

VIRGINIA STANDARDS OF LEARNING

**Spring 2010 Released Test**

# GRADE 8 MATHEMATICS

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Form M0110, CORE 1

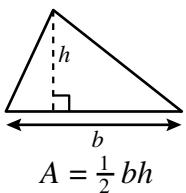
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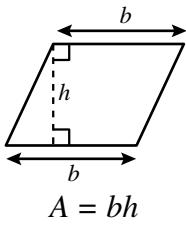


# Grade 8 Mathematics Formula Sheet

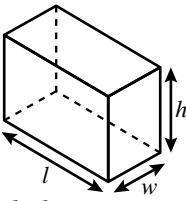
## Geometric Formulas



$$A = \frac{1}{2}bh$$

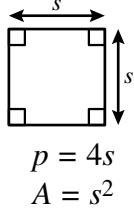


$$A = bh$$



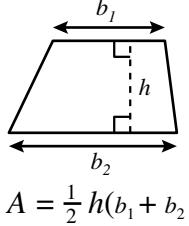
$$V = lwh$$

$$S.A. = 2lw + 2lh + 2wh$$

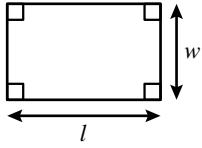


$$P = 4s$$

$$A = s^2$$

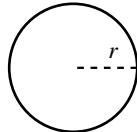


$$A = \frac{1}{2}h(b_1 + b_2)$$



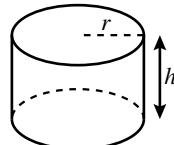
$$P = 2l + 2w$$

$$A = lw$$



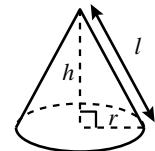
$$C = 2\pi r$$

$$A = \pi r^2$$



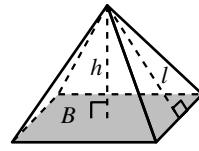
$$V = \pi r^2 h$$

$$S.A. = 2\pi rh + 2\pi r^2$$



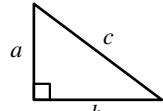
$$V = \frac{1}{3}\pi r^2 h$$

$$S.A. = \pi rl + \pi r^2$$



$$V = \frac{1}{3}Bh$$

$$S.A. = \frac{1}{2}lp + B$$



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

## Abbreviations

milligram	mg
gram	g
kilogram	kg
milliliter	mL
liter	L
kiloliter	kL
millimeter	mm
centimeter	cm
meter	m
kilometer	km
square centimeter	cm <sup>2</sup>
cubic centimeter	cm <sup>3</sup>

ounce	oz
pound	lb
quart	qt
gallon	gal.
inch	in.
foot	ft
yard	yd
mile	mi.
square inch	sq in.
square foot	sq ft
cubic inch	cu in.
cubic foot	cu ft

volume	$V$
total surface area	$S.A.$
area of base	$B$

year	yr
month	mon
hour	hr
minute	min
second	sec

## Pi

$$\pi \approx 3.14$$

$$\pi \approx \frac{22}{7}$$



**Directions**

Read each question and choose the best answer.

**SAMPLE**

**Vicki had \$228. She spends \$37 on a gift. How much did she have left?**

- A**   \$211
- B**   \$191
- C**   \$181
- D**   \$164

**1 Which value is equivalent to the expression shown?**

$$-5(3 \cdot 2 - 4)$$

- A**  $-5$
- B**  $-10$
- C**  $-26$
- D**  $-45$

**2 Which number is *less than* 22,874 ?**

- F**  $2.18 \times 10^4$
- G**  $2.55 \times 10^4$
- H**  $2.43 \times 10^5$
- J**  $1.78 \times 10^6$

**3 What is the value of  $4 - 3^3$  ?**

- A**  $-23$
- B**  $-5$
- C**  $1$
- D**  $3$

**4 Which of the following does *not* represent a rational number?**

**F** 0

**G**  $2\frac{1}{2}$

**H**  $\sqrt{3}$

**J**  $-\frac{1}{10}$

**5 Which of these is a true statement?**

**A**  $2 \times 10^{-2} > 2 \times 10^2$

**B**  $3.1 \times 10^3 = 3,100$

**C**  $2.5 \times 10^{-2} = 250$

**D**  $0.235 < 2.35 \times 10^{-2}$

**6 The set of whole numbers is *not* a subset of —**

**F** irrational numbers

**G** integers

**H** rational numbers

**J** real numbers

**7 Which list of numbers is ordered from *greatest* to *least*?**

- A**  $3.84 \times 10^9, 6.13 \times 10^6, 4.72 \times 10^4, 7.76 \times 10^2$
- B**  $3.84 \times 10^9, 4.72 \times 10^4, 6.13 \times 10^6, 7.76 \times 10^2$
- C**  $7.76 \times 10^2, 6.13 \times 10^6, 4.72 \times 10^4, 3.84 \times 10^9$
- D**  $7.76 \times 10^2, 4.72 \times 10^4, 6.13 \times 10^6, 3.84 \times 10^9$

**8 Which of the following describes a square root of 41 ?**

- F** Between 5 and 6
- G** Between 6 and 7
- H** Between 20 and 21
- J** Between 40 and 42

**9 What is the value of  $2(5 - a)^2 + 7a$  when  $a = 2$  ?**

- A** 16
- B** 20
- C** 32
- D** 50

- 10 Rob had \$363.75 in his bank account on June 12. He made one deposit and two withdrawals as shown.**

**Rob's Bank Account**

Date	Withdrawal	Deposit	Balance
June 12			\$363.75
June 13	\$47.50		
June 14		\$91.25	
June 15	\$54.75		

**What was the balance in Rob's bank account after the withdrawal on June 15 ?**

- F** \$170.25  
**G** \$352.75  
**H** \$374.75  
**J** \$557.25

- 11 What is the value of  $x^3 + x^2 + x$  when  $x = 3$  ?**

- A** 9  
**B** 18  
**C** 21  
**D** 39

**12 Which number is a perfect square?**

- F** 6
- G** 9
- H** 12
- J** 15

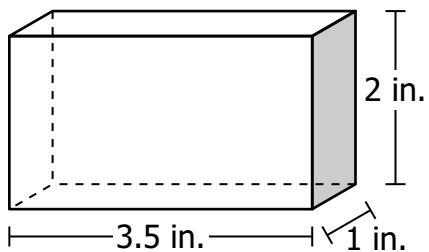
**13 Albert had a goal of saving \$80. He saved 115% of his goal. How much money did Albert save?**

- A** \$70
- B** \$92
- C** \$115
- D** \$195

**14 The square root of which of the following integers is between 7 and 8 ?**

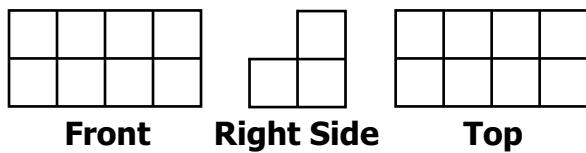
- F** 49
- G** 52
- H** 64
- J** 65

**15** What is the surface area of a rectangular prism with the dimensions shown?



- A** 7 sq in.
- B** 14 sq in.
- C** 18 sq in.
- D** 25 sq in.

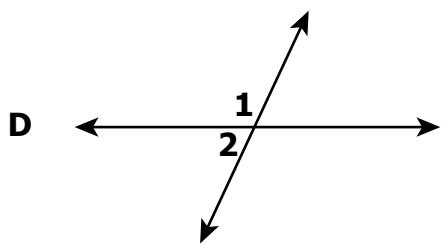
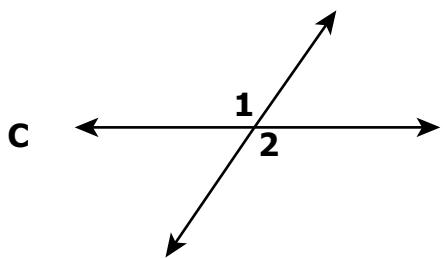
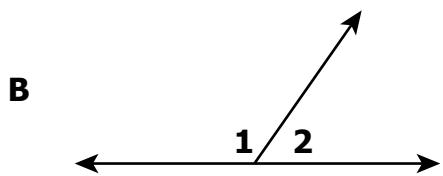
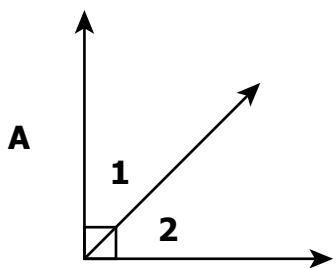
- 16** Three different views of a three-dimensional figure constructed from cubes are shown.



Which of the following figures could these views represent?

- F**
- G**
- H**
- J**

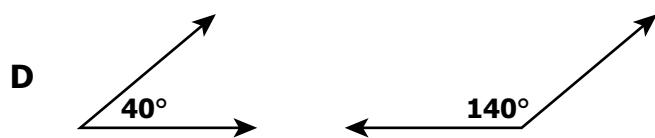
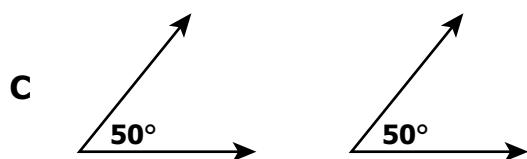
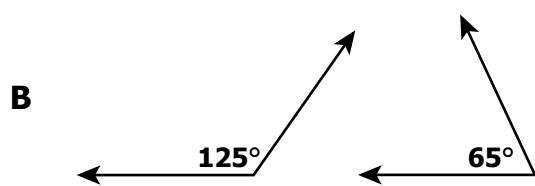
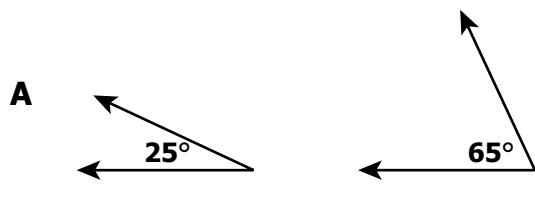
**17 In which diagram do  $\angle 1$  and  $\angle 2$  appear to be vertical angles?**



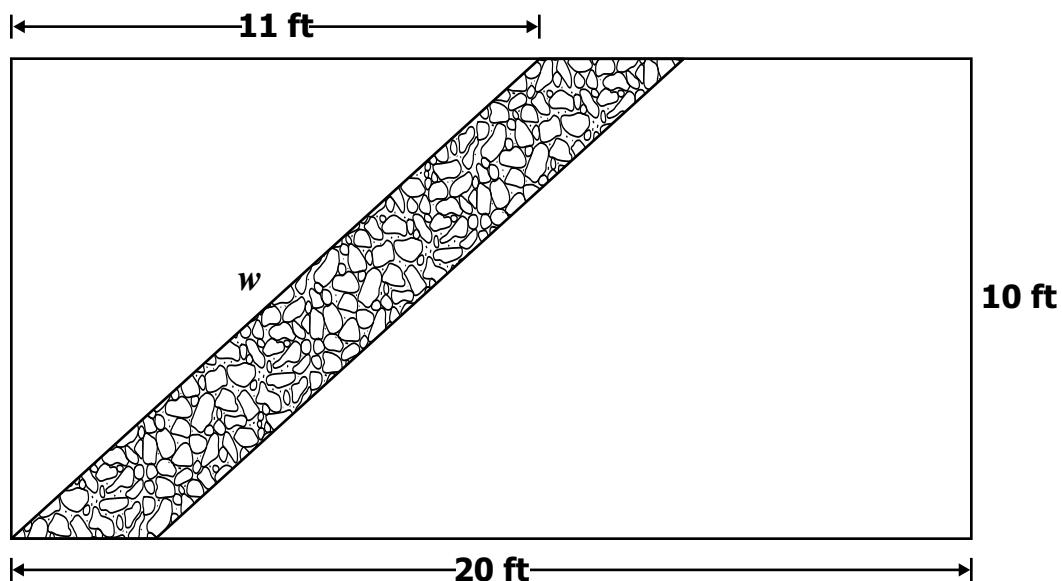
**18 Which group of three side lengths could form a right triangle?**

- F** 5 ft, 12 ft, 13 ft
- G** 7 ft, 11 ft, 14 ft
- H** 15 ft, 20 ft, 22 ft
- J** 18 ft, 34 ft, 39 ft

**19 Which pair of angles is supplementary?**



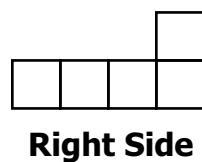
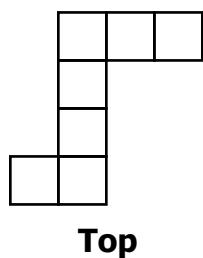
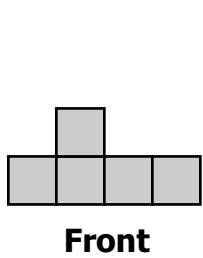
- 20** Mr. Malone plans to construct a walkway through his rectangular garden, as shown in the drawing.



Which is closest to the value of  $w$  ?

- F** 22 ft
- G** 21 ft
- H** 15 ft
- J** 11 ft

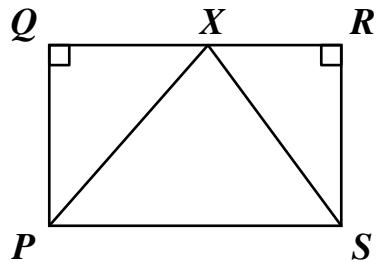
- 21** A three-dimensional figure is constructed from identical cubes. Three views of the figure are shown.



Which of the following could be the three-dimensional figure?

- A
- B
- C
- D

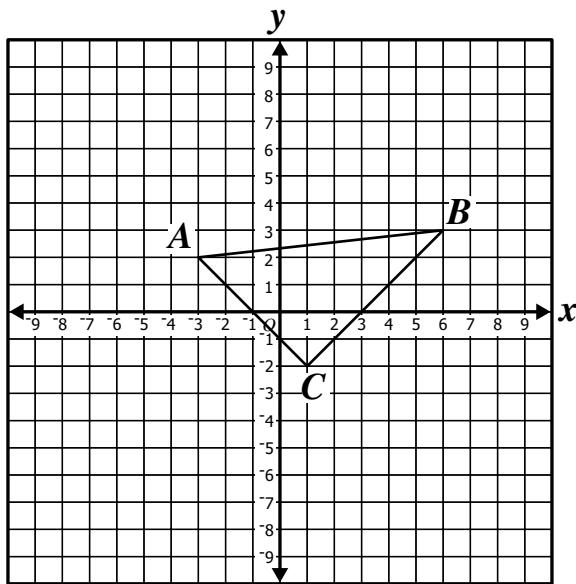
**22 Three triangles are drawn in rectangle  $PQRS$ .**



**Which of the following segments is a hypotenuse of one of these triangles?**

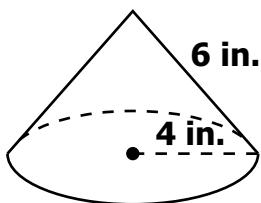
- F**  $\overline{RS}$
- G**  $\overline{RQ}$
- H**  $\overline{XS}$
- J**  $\overline{XQ}$

- 23** What are the new coordinates of point  $B$  after  $\triangle ABC$  is translated 2 units down and 3 units to the left?



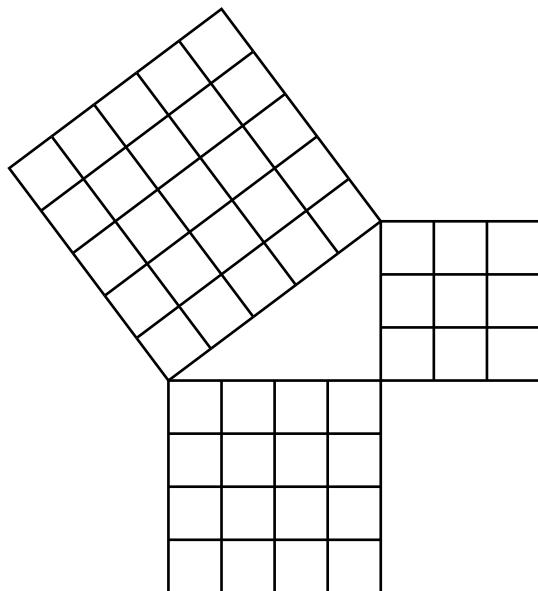
- A** (3, 1)
- B** (4, 0)
- C** (8, 6)
- D** (9, 5)

- 24** The radius of the base of a cone is 4 inches. The slant height of the cone is 6 inches. Which is closest to the surface area of the cone?

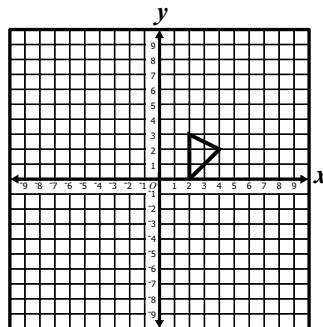


- F** 75 sq in.
- G** 100 sq in.
- H** 126 sq in.
- J** 188 sq in.

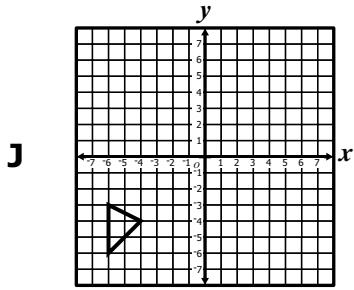
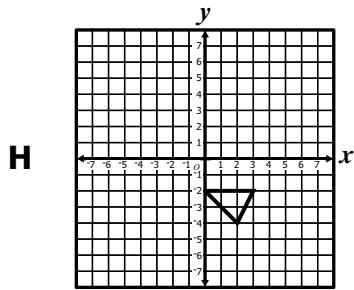
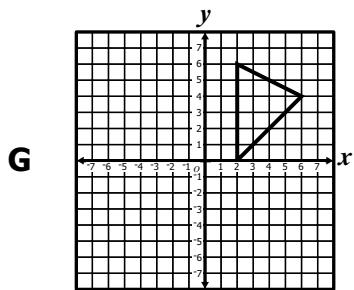
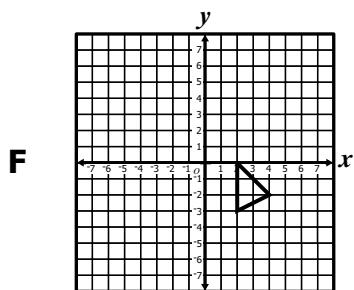
- 25** Which of the following equations is represented by the figure?



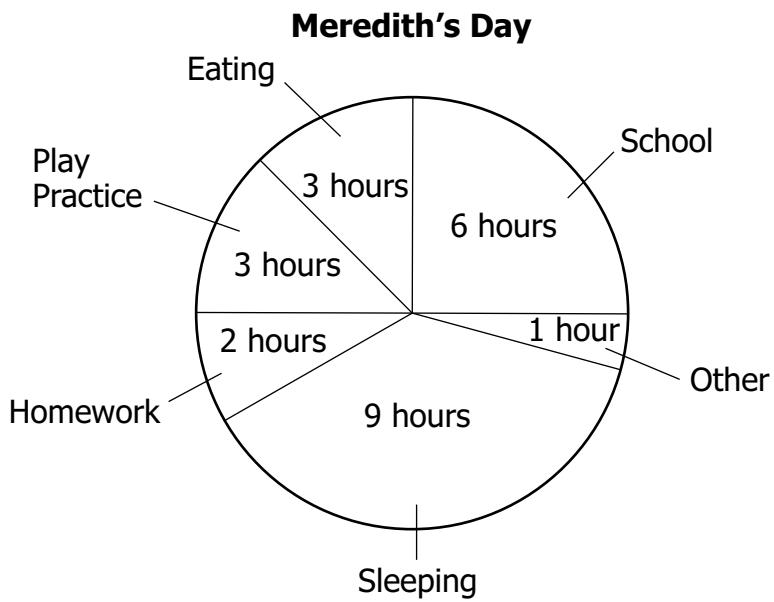
- A**  $4^2 + 5^2 = 9^2$
- B**  $3^2 + 5^2 = 8^2$
- C**  $3^2 + 4^2 = 7^2$
- D**  $3^2 + 4^2 = 5^2$



**Which of the following graphs shows a dilation of the triangle from a fixed point?**



- 27 This circle graph displays the number of hours Meredith spent on various activities in a day.



Based on the data in the circle graph, what percent of Meredith's day was spent on activities other than sleeping and eating?

- A 12%
- B 25%
- C 38%
- D 50%

- 28** This graph shows the number of slices of pizza sold each day during one week in the school cafeteria.

Slices of Pizza Sold

Day of Week	Number Sold
Monday	2 slices
Tuesday	2 slices
Wednesday	1 slice
Thursday	5 slices
Friday	5 slices

**Key:**  = 10 slices

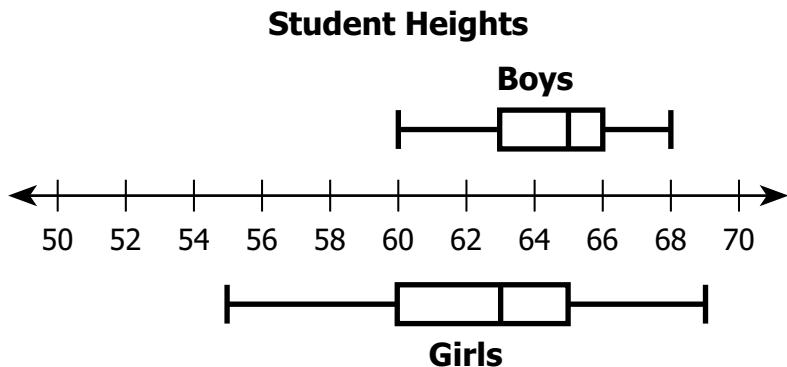
Each slice of pizza costs \$0.50. What is the total amount of money the school cafeteria collected on the sales of pizza for this week?

- F** \$7.50
- G** \$15.50
- H** \$75.00
- J** \$150.00

- 29** A fair cube used in a game has 1 yellow side and 5 green sides. Emily will win the game if the cube lands on a green side on her next roll. Which statement best describes Emily's chance of winning the game?

- A** Certainly will win
- B** Certainly will lose
- C** Most likely will win
- D** Most likely will lose

- 30** These box-and-whisker plots summarize the heights of the boys and the heights of the girls in an eighth-grade class.



Based on the data in these box-and-whisker plots, which statement is true?

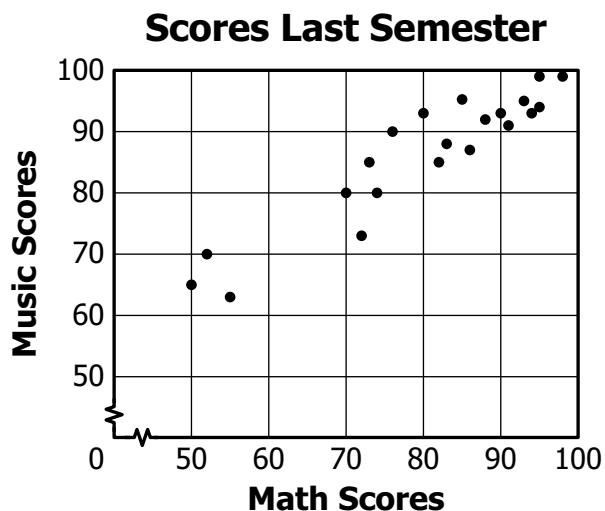
- F** The tallest student in the class is a girl.
- G** The shortest student in the class is a boy.
- H** The range of the boys' heights is greater than the range of the girls' heights.
- J** The median height of the girls is greater than the median height of the boys.

- 31** This matrix shows the grades on three weekly quizzes for Eric, Sam, and Curt. What is the element at row 2, column 3?

	Eric	Sam	Curt
1st	87	92	82
2nd	82	86	80
3rd	85	88	89

- A** 80
- B** 86
- C** 87
- D** 88

- 32** The following scatterplot shows the scores several students received in math and music classes last semester.



Which statement best describes the relationship in the scatterplot?

- F** As the math score decreases, the music score increases.
- G** As the math score increases, the music score decreases.
- H** As the math score decreases, the music score does not change.
- J** As the math score increases, the music score increases.

- 33** This table shows the number of marbles in a bag by color. If one marble is randomly selected from the bag, what is the probability that it will be a blue or a red marble?

**Marbles in a Bag**

Color	Number
Blue	7
Green	10
Yellow	14
Red	19

- A** 24%
- B** 26%
- C** 38%
- D** 52%

**34** Three girls sent each other text messages as shown.

- Sonia sent Hannah 3 text messages and Takara 2 text messages.
- Hannah sent Sonia 1 text message and Takara 3 text messages.
- Takara sent Sonia 2 text messages and Hannah 1 text message.

Which matrix best summarizes this information?

		To		
		Sonia	Hannah	Takara
From	Sonia	0	1	2
	Hannah	3	0	1
	Takara	2	3	0

		To		
		Sonia	Hannah	Takara
From	Sonia	1	1	2
	Hannah	1	3	3
	Takara	2	1	1

		To		
		Sonia	Hannah	Takara
From	Sonia	0	3	2
	Hannah	1	0	3
	Takara	2	1	0

		To		
		Sonia	Hannah	Takara
From	Sonia	2	1	0
	Hannah	0	3	2
	Takara	1	0	3

- 35 Margaret has \$200 in her savings account. She will deposit \$50 into this account each week and will make no withdrawals. Which table represents this situation, excluding interest?

**Savings**

<b>Week</b>	<b>Amount in Account</b>
0	\$200
1	\$250
2	\$300
3	\$350

**Savings**

<b>Week</b>	<b>Amount in Account</b>
0	\$50
1	\$250
2	\$450
3	\$650

**Savings**

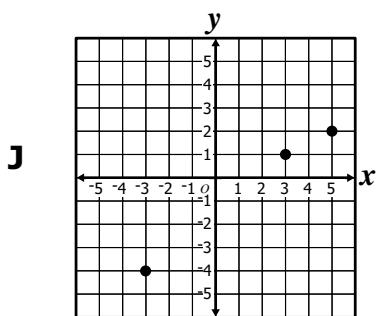
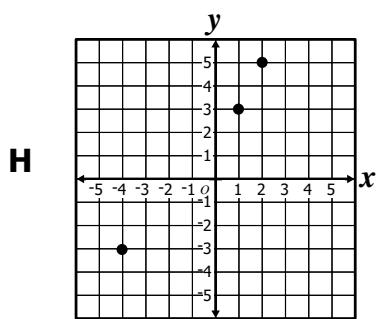
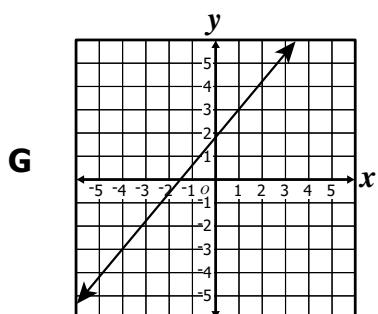
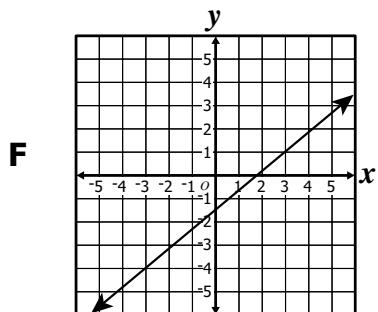
<b>Week</b>	<b>Amount in Account</b>
0	\$200
1	\$150
2	\$100
3	\$50

**Savings**

<b>Week</b>	<b>Amount in Account</b>
0	\$50
1	\$100
2	\$150
3	\$200

**36 Which graph contains all the ordered pairs in this table?**

$x$	$y$
-3	-4
3	1
5	2



**37 Which of the following is equivalent to the inequality  $5x + 7 < 17$  ?**

- A  $5x < 10$
- B  $5x > 10$
- C  $5x < 24$
- D  $5x > 24$

**38 Which table contains only points that lie on the line of the equation  $y = 6x - 6$  ?**

F

$x$	$y$
0	-6
5	5

G

$x$	$y$
0	6
3	12

H

$x$	$y$
2	6
-2	-18

J

$x$	$y$
2	6
-1	0

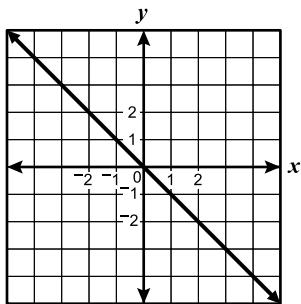
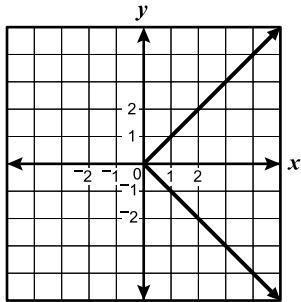
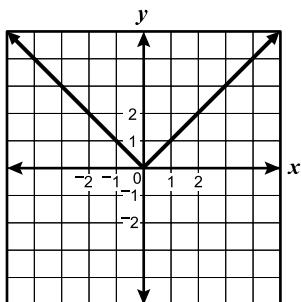
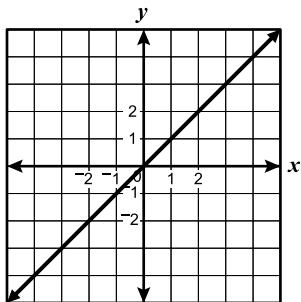
**39** What value of  $n$  makes this equation true?

$$4n + 9 = 6$$

- A**  $-7.50$
- B**  $-0.75$
- C**  $3.75$
- D**  $10.50$

$x$	$y$
4	4
2	2
0	0
-2	-2
-4	-4

If the line containing the points in the table is plotted on a coordinate system, what does the graph look like?

**F****G****H****J**

**41** At the Good Earth Orchard, there are  $\frac{1}{3}$  as many lemon trees as there are orange trees. There are 132 orange trees at Good Earth Orchard. How many lemon trees are there?

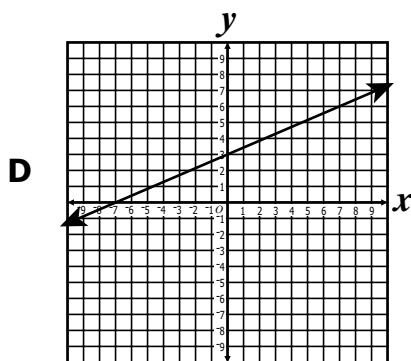
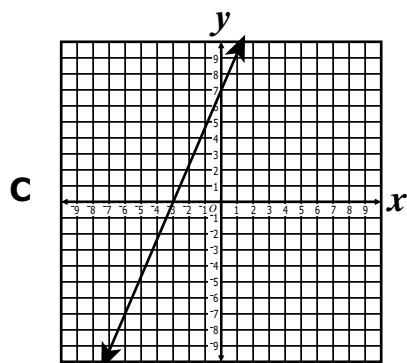
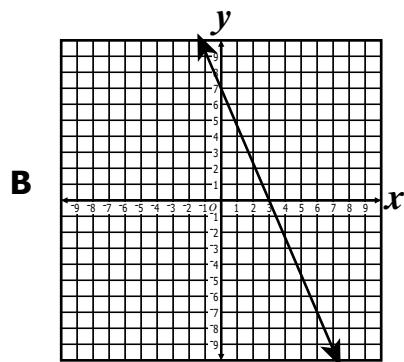
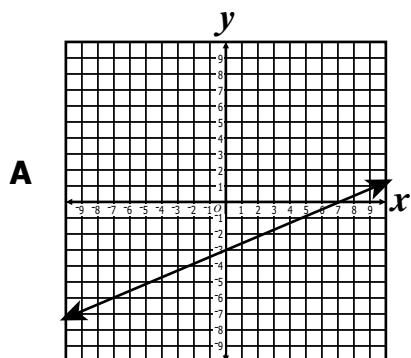
- A** 43
- B** 44
- C** 396
- D** 528

**42** The formula  $d = 52t + 65t$  can be used to find the distance,  $d$ , between two cars after traveling  $t$  hours in opposite directions. After how many hours will the distance between the two cars be 234 miles?

- F** 0.5
- G** 2.0
- H** 3.6
- J** 4.5

**43 Which graph contains the ordered pairs listed in the table?**

$x$	$y$
0	7
-3	0



**44** Which number is *not* an element of the domain of the relation shown?

$$\{(-2, 4), (0, 4), (1, 2), (3, 2)\}$$

**F** -2

**G** 0

**H** 1

**J** 4

**45** Which of the following tables of values is true for the equation  $y = 3(x - 3)$ ?

**A**

$x$	$y$
-4	-21
4	3

**B**

$x$	$y$
-4	-3
4	21

**C**

$x$	$y$
-4	-15
4	9

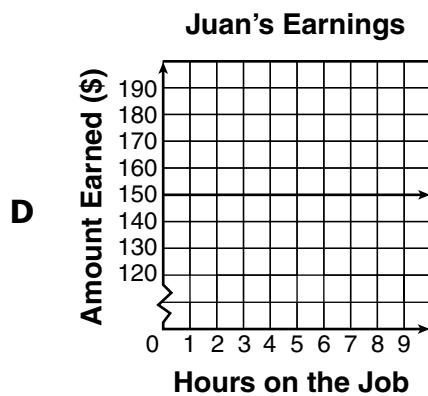
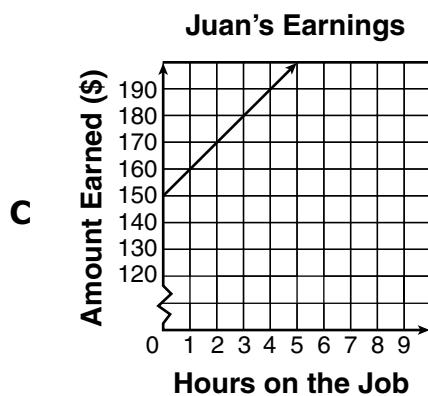
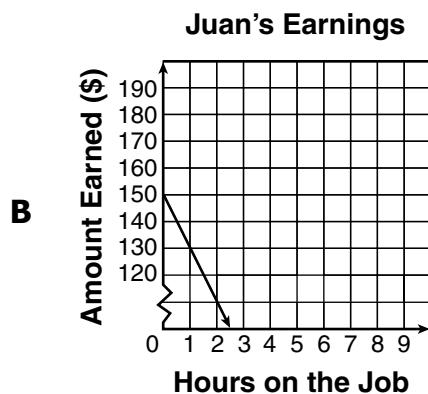
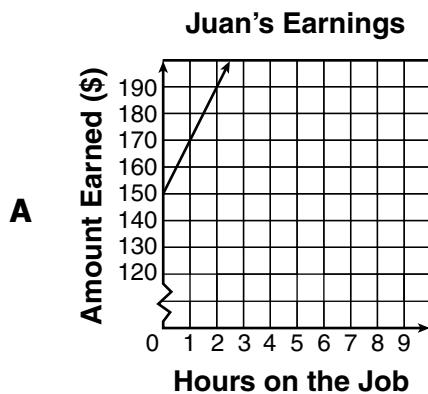
**D**

$x$	$y$
-4	-9
4	15

- 46** It takes Kim 8 hours to travel a distance of 360 miles. At this rate, how many miles does Kim travel in 12 hours?

- F** 720
- G** 600
- H** 540
- J** 390

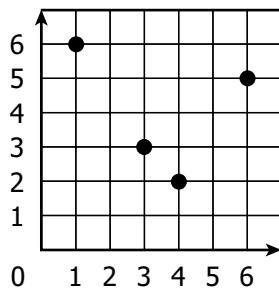
- 47** Juan earns a flat fee of \$150 plus \$20 for every hour he works decorating a house. Which graph correctly displays Juan's earnings?



**48** What is the solution to  $\frac{n}{2} - 4 > 10$ ?

- F**  $n > 7$
- G**  $n > 12$
- H**  $n > 24$
- J**  $n > 28$

**49** A relation is graphed as shown.



What is the domain of this relation?

- A**  $\{1, 3, 4, 6\}$
- B**  $\{2, 3, 5, 6\}$
- C**  $\{1, 2, 3, 4, 5, 6\}$
- D**  $\{0, 1, 2, 3, 4, 5, 6\}$

**50 Which of these equations represents the table of values?**

<i>x</i>	<i>y</i>
-2	2
1	8
3	12
6	18

- F**  $y = -x$   
**G**  $y = x + 7$   
**H**  $y = 3x + 3$   
**J**  $y = 2x + 6$



**Answer Key-8075-M0110**

<b>Test Sequence Number</b>	<b>Correct Answer</b>	<b>Reporting Category</b>	<b>Reporting Category Description</b>
1	B	001	Number and Number Sense
2	F	001	Number and Number Sense
3	A	001	Number and Number Sense
4	H	001	Number and Number Sense
5	B	001	Number and Number Sense
6	F	001	Number and Number Sense
7	A	001	Number and Number Sense
8	G	002	Computation and Estimation
9	C	002	Computation and Estimation
10	G	002	Computation and Estimation
11	D	002	Computation and Estimation
12	G	002	Computation and Estimation
13	B	002	Computation and Estimation
14	G	002	Computation and Estimation
15	D	003	Measurement and Geometry
16	G	003	Measurement and Geometry
17	C	003	Measurement and Geometry
18	F	003	Measurement and Geometry
19	D	003	Measurement and Geometry
20	H	003	Measurement and Geometry
21	D	003	Measurement and Geometry
22	H	003	Measurement and Geometry
23	A	003	Measurement and Geometry
24	H	003	Measurement and Geometry
25	D	003	Measurement and Geometry
26	G	003	Measurement and Geometry
27	D	004	Probability and Statistics
28	H	004	Probability and Statistics
29	C	004	Probability and Statistics
30	F	004	Probability and Statistics
31	A	004	Probability and Statistics
32	J	004	Probability and Statistics
33	D	004	Probability and Statistics
34	H	004	Probability and Statistics
35	A	005	Patterns, Functions, and Algebra
36	J	005	Patterns, Functions, and Algebra
37	A	005	Patterns, Functions, and Algebra
38	H	005	Patterns, Functions, and Algebra
39	B	005	Patterns, Functions, and Algebra
40	J	005	Patterns, Functions, and Algebra
41	B	005	Patterns, Functions, and Algebra
42	G	005	Patterns, Functions, and Algebra
43	C	005	Patterns, Functions, and Algebra
44	J	005	Patterns, Functions, and Algebra
45	A	005	Patterns, Functions, and Algebra
46	H	005	Patterns, Functions, and Algebra
47	A	005	Patterns, Functions, and Algebra
48	J	005	Patterns, Functions, and Algebra
49	A	005	Patterns, Functions, and Algebra
50	J	005	Patterns, Functions, and Algebra

## Grade 8 Math, Core 1

If you get this many items correct:	Then your converted scale score is:
0	000
1	011
2	069
3	104
4	130
5	151
6	168
7	184
8	198
9	210
10	222
11	232
12	242
13	252
14	261
15	270
16	279
17	287
18	295
19	303
20	311
21	318
22	326
23	333
24	341
25	348
26	356
27	363
28	371
29	378
30	386
31	394
<b>32</b>	<b>402</b>
33	410
34	418
35	427
36	436
37	445
38	455
39	465
40	476
41	487
<b>42</b>	<b>500</b>
43	514
44	529
45	547
46	567
47	593
48	600
49	600
50	600

A total raw score (left column) is converted to a total scaled score (right column). The total scaled score may range from 0 to 600.

A scaled score of 400 or more means the student passed the SOL test, while a scaled score of 399 or less means the student did not pass the test. A scaled score of 500 or more indicates the student passed the SOL test at an advanced level.