GLCE	Type	Description
11	C	N.FL.07.03	Core	Calculate rates of change, including speed
12	B	N.FL.07.03	Core	Calculate rates of change, including speed
13	D	N.MR.07.04	Core	Convert ratio quantities between systems of units
14	B	N.MR.07.04	Core	Convert ratio quantities between systems of units
15	C	N.FL.07.05	Core	Solve proportion problems
16	A	N.FL.07.05	Core	Solve proportion problems
17	A	N.MR.07.06	Core	Understand the concept of square root and cube root
18	A	N.MR.07.06	Core	Understand the concept of square root and cube root
19	D	N.FL.07.07	Core	Solve problems involving operations with integers
20	D	N.FL.07.07	Core	Solve problems involving operations with integers
21	D	G.TR.07.03	Core	Know properties of similar figures and scale factor.
22	B	G.TR.07.03	Core	Know properties of similar figures and scale factor.
23	C	G.TR.07.04	Core	Solve problems of similar figures, scale drawings
24	D	G.TR.07.04	Core	Solve problems of similar figures, scale drawings
25	D	G.TR.07.05	Core	Show similarity of triangles using properties
26	A	G.TR.07.05	Core	Show similarity of triangles using properties
27	D	G.TR.07.06	Core	Use similarity of triangles and scale factor
28	D	G.TR.07.06	Core	Use similarity of triangles and scale factor
29	B	D.RE.07.01	Core	Create, select, interpret graphical representations
30	D	D.RE.07.01	Core	Create, select, interpret graphical representations
31	C	D.AN.07.03	Core	Interpret relative & cumulative frequencies
32	D	D.AN.07.03	Core	Interpret relative & cumulative frequencies
33	B	D.AN.07.04	Core	Find, interpret the median, quartiles, and IQR

Scoring Key: Part 2

34	D	D.AN.07.04	Core	Find, interpret the median, quartiles, and IQR
35	A	A.PA.07.04	Core	Solve applied linear problems w/ graphs, equations
36	D	A.PA.07.04	Core	Solve applied linear problems w/ graphs, equations
37	D	A.PA.07.11	Core	Understand & use basic properties of real numbers
38	A	A.PA.07.11	Core	Understand & use basic properties of real numbers
39	A	A.FO.07.12	Core	Compute simple linear algebraic expressions
40	B	A.FO.07.12	Core	Compute simple linear algebraic expressions
41	D	A.FO.07.08	Future	Find and interpret x and y intercepts
42	B	A.FO.07.13	Future	Generate and solve linear equations
43	A	A.PA.07.03	Future	Graph linear equations & interpret slope
44	B	A.PA.07.05	Future	Use proportional & linear relationships
45	C	A.PA.07.06	Future	Compute the slope of a linear equation
46	C	A.PA.07.07	Future	Graph linear equations, interpret slope, y- intercept
47	A	A.PA.07.09	Future	Recognize inversely proportional relationships
48	A	D.AN.07.02	Future	Make, interpret scatterplots; find line of best fit
49	A	N.MR.07.02	Future	Solve problems involving derived quantities