

Grade 8

FCAT 2.0 Mathematics

Sample Questions

The intent of these booklets is to orient teachers and students to the types of questions on FCAT 2.0 tests. By using these materials, students will become familiar with the types of items and response formats that they will see on the actual test. The sample questions and answers are not intended to demonstrate the length of the actual test, nor should student responses be used as an indicator of student performance on the actual test. Additional information about test items can be found in the *FCAT Test Item Specifications* at: <http://fcat.fldoe.org/fcatis01.asp>.

The 2011 FCAT 2.0 Mathematics tests and sample questions and answers are based on the 2007 Next Generation Sunshine State Standards.

Directions for Answering the Mathematics Sample Questions

Mark your answers on the Mathematics Sample Answer Sheet, which begins on page 15 of this booklet. If you don't know how to work a problem, ask your teacher to explain it to you. Your teacher has the answers to the sample questions.

The sample questions for students and the sample answers for teachers will only be available online at: <http://fcat.fldoe.org/fcatsmpl.asp>.

You may need formulas and conversions to help you solve some of the problems. You may refer to the Reference Sheet on pages 5 and 6 as often as you like.

Use the space in your Mathematics Sample Questions booklet to do your work on the multiple-choice and gridded-response questions, but be sure to put your answers on the Sample Answer Sheet.

FCAT 2.0 Question Symbol

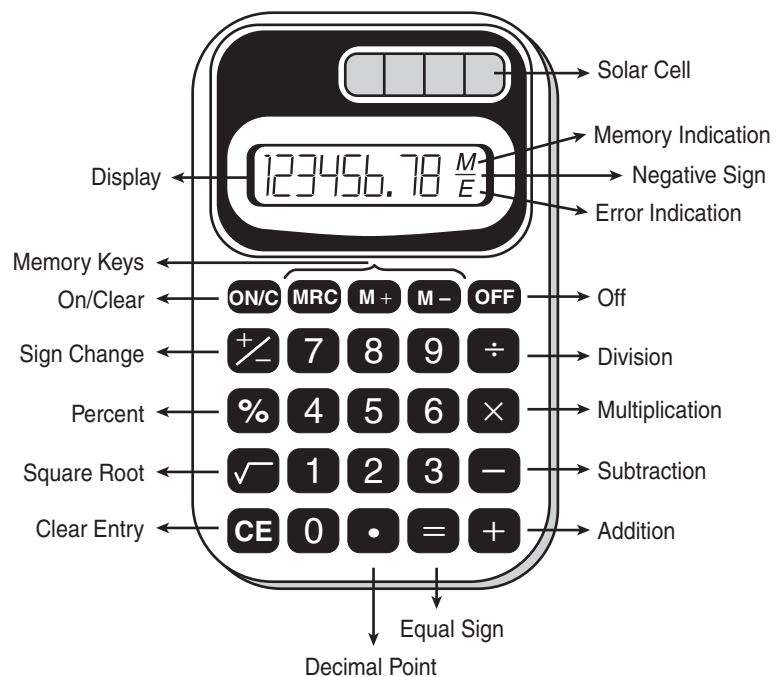


This symbol appears next to questions that require you to fill in your answer on a grid. There may be more than one correct way to fill in a response grid. You **MUST** fill in the bubbles accurately to receive credit for your answer. A correct answer to each of these questions is worth 1 point.

Helpful Hints for Taking the FCAT 2.0 Mathematics Test

- 1) When starting a new problem, always clear your calculator by pressing the On/Clear key.
- 2) If you see an **E** in the display, clear the error before you begin.
- 3) If you see an **M** in the display, clear the memory and the calculator before you begin.
- 4) Remember, your calculator will NOT automatically perform the algebraic order of operations.
- 5) The negative sign may appear either to the left or to the right of the number.
- 6) When solving any mathematics item, do not round decimal equivalents and/or approximations until the final step of the item or task. Focus on whether the item specifies the decimal place, equivalent fraction, and/or *pi* approximation needed for the answer. In most cases, front-end estimation and truncation are not accurate processes for estimation.

CALCULATOR MODEL



How to Complete the Grade 8 Response Grid



Mathematics test questions with this symbol require that you fill in a grid on your answer sheet. There may be more than one correct way to fill in a response grid.

This section shows you different ways the response grid may be completed.

Directions

1. Work the problem and find an answer.
2. Write your answer in the answer boxes at the top of the grid.
 - The left answer box only allows for a negative sign. If the answer is negative, place a negative sign in the answer box. If the answer is positive, leave this answer box blank.
 - Print your answer with the first digit in the second answer box from the left OR with the last digit in the right answer box.
 - Print only one digit or symbol in each answer box. Do NOT leave a blank answer box in the middle of an answer.
 - Be sure to write a decimal point or fraction bar in the answer box if it is a part of the answer.
3. Fill in a bubble under each box in which you wrote your answer.
 - Fill in one and ONLY one bubble for each answer box. Do NOT fill in a bubble under an unused answer box.
 - Fill in each bubble by making a solid black mark that completely fills the circle.
 - You MUST fill in the bubbles accurately to receive credit for your answer.

In Grade 8, there is a seven-column grid that includes the digits 0 through 9, the decimal point, the fraction bar, and a seventh column to allow for the negative sign (–).

	2	0				
⊖		/	/	/	/	
•	•	•	•	•	•	
0	•	0	0	0	0	0
1	1	1	1	1	1	1
•	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

} answer boxes
 } fraction bar or negative sign
 } decimal point
 } number bubbles

When a percent is required to answer a question, do NOT convert the percent to its decimal or fractional equivalent. Grid in the percent value without the % symbol. Do the same with dollar amounts.

-	1	1				
●		/	/	/	/	
	○	○	○	○	○	○
	0	0	0	0	0	0
	●	●	①	①	①	①
	②	②	②	②	②	②
	③	③	③	③	③	③
	④	④	④	④	④	④
	⑤	⑤	⑤	⑤	⑤	⑤
	⑥	⑥	⑥	⑥	⑥	⑥
	⑦	⑦	⑦	⑦	⑦	⑦
	⑧	⑧	⑧	⑧	⑧	⑧
	⑨	⑨	⑨	⑨	⑨	⑨

—			6	.	7	8
●		○	○	○	○	
	○	○	○	●	○	○
	(0)	(0)	(0)	(0)	(0)	(0)
	(1)	(1)	(1)	(1)	(1)	(1)
	(2)	(2)	(2)	(2)	(2)	(2)
	(3)	(3)	(3)	(3)	(3)	(3)
	(4)	(4)	(4)	(4)	(4)	(4)
	(5)	(5)	(5)	(5)	(5)	(5)
	(6)	(6)	●	(6)	(6)	(6)
	(7)	(7)	(7)	(7)	●	(7)
	(8)	(8)	(8)	(8)	(8)	●
	(9)	(9)	(9)	(9)	(9)	(9)

	2	5	.	3		
○		/	/	/	/	
●	○	○	●	○	○	○
(0)	(0)	(0)	(0)	(0)	(0)	(0)
(1)	(1)	(1)	(1)	(1)	(1)	(1)
●	(2)	(2)	(2)	(2)	(2)	(2)
(3)	(3)	(3)	●	(3)	(3)	(3)
(4)	(4)	(4)	(4)	(4)	(4)	(4)
(5)	●	(5)	(5)	(5)	(5)	(5)
(6)	(6)	(6)	(6)	(6)	(6)	(6)
(7)	(7)	(7)	(7)	(7)	(7)	(7)
(8)	(8)	(8)	(8)	(8)	(8)	(8)
(9)	(9)	(9)	(9)	(9)	(9)	(9)

				1	3	6
⊖		⊗	⊗	⊗	⊗	
⊙	⊙	⊙	⊙	⊙	⊙	
0	0	0	0	0	0	
1	1	1	●	1	1	
2	2	2	2	2	2	
3	3	3	3	●	3	
4	4	4	4	4	4	
5	5	5	5	5	5	
6	6	6	6	6	●	
7	7	7	7	7	7	
8	8	8	8	8	8	
9	9	9	9	9	9	

INCORRECT

$$12\frac{3}{4} + \frac{1}{2} =$$

		5	3	/	4		
⊖		⊗	●	⊗	⊗		
⊙	⊙	⊙	⊙	⊙	⊙	⊙	
①	①	①	①	①	①	①	
②	②	②	②	②	②	②	
③	●	③	③	③	③	③	
④	④	④	●	④	④	④	
●	⑤	⑤	⑤	⑤	⑤	⑤	
⑥	⑥	⑥	⑥	⑥	⑥	⑥	
⑦	⑦	⑦	⑦	⑦	⑦	⑦	
⑧	⑧	⑧	⑧	⑧	⑧	⑧	
⑨	⑨	⑨	⑨	⑨	⑨	⑨	

OR

	1	3	.	2	5	
-		/	/	/	/	
	•	•	●	•	•	•
(0)	(0)	(0)	(0)	(0)	(0)	(0)
●	(1)	(1)	(1)	(1)	(1)	(1)
(2)	(2)	(2)	●	(2)	(2)	(2)
(3)	●	(3)	(3)	(3)	(3)	(3)
(4)	(4)	(4)	(4)	(4)	(4)	(4)
(5)	(5)	(5)	(5)	●	(5)	(5)
(6)	(6)	(6)	(6)	(6)	(6)	(6)
(7)	(7)	(7)	(7)	(7)	(7)	(7)
(8)	(8)	(8)	(8)	(8)	(8)	(8)
(9)	(9)	(9)	(9)	(9)	(9)	(9)

Grades 6–8 FCAT 2.0 Mathematics Reference Sheet

Area

Rectangle	$A = bh$
Parallelogram	$A = bh$
Triangle	$A = \frac{1}{2}bh$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Circle	$A = \pi r^2$

KEY

b = base	A = area
h = height	B = area of base
w = width	C = circumference
d = diameter	V = volume
r = radius	P = perimeter of base
ℓ = slant height	$S.A.$ = surface area

Use 3.14 or $\frac{22}{7}$ for π .

Circumference

$$C = \pi d \text{ or } C = 2\pi r$$

Volume/Capacity

Total Surface Area

	Rectangular Prism	$V = bwh$ or $V = Bh$	$S.A. = 2bh + 2bw + 2hw$ or $S.A. = Ph + 2B$
	Right Circular Cylinder	$V = \pi r^2 h$ or $V = Bh$	$S.A. = 2\pi r h + 2\pi r^2$ or $S.A. = 2\pi r h + 2B$
	Right Square Pyramid	$V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}P\ell + B$
	Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$ or $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$

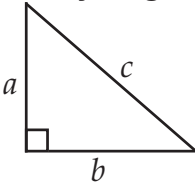
Sum of the measures of the interior angles of a polygon = $180(n - 2)$

Measure of an interior angle of a regular polygon = $\frac{180(n - 2)}{n}$

where:

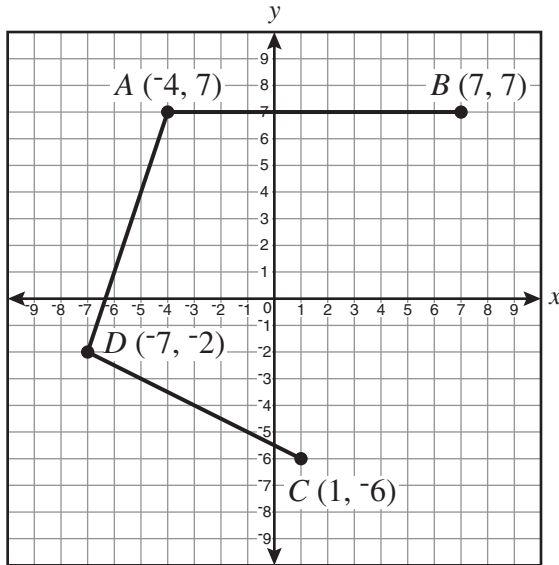
n represents the number of sides

Grades 6–8 FCAT 2.0 Mathematics Reference Sheet

Pythagorean theorem  $a^2 + b^2 = c^2$	Simple interest formula $I = prt$ where p = principal, r = rate, t = time
Slope-intercept form of a linear equation $y = mx + b$ where m = slope and b = y-intercept	Distance, rate, time formula $d = rt$ where d = distance, r = rate, t = time

Conversions within a System of Measure 1 yard = 3 feet 1 mile = 1,760 yards = 5,280 feet 1 acre = 43,560 square feet 1 cup = 8 fluid ounces 1 pint = 2 cups 1 quart = 2 pints 1 gallon = 4 quarts 1 pound = 16 ounces 1 ton = 2,000 pounds 1 meter = 100 centimeters = 1000 millimeters 1 kilometer = 1000 meters 1 liter = 1000 milliliters = 1000 cubic centimeters 1 gram = 1000 milligrams 1 kilogram = 1000 grams 1 minute = 60 seconds 1 hour = 60 minutes 1 year = 52 weeks = 365 days	
Conversions between Systems of Measure When converting from Customary to Metric, use these approximations. 1 inch = 2.54 centimeters 1 foot = 0.305 meter 1 mile = 1.61 kilometers 1 cup = 0.24 liter 1 gallon = 3.785 liters 1 ounce = 28.35 grams 1 pound = 0.454 kilogram When converting from Metric to Customary, use these approximations. 1 centimeter = 0.39 inch 1 meter = 3.28 feet 1 kilometer = 0.62 mile 1 liter = 4.23 cups 1 liter = 0.264 gallon 1 gram = 0.0352 ounce 1 kilogram = 2.204 pounds	
Temperature conversions between Celsius and Fahrenheit $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1.8$ $^{\circ}\text{F} = (^{\circ}\text{C} \times 1.8) + 32$	

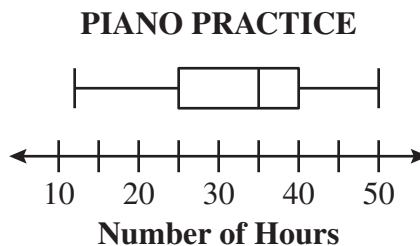
- 1 Marcella is designing an outdoor stage. When complete, the stage will be represented by polygon $ABCD$ on the coordinate plane below.



SCALE
1 unit represents 5 feet

What is the actual distance, to the nearest foot, from B to C ?

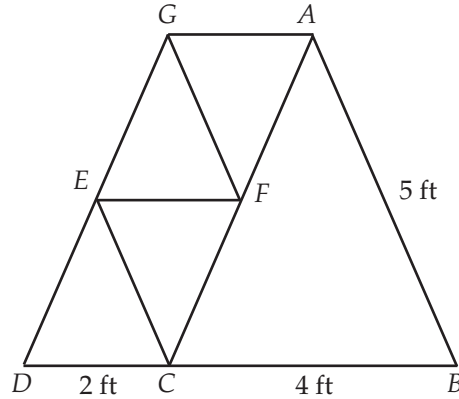
- 2 Ms. Davis drew a box-and-whisker plot to display data about the number of hours her piano students practiced last month, as shown below.



What whole number best represents the median number of hours her students practiced playing the piano last month?

3

An architect is using isosceles triangles in the design of a bridge. In the diagram below, all line segments represent the steel beams needed to build this section of the bridge. Triangle DEC is similar to $\triangle CAB$ and congruent to $\triangle AFG$.



What is the length, **in feet (ft)**, of segment EC ?

- 4 The formula for the area of a triangle is shown below.

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

Which of the following is the solution for h in terms of A and b ?

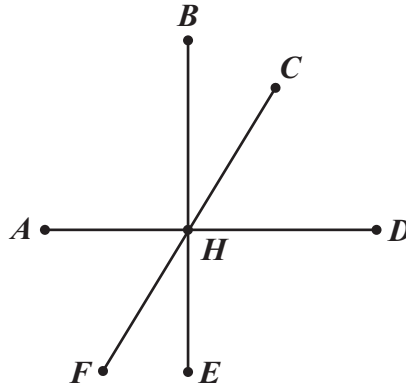
- A. $h = \frac{2A}{b}$
- B. $h = \frac{Ab}{2}$
- C. $h = A - \frac{1}{2}b$
- D. $h = 2A - b$
- 5 Sami installed a 6-foot-tall cylindrical storage tank to collect rainwater from the roof of her house. She used the rainwater to water the lawn and garden during dry spells. Sami recorded the rise in the water level in her storage tank after each of 3 rainstorms. Her results are shown in the table below.

Rainfall (in inches)	Rise of Water Level in Storage Tank (in inches)
1.5	24
0.5	8
2.5	40

Which is the best prediction of the rise of the water level, in inches, in her tank after a storm produced 2.25 inches of rain?

- F. 16 inches
- G. 28 inches
- H. 32 inches
- I. 36 inches

- 6 The illustration below is made up of $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$. All three segments intersect at point H .



$\overline{AD}$ is perpendicular to $\overline{BE}$. If the measure of $\angle FHA$ is 65° , then what is the measure of $\angle BHC$?

- A. 45°
 B. 35°
 C. 25°
 D. 15°
- 7 Mrs. Rafferty put four expressions on the board and asked her students to simplify them.

Expression 1	$4.6507 - 5.196$
Expression 2	$\sqrt{45 - 9}$
Expression 3	$ -2 - 1 $
Expression 4	$(-3)^3$

Which simplified expression has the **least** value?

- F. Expression 1
 G. Expression 2
 H. Expression 3
 I. Expression 4

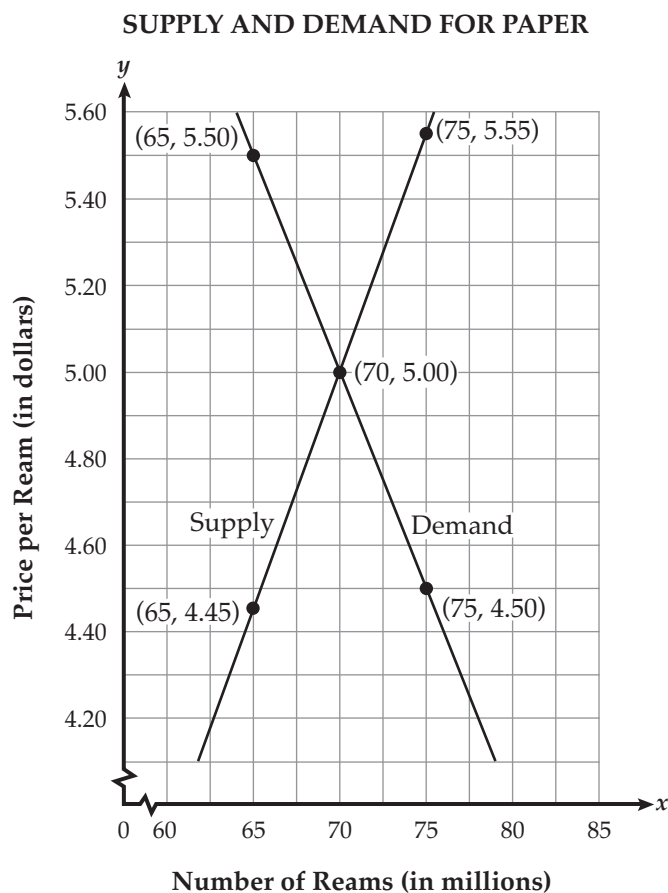
- 8 An economist is helping a paper company evaluate the demand for reams of paper at different selling prices. The point at which the supply and demand graphs intersect is referred to as *market equilibrium*.



The economist graphed the supply and demand equations shown below.

Demand equation: $y = -0.1x + 12$

Supply equation: $y = 0.11x - 2.7$

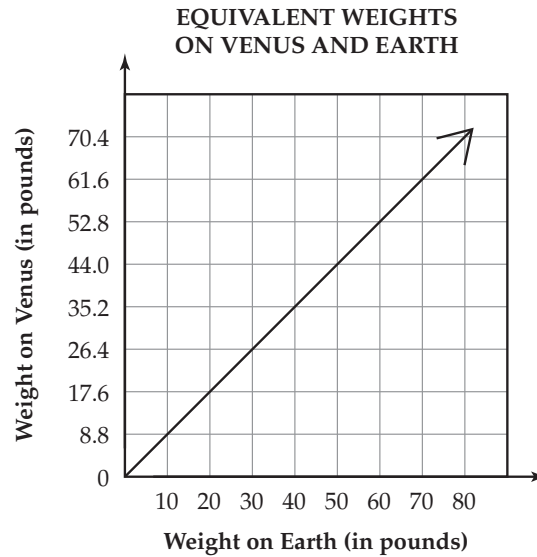


What is the price per ream, **in dollars**, of the *market equilibrium*?

- 9 A farmer needs to calculate the number of cubic yards in 837 cubic feet of soil. How many **cubic yards** are equivalent to 837 cubic feet?



- 10 The graph below represents the equivalent weights, in pounds, of people on the planets Venus and Earth.



Which equation best represents the relationship shown in the graph?

- A. $y = 0.88x$
- B. $y = 1.14x$
- C. $y = 8.8x$
- D. $y = 10x$

- 11 The average yearly rainfall for a town in California is 14 inches. The yearly rainfall for each of the past 10 years was within 6 inches of the average yearly rainfall. Which number line below shows the range of the yearly rainfall for the past 10 years?

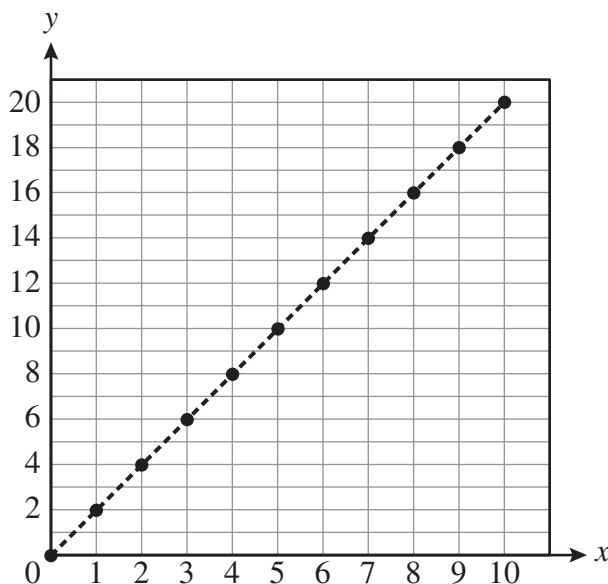
- F.
- G.
- H.
- I.

- 12 Listed below are 7 of Martha's quiz scores. When Martha added 2 more quiz scores to the list below, the median score in the list did not change.

95, 87, 85, 85, 90, 89, 90

Which of the following scores could be added to the list without changing the **median** score?

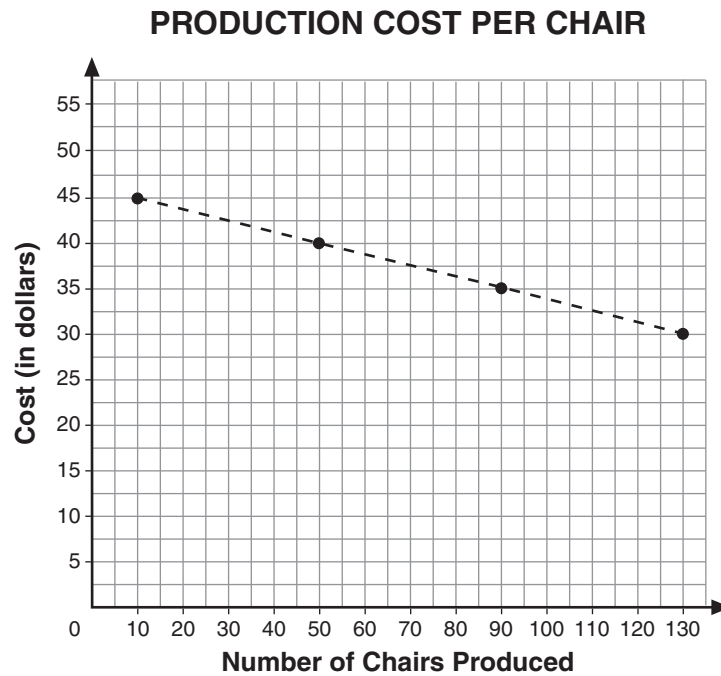
- A. 86 and 87
B. 90 and 98
C. 88 and 96
D. 80 and 82
- 13 A function is represented in the graph below.



Which of the following situations could be represented by the function shown in the graph?

- F. For every girl (y) in the class, there are twice as many boys (x).
G. The Atlanta airport has 3 planes landing (y) for every 6 planes taking off (x).
H. For every raffle ticket sold (x), the cost is 1 dollar (y).
I. The total amount of Carol's mortgage (x) is one-half of Sam's rent (y).

- 14 The production manager of a furniture manufacturing company plotted values on the graph below to show how the production cost per chair decreases as the number of chairs produced increases. The slope of the dashed line segment joining these points is $-\frac{1}{8}$.



Which statement does this slope of the dashed line segment represent?

- A. Each chair produced decreases the cost per chair by \$5.
- B. Each chair produced decreases the cost per chair by \$8.
- C. For every 8 chairs produced, the cost per chair decreases by \$1.
- D. For every 10 chairs produced, the cost per chair decreases by \$5.

Name _____

Answer all the Mathematics Sample Questions on this Sample Answer Sheet.

1

−		/	/	/	/		
•	•	•	•	•	•	•	•
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

2

−		/	/	/	/		
•	•	•	•	•	•	•	•
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

3

−		/	/	/	/		
•	•	•	•	•	•	•	•
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

4 (A) (B) (C) (D)

5 (F) (G) (H) (I)

6 (A) (B) (C) (D)

7 (F) (G) (H) (I)

8

−		/	/	/	/		
•	•	•	•	•	•	•	•
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

9

−		/	/	/	/		
•	•	•	•	•	•	•	•
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

10 (A) (B) (C) (D)

12 (A) (B) (C) (D)

14 (A) (B) (C) (D)

11 (F) (G) (H) (I)

13 (F) (G) (H) (I)



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