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# MAKING & USING A STUDY GUIDE for a test

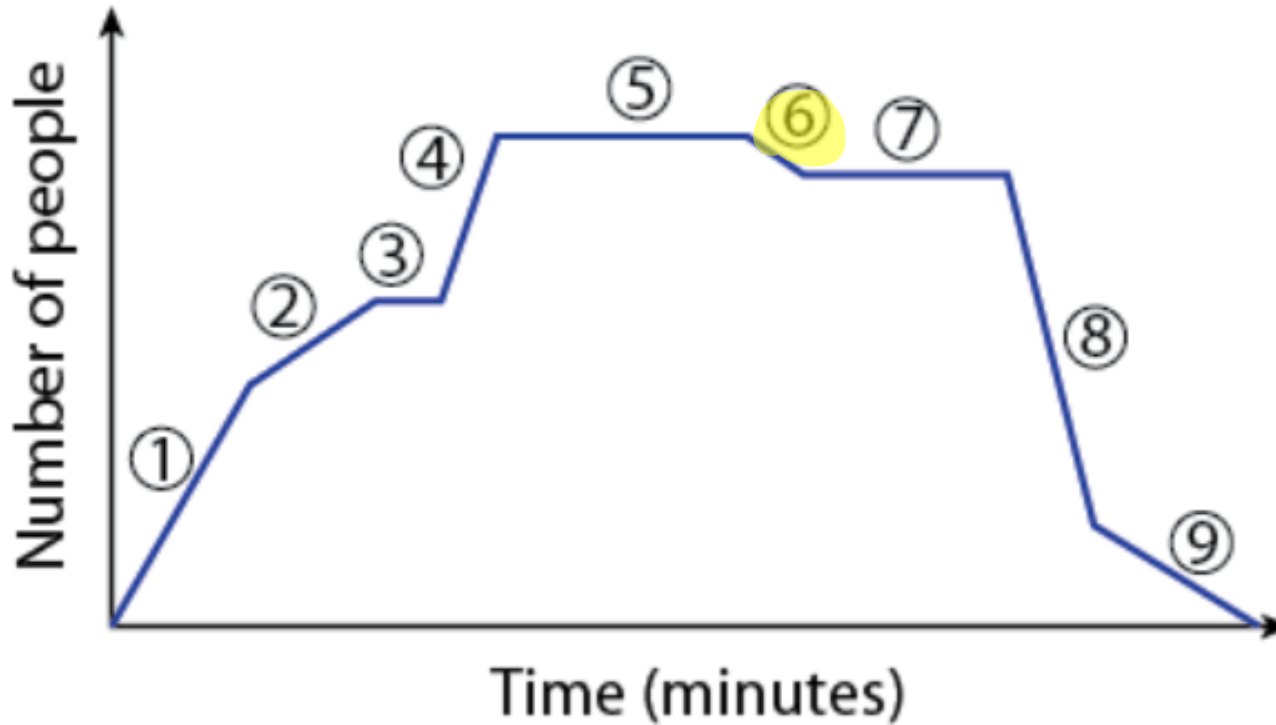
Exam-3: Functions and Models

Study Guide: helps you <sup>①</sup> summarize,  
<sup>②</sup> visualize, and <sup>③</sup> analyze  
concepts learned in class

\* Warning: simply making a study guide  
does not guarantee you an  
A+ on the test.

#1

The graph shows the attendance at a hockey game, and the rate at which the fans enter and exit the arena.



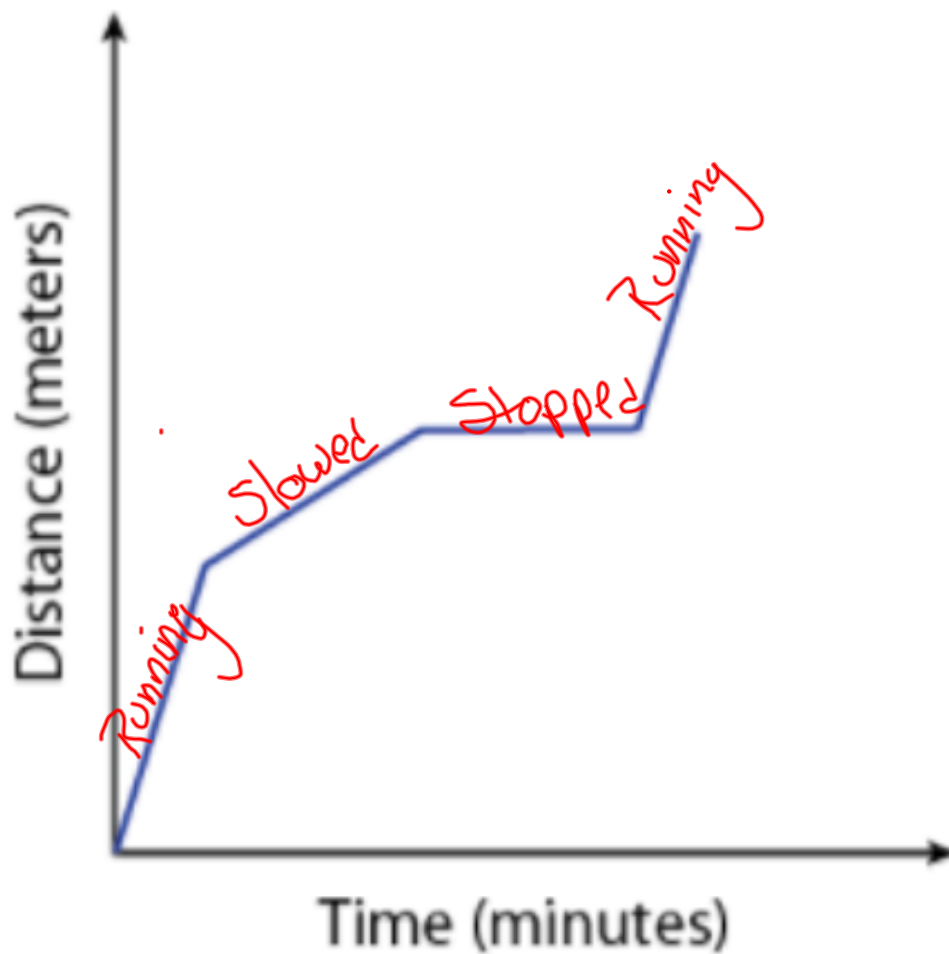
What does segment 6 mean?

Some fans started to leave before the end of the game.

Since the downward slope of segment 6 occurs before the large downward slope at the end of the graph, it can be inferred that a small number of fans left before the end of the game. Therefore, this statement is correct.

#2

Janelle alternates between running and walking. Janelle began by running, then slowed to a walk, stopped, and then began running again. Which graph would represent this situation?



### Study Guide Exam-3: Functions and Models

#3

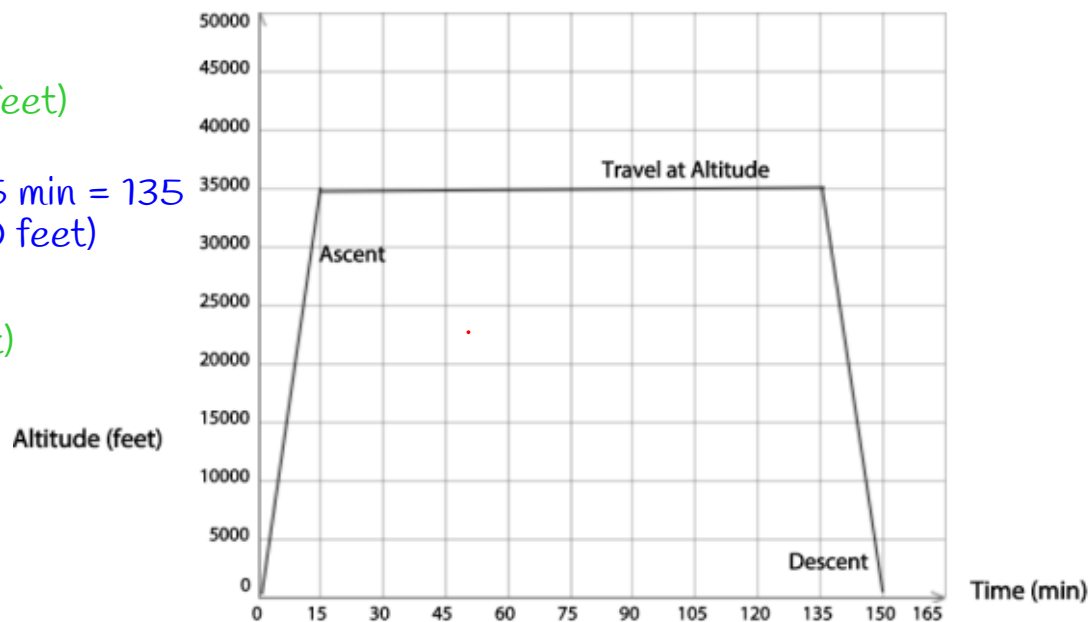
A plane takes off and climbs steadily for 15 minutes until it reaches 35,000 feet. It travels at that altitude for 2 hours until it begins to descend to land, which it takes 15 minutes at a constant rate. Draw a graph of the situation.

(x,y)

(15 minutes, 35,000 feet)

2 hours = 120 min + 15 min = 135  
(135 minutes, 35,000 feet)

(150 minutes, 0 feet)



Ascent "up"

Note: The ascending segment should be a straight-line segment that is increasing to a height of 35,000 feet for 15 minutes.



Travel at Altitude "Flat"

The second segment should be horizontal for 2 hours.



Descent "Down"

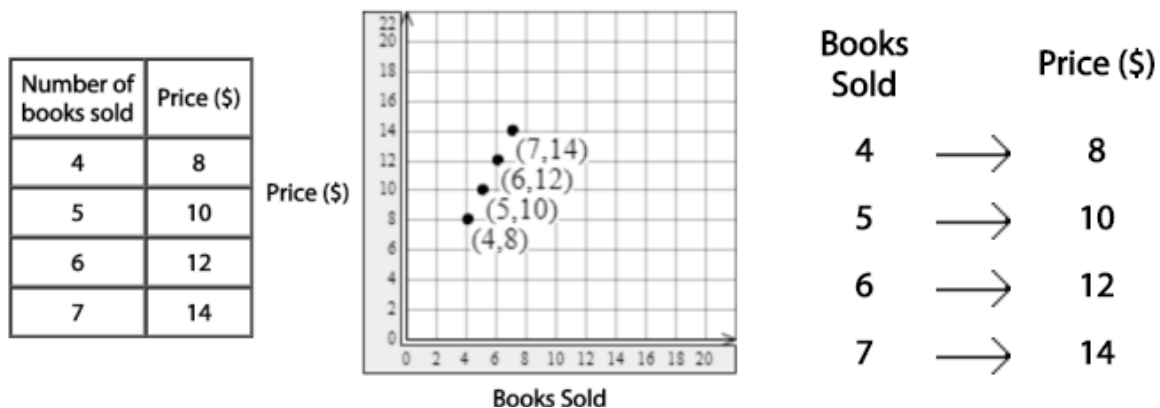
The third segment should be a straight-line segment that is decreasing from a height of 35,000 feet for 15 minutes.

## Study Guide Exam-3: Functions and Models

#4

Give the domain and range of each relation and interpret them in context. State the corresponding outputs for the given inputs in context and explain whether the relation is a function.

The relation represents the number of books sold and the price for the corresponding number of books.



The domain values are , , , and .

The range values are , , , and .

For an input of 4 books sold, there is an output of \$ .

For an input of 5 books sold, there is an output of \$ .

For an input of 6 books sold, there is an output of \$ .

For an input of 7 books sold, there is an output of \$ .

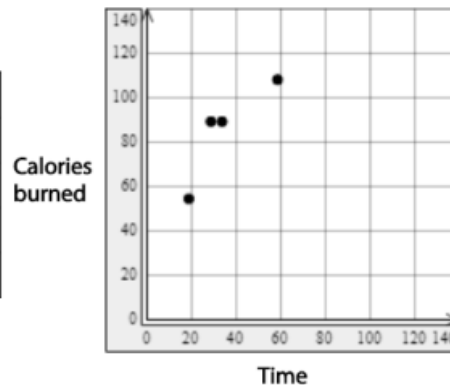
The relation  a function. Each domain value is paired with  one range value.

## Study Guide Exam-3: Functions and Models

#5

Give the domain and range of the relation and interpret them in context. State the corresponding outputs for the given inputs in context and explain whether the relation is a function. The relation represents the time spent exercising and the number of calories burned during that time.

Time (min)	Calories burned
18	54
28	89
33	89
58	108



Time    Calories

18 → 54

28 ↘ 89

33 ↗ 89

58 → 108

The domain values are , , , and .

The domain is the  exercising.

The range values are , , and .

The range is the  exercising.

For an input of 18 minutes exercising, there is an output of  calories burned.

For an input of 28 minutes exercising, there is an output of  calories burned.

For an input of 33 minutes exercising, there is an output of  calories burned.

For an input of 58 minutes exercising, there is an output of  calories burned.

The relation  a function. Each domain value is paired with  one range value

#6

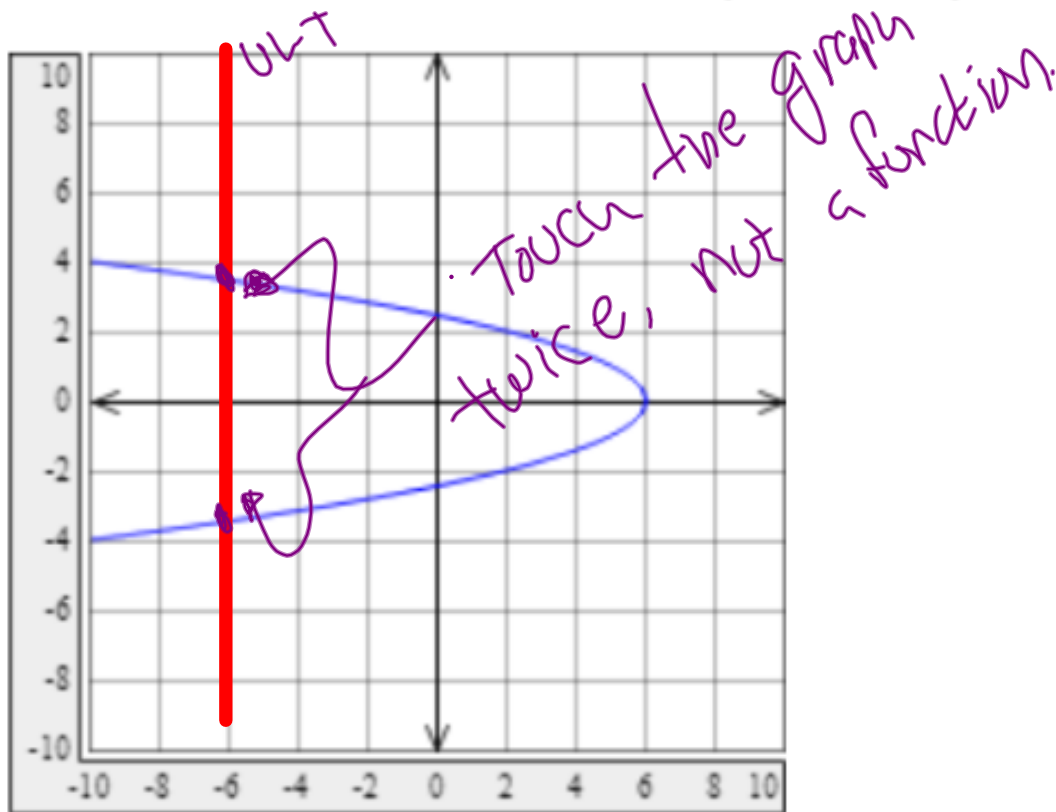
Use the vertical line test to determine if the relation is a function. Complete the explanation.



Since  vertical line(s) will pass through more than one point, the graph  the vertical line test. Therefore, the relation  a function.

#7

Use the vertical line test to determine if the relation is a function. Complete the explanation.



Since  vertical line will pass through more than one point, the graph  the vertical line test. Therefore, the relation  a function.



#8

Express the relation as a table, as a graph, and as a mapping diagram.

The relation below represents the ages of students and the number of words they can write per minute.

$\{(5, 9), (6, 18), (6, 27), (7, 30)\}$

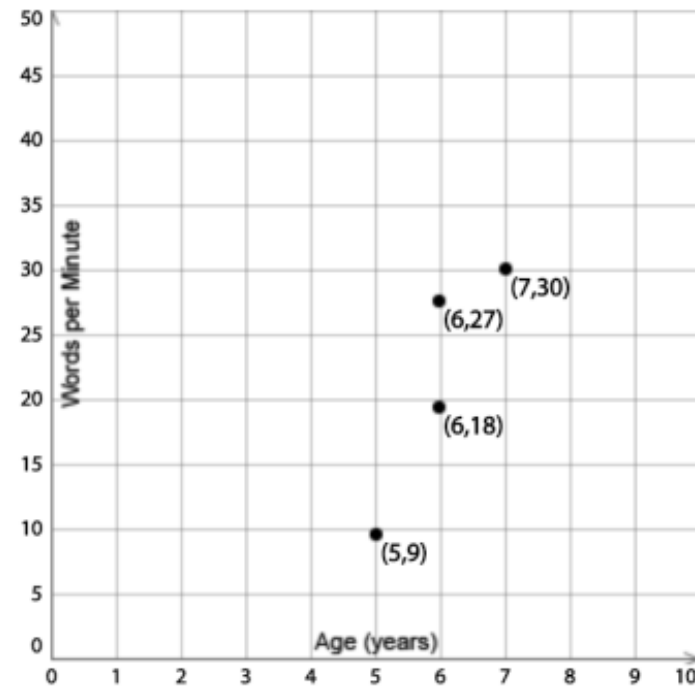
Part 1 out of 3

Drag and drop the missing values of the relation into the correct boxes to complete the table below.

x	y
5	9
6	18
6	27
7	30

Part 2

Plot the ordered pairs for the relation in the graph below.



Part 3

Age (years)

Words per Minute

5 →

9

6

↗

18

↘

27

7 →

30

#9

Express the relation as a table, as a graph, and as a mapping diagram.

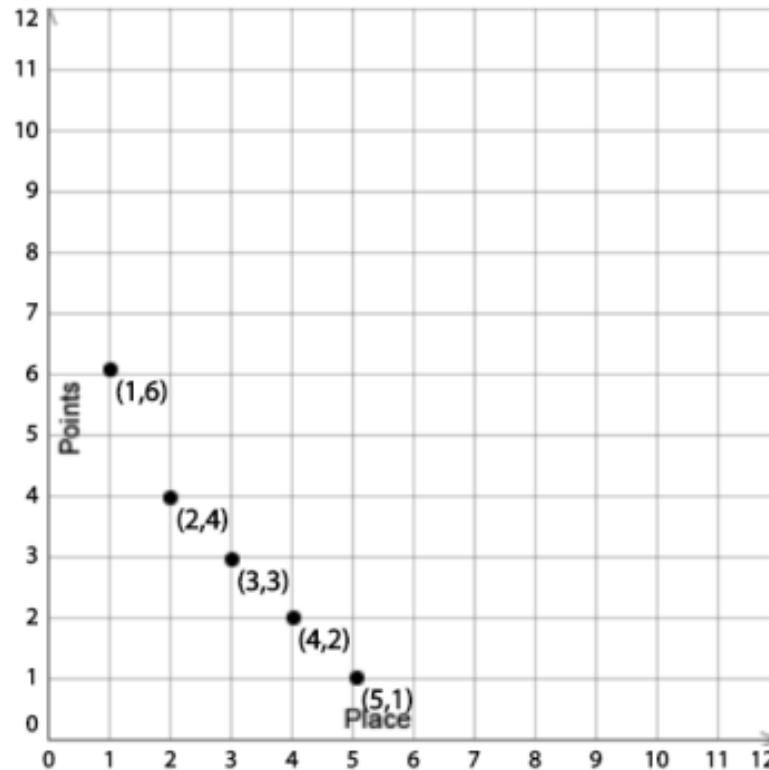
The relation represents the place won in a track meet and the number of points that place finish is worth.

$\{(1, 6), (2, 4), (3, 3), (4, 2), (5, 1)\}$

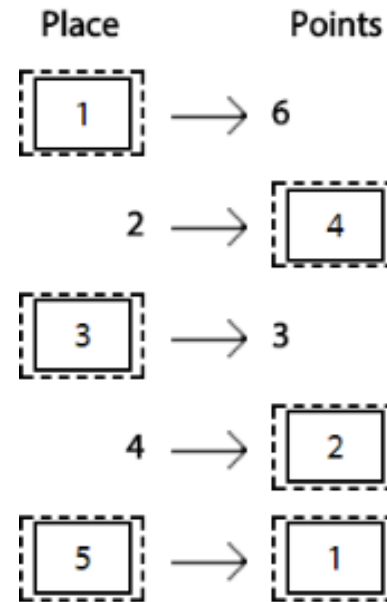
Part 1 out of 3

x	y
1	6
2	4
3	3
4	2
5	1

Part 2

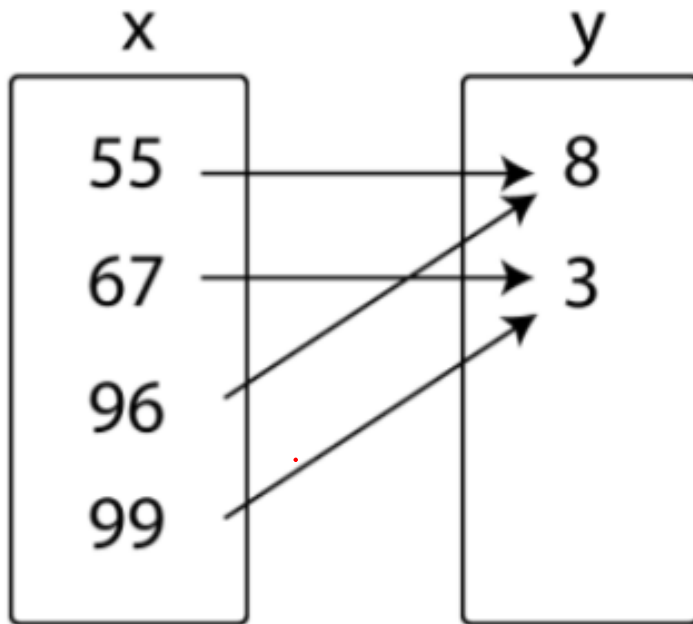


Part 3



#10

State the domain and range of the relation.



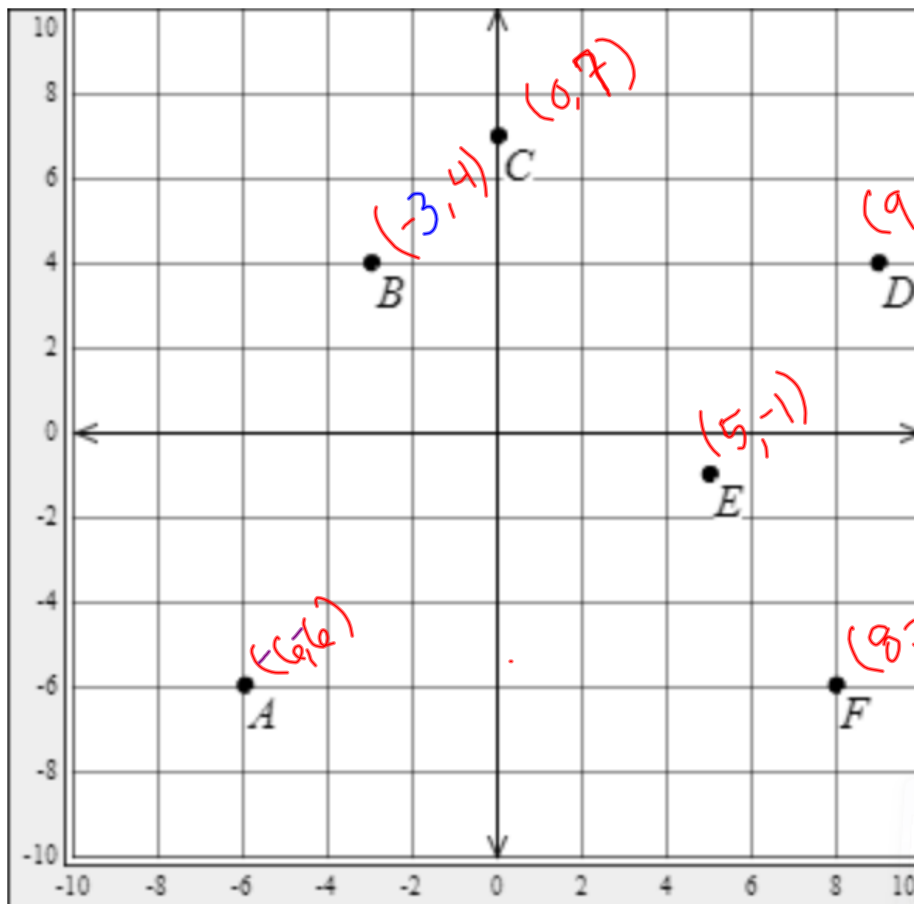
The domain values are <sup>x</sup>  ,  ,  , and  .

The range values are <sup>y</sup>  and  .

Study Guide Exam-3: Functions and Models

#11

State the <sup>x</sup> domain and <sup>y</sup> range of the relation.



The coordinates of the points shown in the graph are all integers.

The domain values are , , , , , and .

The range values are , , , and .

#12

A person can burn about 9 calories per minute bicycling. Let  $x$  represent the number of minutes bicycled, and let  $y$  represent the number of calories burned. Create a mapping diagram to show the number of calories burned by bicycling for 40, 80, 120, or 160 minutes. Determine the domain and range of the relation in context and explain whether or not this represents a function.



The domain values are , , , and .

The domain is .

The range values are , , , and .

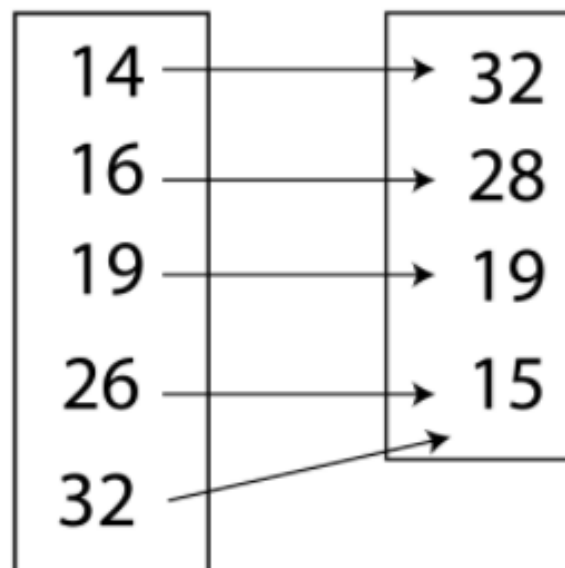
The range is the .

This relation  a function. Each domain value is paired with  one range value.

#13

Express each relation as a mapping diagram and complete the explanation of whether or not the relation represents a function.

$(14, 32), (16, 28), (19, 19), (26, 15), (32, 15)$



This relation  a function. Each domain value is paired with  one range value.

#14

Identify the independent and dependent variables. Enter a function in function notation for the situation. Then use the function to solve the problem.

Stan, a local delivery driver, is paid \$2.50 per mile driven plus a daily amount of \$95. On Monday, he is assigned a route that is 20 miles long. How much is he being paid for that day?

The dependent variable is the .

The independent variable is the .

Let  $m$  represent the number of miles. Then,  $f(m) =$   \* (Use the same variable as in f of m)

Stan is paid \$  for driving 20 miles that day.

$m = 20$

$$2.50(20) + 95 = 145$$

#15

Identify the independent and dependent variables. Enter a function in function notation for the situation. Then use the function to solve the problem.

Bruce owns a small grocery store and charges \$4.50 per pound of produce. If a customer orders 6 pounds of produce, how much does Bruce charge the customer?

The dependent variable is the .


The independent variable is the .

Let  $p$  represent the number of pounds of produce ordered. Then,  $f(p) =$  .

*\*(Use the same variable as in f of p)*

Bruce charges the customer \$  for 6 pounds of produce.

Substitute  $p = 6$

$$4.50(6) = 27$$




#16

Identify the independent and dependent variables. Enter a function in function notation for the situation. Then use the function to solve the problem.

Georgia, a florist, charges \$8.95 per flower bundle plus a \$15 delivery charge per order. If Charlie orders 5 flower bundles and has them delivered, how much does Georgia charge Charlie?

The dependent variable is the .


The independent variable is the .

Let  $b$  represent the number of flower bundles ordered. Then,  $f(b) =$  .

*\*(Use the same variable as in f of b)*

Georgia charges Charlie \$  for 5 flower bundles, plus delivery.

Substitute  $b=5$   
 $8.95(5) + 15$



#17 The function  $f(x) = -7x + 9$  has a range given by  $\{2, -19, -40, -47\}$ .

Solve the equation for  $x$ .

$$f(x) = -7x + 9$$

$$y = -7x + 9$$

$$\begin{array}{r} y - 9 \\ \hline -7 \end{array} \quad \begin{array}{r} -7x \\ \hline -7 \end{array}$$

$$x = \frac{y - 9}{-7}$$

$x$	$f(x)$
$\frac{2 - 9}{-7} = 1$	2
$\frac{-19 - 9}{-7} = 4$	-19
$\frac{-40 - 9}{-7} = 7$	-40
$\frac{-47 - 9}{-7} = 8$	-47

I substituted each range value into the function for  $f(x)$  and solved each resulting equation for  $x$ .

- |                                       |   |                                       |   |                                       |   |                                       |   |
|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|
| <input checked="" type="checkbox"/> A | 1 | <input checked="" type="checkbox"/> B | 2 | <input checked="" type="checkbox"/> C | 3 | <input checked="" type="checkbox"/> D | 4 |
| <input checked="" type="checkbox"/> E | 5 | <input checked="" type="checkbox"/> F | 6 | <input checked="" type="checkbox"/> G | 7 | <input checked="" type="checkbox"/> H | 8 |

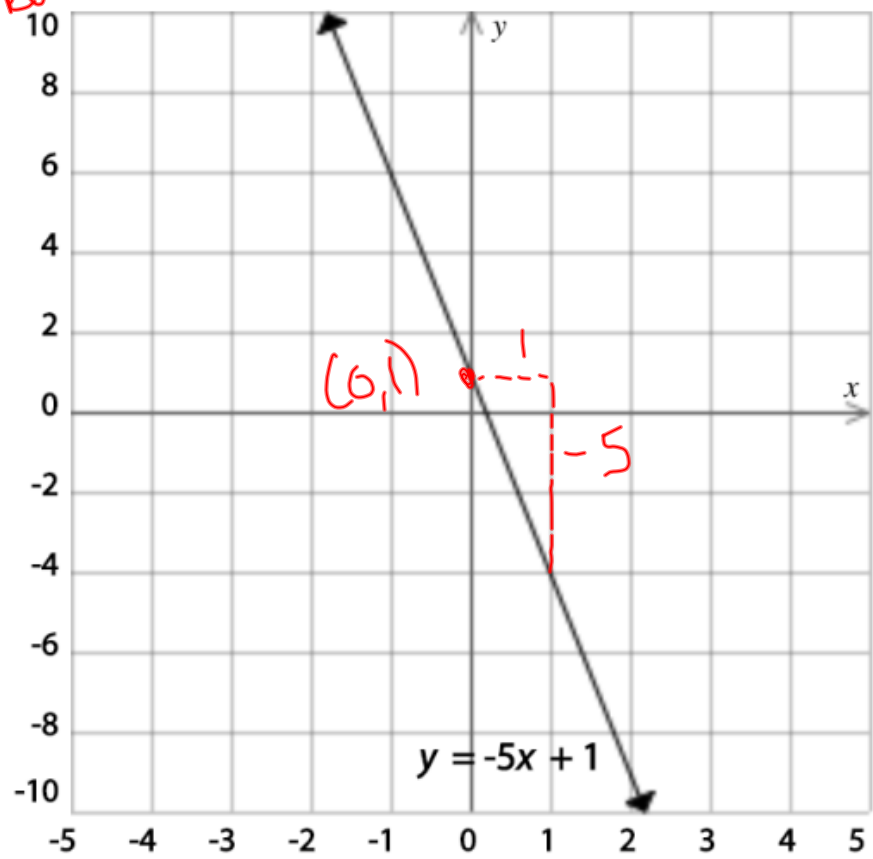
#18 Graph the function  $y = -5x + 1$ .

$y = mx + b$   
slope  $m$     intercept  $b$   
 $(0, b)$

Rise  
= Run

$m = \frac{-5}{1}$

$(0, 1)$   
cross y-int.



#19

A cruise ship is currently 15 kilometers away from its port and is traveling away from the port at 15 kilometers per hour. The function  $y = 15x + 15$  relates the number of kilometers  $y$  the ship will be from its port  $x$  hours from now. How far will the cruise ship be from its port 4.5 hours from now?

The cruise ship will be  kilometers away from port in 4.5 hours.

$$x = 4.5$$

$$y = 15(4.5) + 15$$

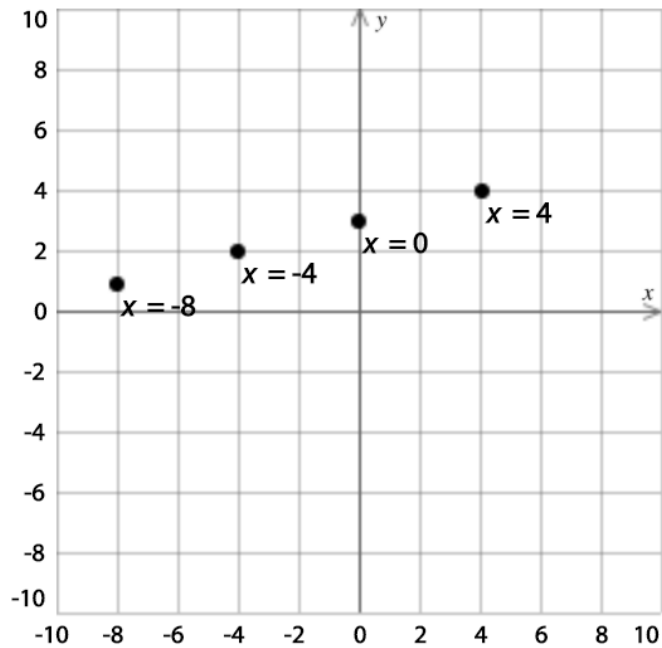
$$y = 82.5 \text{ km} \approx 83$$

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#20 Graph the function for the given domain.

$$y = \frac{1}{4}x + 3 \quad D: \{-8, -4, 0, 4\}$$

x	y
-8	$\frac{1}{4}(-8) + 3 = 1 \Rightarrow (-8, 1)$
-4	$\frac{1}{4}(-4) + 3 = 2 \Rightarrow (-4, 2)$
0	$\frac{1}{4}(0) + 3 = 3 \Rightarrow (0, 3)$
4	$\frac{1}{4}(4) + 3 = 4 \Rightarrow (4, 4)$

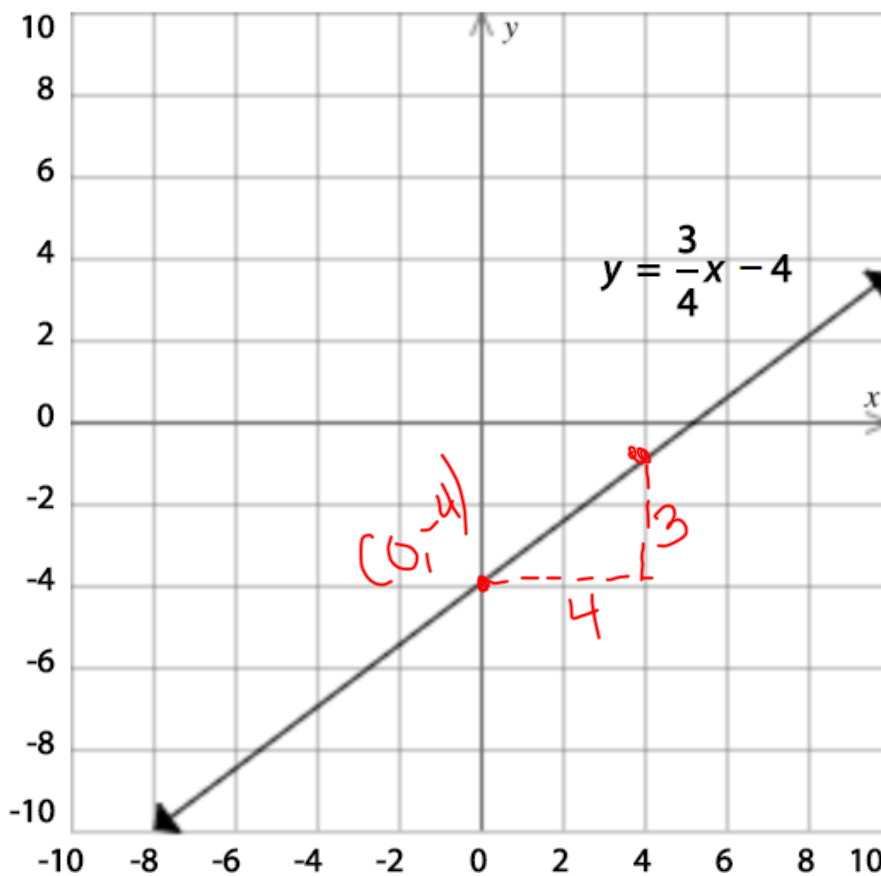


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#21

Graph the function  $y = \frac{3}{4}x - 4$ .

Slope =  $\frac{\text{Rise}}{\text{Run}}$       y-int. (0, -4)

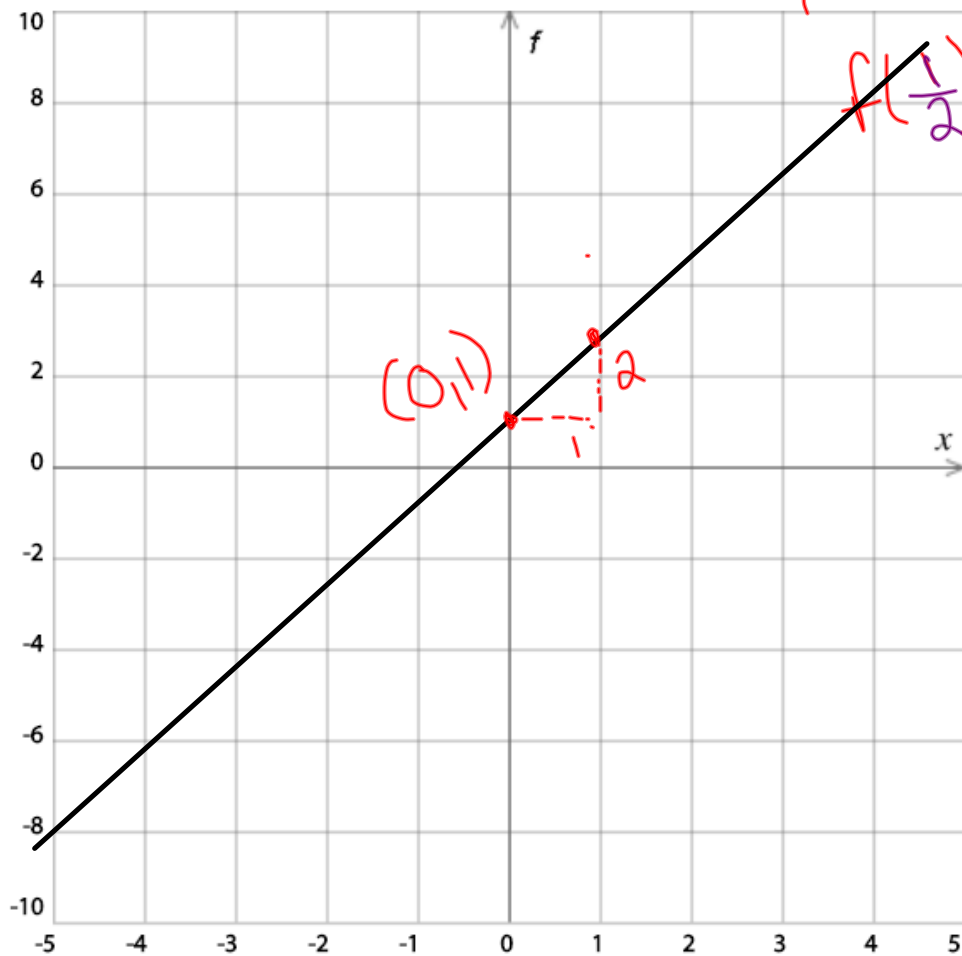


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#22

Graph the function  $f(x) = 1 + 2x$ . Then find the value of  $f(x)$  when  $x = \frac{1}{2}$ .

y-int  $(0,1)$   
slope =  $\frac{\text{Rise}}{\text{Run}}$   
 $= \frac{2}{1}$

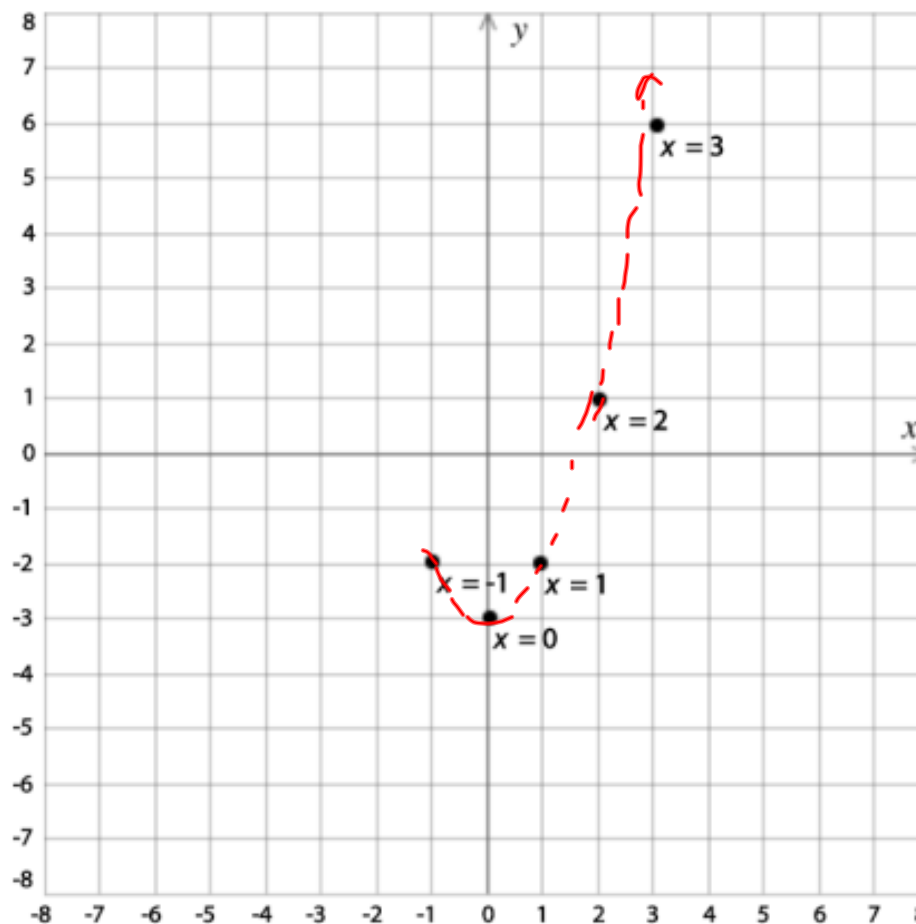


$$f\left(\frac{1}{2}\right) = 1 + 2\left(\frac{1}{2}\right)$$
$$= 1 + 1 = \boxed{2}$$

#23 Graph the function for the given domain.

$$y = x^2 - 3 \quad D:\{-1, 0, 1, 2, 3\}$$

x	y
-1	$(-1)^2 - 3 = -2$
0	$(0)^2 - 3 = -3$
1	$(1)^2 - 3 = -2$
2	$(2)^2 - 3 = 1$
3	$(3)^2 - 3 = 6$

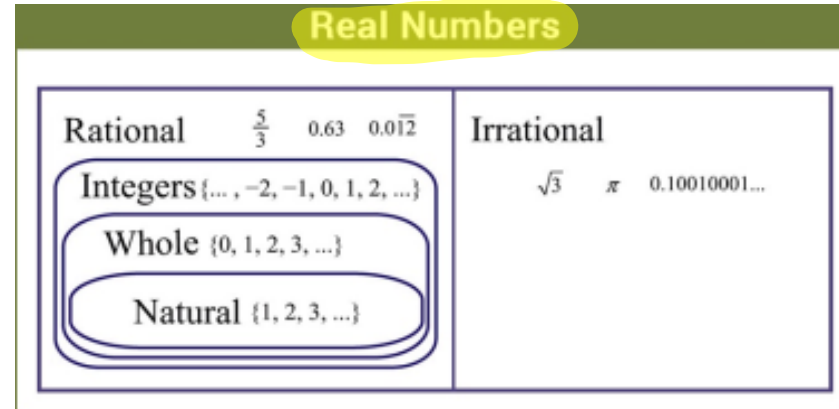




# #24

The relation shown on the table represents the number of comic books sold and the total price for the comics.

Number of comic books sold, $x$	Price (\$), $y$
1	5
2	6
3	8
4	12



Is each statement True?

The domain is all real numbers.

A Yes  B No

The range is  $\{5, 6, 8, 12\}$ .

A Yes  B No

The relation is a function.

A Yes  B No

#25

Solve the following equation for x.

$$\frac{1}{2}(5x + 12) = 2x - 3$$

$$\begin{array}{r|l} \frac{1}{2} \cdot 5x + \frac{1}{2} \cdot 12 & 2x - 3 \\ \hline \frac{5}{2}x + 6 & 2x - 3 \\ -6 & -6 \\ \hline \frac{5}{2}x & 2x - 9 \\ -2x & -2x \\ \hline \frac{1}{2}x & -9 \end{array}$$

$$\frac{1}{2}x = -9$$

$$x = -18$$

Side meth

$$\frac{1}{2} \cdot 5 - \frac{1}{2} \cdot 2 = \frac{1}{2} \cdot 12$$

$$\frac{5}{2} - \frac{1}{2} = \frac{12}{2}$$

$$2 = 6$$

~~$$\frac{1}{2}(5x + 12) = 2x - 3$$~~

$$\begin{array}{r|l} 5x + 12 & 4x - 6 \\ -12 & -12 \\ \hline 5x & 4x - 18 \\ -4x & -4x \\ \hline x & -18 \end{array}$$