

FCAT 2.0 Mathematics Sample Questions

The intent of these sample test materials 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 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 2.0 Test Item Specifications* at <http://fcat.fldoe.org/fcat2/itemspecs.asp>.

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

The sample questions for students and the sample answers for teachers will only be available online, at <http://fcat.fldoe.org/fcat2/fcatitem.asp>.

Directions for Answering the Mathematics Sample Questions

Mark your answers on the Mathematics Sample Answer Sheet 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.

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.

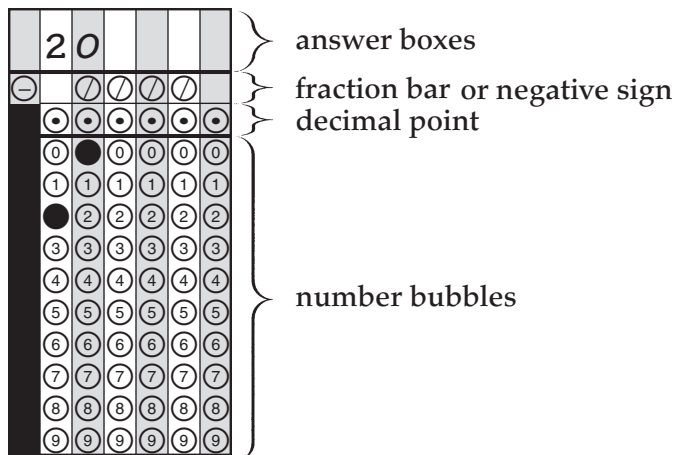


This symbol appears next to questions that require you to fill in your answer on a grid.

Directions for Completing the Response Grids

1. Work the problem and find an answer.
2. Write your answer in the answer boxes at the top of the grid.
 - Print your answer with the first digit in the left answer box OR with the last digit in the right answer box. Note that some grids only allow for a negative sign in the left 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 mark that completely fills the circle.
 - You MUST fill in the bubbles accurately to receive credit for your answer.

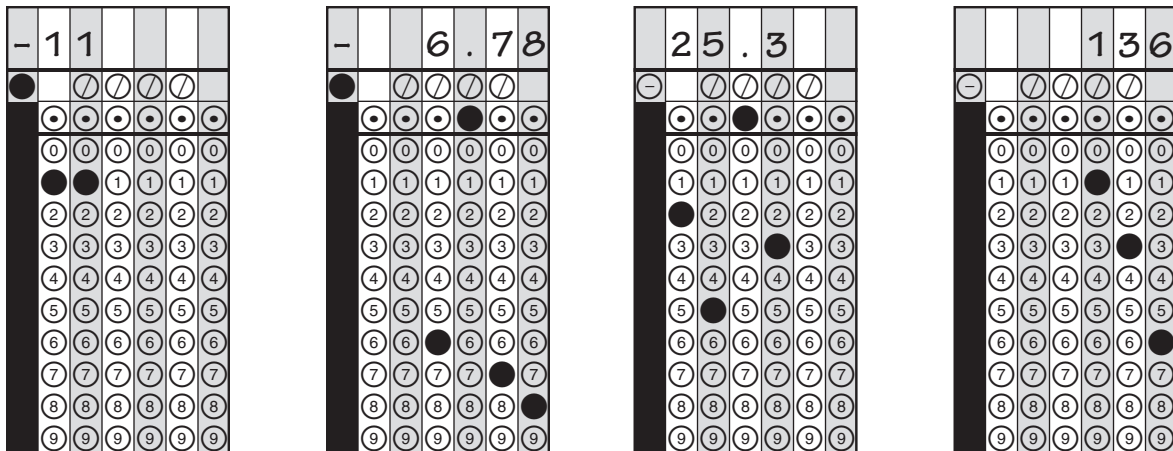
In Grade 8, there is a seven-column grid that includes the digits 0 through 9, the decimal point, the fraction bar, and a seventh column to allow for the negative sign (-).



The following are examples of some of the ways to fill in answers correctly.

The grid may be filled in from the left or the right. Do NOT leave spaces in the middle. Fill in all bubbles for numbers and symbols.

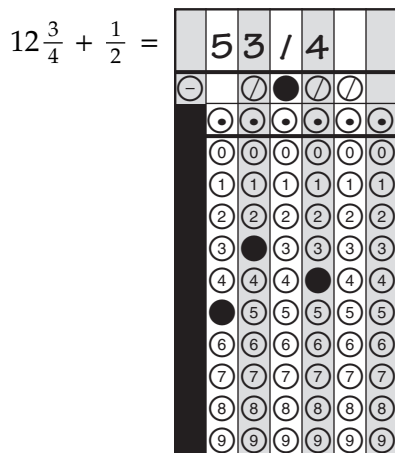
When a percent is required to answer a question, do NOT convert the percent to its decimal or fractional equivalent. Grid in the percent value without the % symbol. Do the same with dollar amounts.



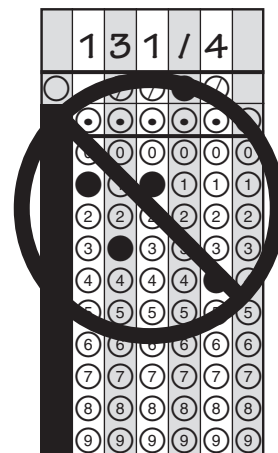
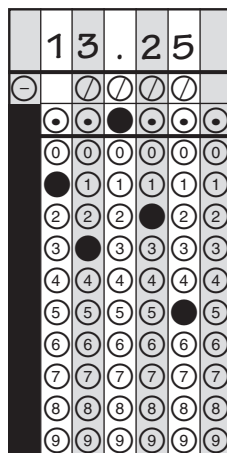
Do NOT write a **mixed number** such as $13\frac{1}{4}$ in the answer grid. Convert the answer to an improper fraction, such as $\frac{53}{4}$, or to a decimal number, such as 13.25. Do not try to fill in $13\frac{1}{4}$, as it would be read as $\frac{131}{4}$ and would be counted wrong.

CORRECT

INCORRECT



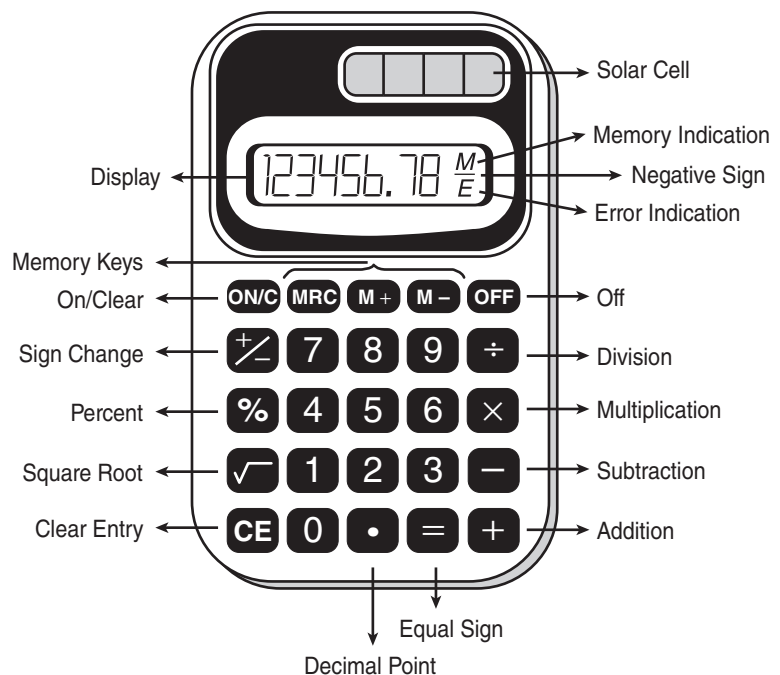
OR



HELPFUL HINTS FOR USING A FOUR-FUNCTION CALCULATOR

1. Read the problem very carefully. Then decide whether or not you need the calculator to help you solve the problem.
2. When starting a new problem, always clear your calculator by pressing the on/clear key.
3. If you see an **E** in the display, clear the error before you begin.
4. If you see an **M** in the display, clear the memory and the calculator before you begin.
5. If the number in the display is not one of the answer choices, check your work.
6. Remember, your calculator will NOT automatically perform the algebraic order of operations.
7. Calculators might display an incorrect answer if you press the keys too quickly. When working with calculators, use careful and deliberate keystrokes, and always remember to check your answer to make sure that it is reasonable.
8. The negative sign may appear either to the left or to the right of the number.
9. When solving items, wait until the final step to round decimal equivalents and/or approximations. Focus on whether the item specifies the decimal place, equivalent fraction, and/or π approximation needed for the answer. In most cases, front-end estimation and truncation are not accurate processes for estimation.
10. Always check your answer to make sure that you have completed all of the necessary steps.

CALCULATOR MODEL



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

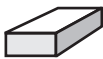



Use 3.14 or $\frac{22}{7}$ for π .

Circumference

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

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 $V = \frac{1}{3}Bh$	$S.A. = \frac{1}{2}(2\pi r)\ell + B$

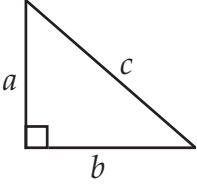
Sum of the measures of the interior angles of a polygon = $180(n - 2)$

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

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

Conversions within a System of Measure

1 yard = 3 feet	1 meter = 100 centimeters = 1000 millimeters
1 mile = 1,760 yards = 5,280 feet	1 kilometer = 1000 meters
1 acre = 43,560 square feet	
	1 liter = 1000 milliliters = 1000 cubic centimeters
1 cup = 8 fluid ounces	1 gram = 1000 milligrams
1 pint = 2 cups	1 kilogram = 1000 grams
1 quart = 2 pints	
1 gallon = 4 quarts	1 minute = 60 seconds
1 pound = 16 ounces	1 hour = 60 minutes
1 ton = 2,000 pounds	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 cup = 0.24 liter
1 foot = 0.305 meter	1 gallon = 3.785 liters
1 mile = 1.61 kilometers	1 ounce = 28.35 grams
	1 pound = 0.454 kilogram

When converting from Metric to Customary, use these approximations.

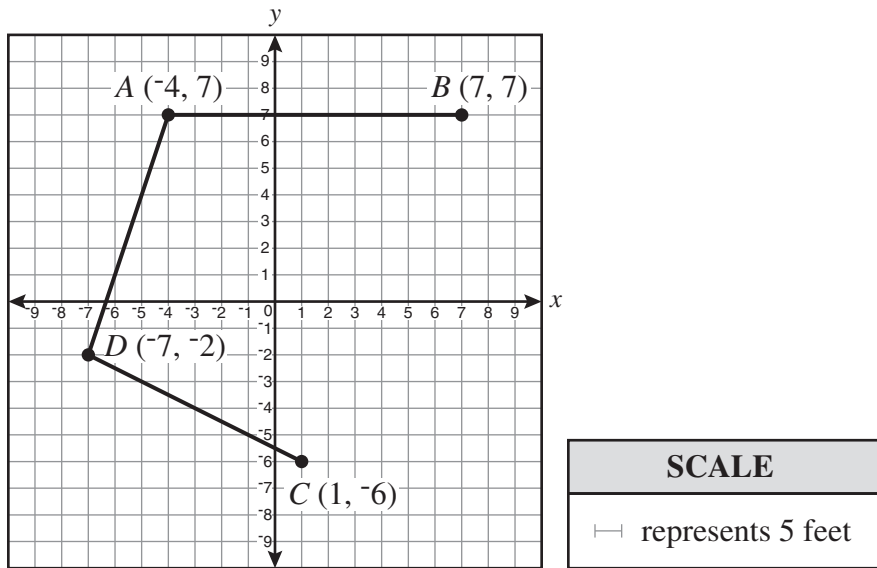
1 centimeter = 0.39 inch	1 liter = 4.23 cups
1 meter = 3.28 feet	1 liter = 0.264 gallon
1 kilometer = 0.62 mile	1 gram = 0.0352 ounce
	1 kilogram = 2.204 pounds

Temperature conversions between Celsius and Fahrenheit

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1.8$$

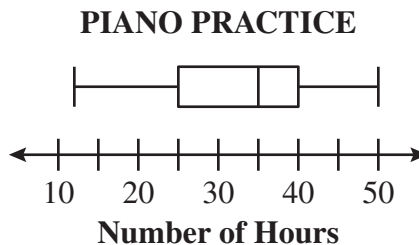
$$^{\circ}\text{F} = (^{\circ}\text{C} \times 1.8) + 32$$

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



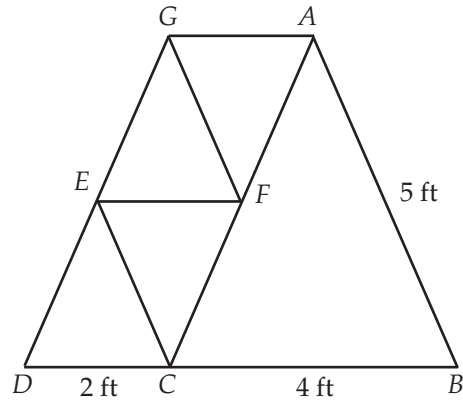
What is the actual distance, to the nearest foot, from B to C ?

- 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. $h = 2A - b$

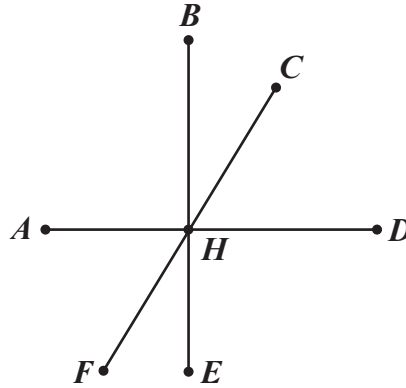
- 5 Sami installed a 6-foot-tall cylindrical storage tank to collect rainwater from the roof of her house. She used the rainwater to water the lawn and garden during dry spells. Sami recorded the rise in the water level in her storage tank after each of 3 rainstorms. Her results are shown in the table 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

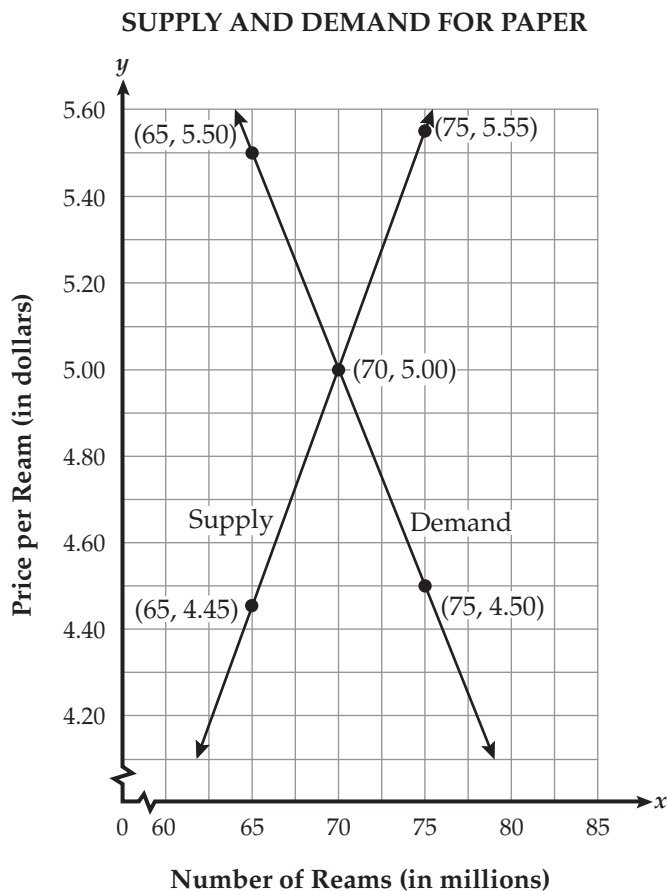
- 8 An economist is helping a paper company evaluate the demand for reams of paper at different selling prices. The point at which the supply and demand graphs intersect is referred to as *market equilibrium*.



The economist graphed the supply and demand equations shown below.

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

Supply equation: $y = 0.11x - 2.7$

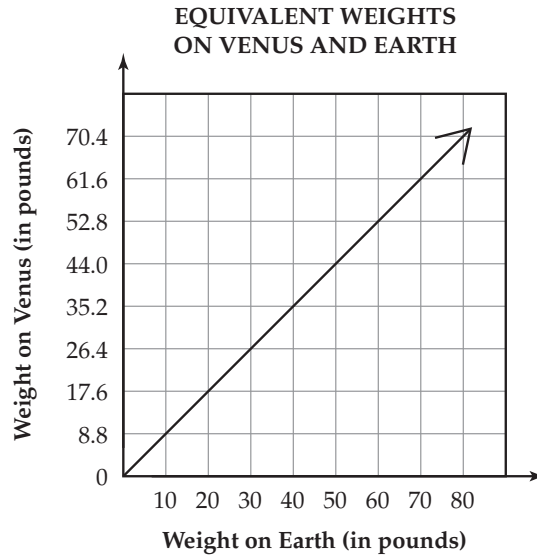


What is the price per ream, **in dollars**, of the *market equilibrium*?

- 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?

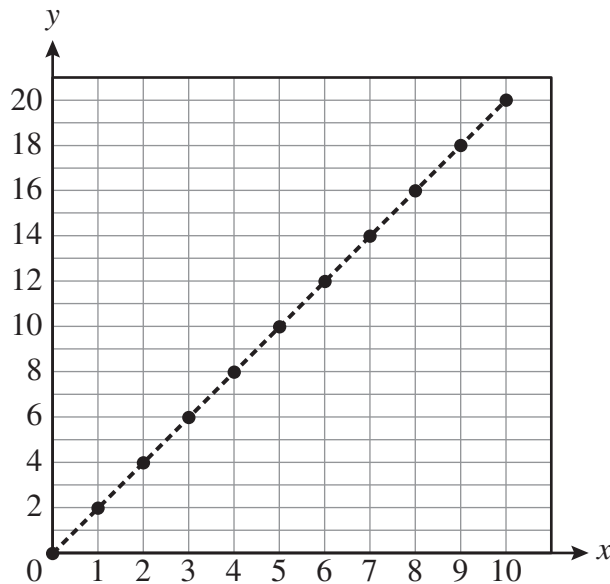
- F.
- G.
- H.
- I.

- 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?

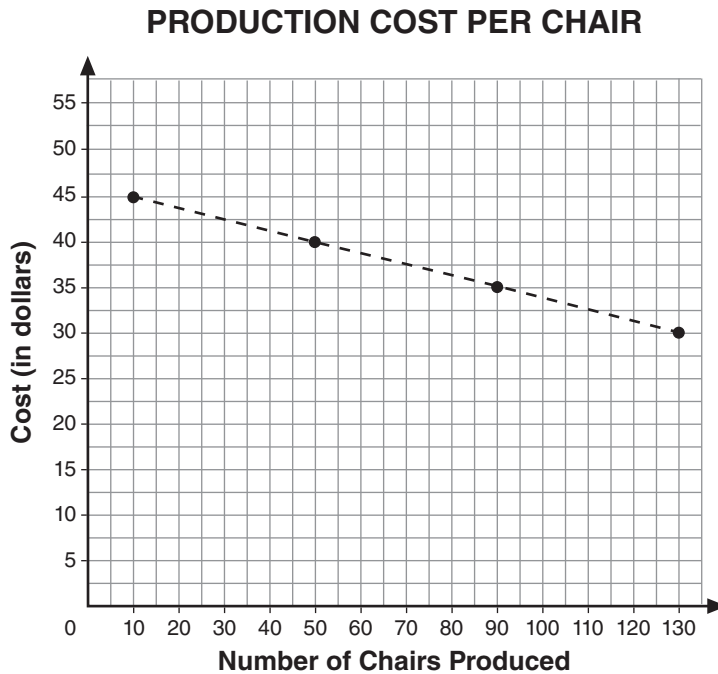
- 13 A function is represented in the graph below.



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
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	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

2

-	/	/	/	/	/
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	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

3

-	/	/	/	/	/
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	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

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

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	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

9

-	/	/	/	/	/
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	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

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

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

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

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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