

## 5.7 Interpreting Graphs of Linear Functions

### **Lesson Focus**

Use intercepts, rate of change, domain, and range to describe the graph of a linear function

D:  $0 \leq d \leq 400$   
 R:  $60 \leq C \leq 140$  Explore

$C = 0.20d + 60$

base fee of \$60 to rent car

Where does the graph intersect the vertical axis?

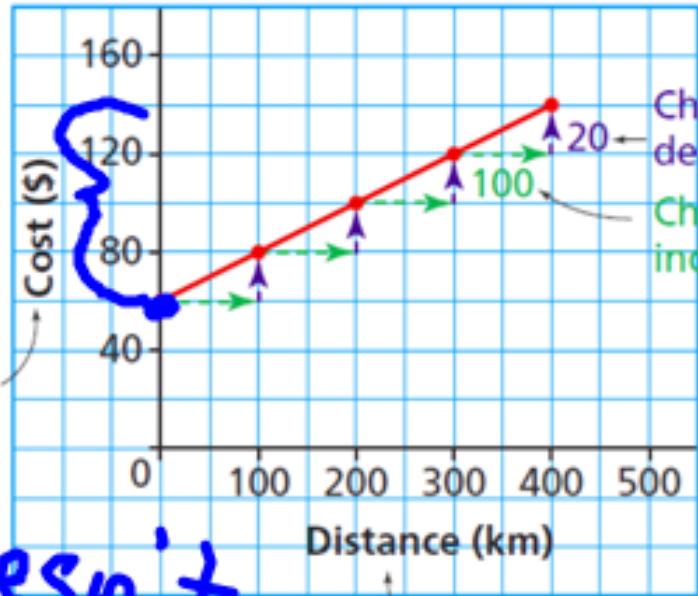
Where does the graph intersect the horizontal axis?

Will it ever cross the horizontal axis? No

What is the rate of change for this graph?

$ROC = \frac{\Delta y}{\Delta x} = \frac{\$20}{100 \text{ km}} = \$0.20/\text{km}$

Car Rental Cost



Doesn't

# Graphs of Linear Functions

Any graph of a line that is **not vertical** represents a function

We call these functions **linear functions**

The point where the graph intersects the horizontal axis is the **horizontal intercept** (*x-intercept*)

*Either give as  $x = \underline{a}$  or a coordinate pair  $(\underline{a}, 0)$*

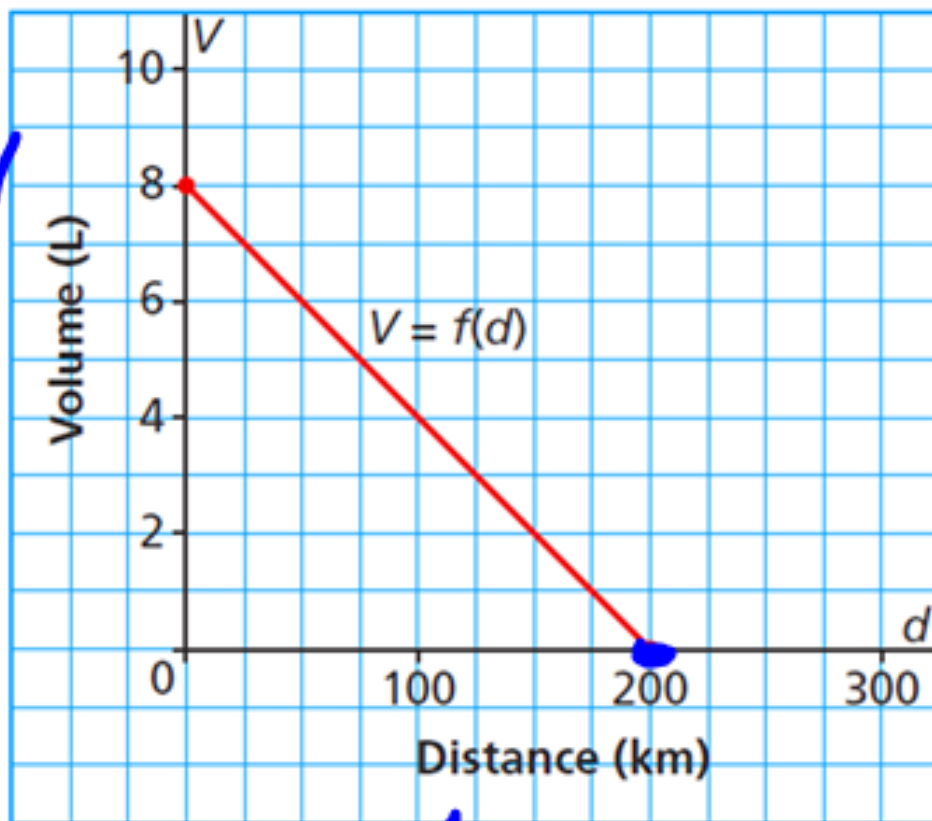
The point where the graph intersects the vertical axis is the **vertical intercept** (*y-intercept*)

*Either give as  $y = \underline{b}$  or a coordinate pair  $(0, \underline{b})$*

# Example

$$d = 200 \quad (200, 0)$$
$$v = 8 \quad (0, 8)$$

Volume of Gas in a Scooter



$d$

Write the coordinate of the points where the graph intersects the axes.

Determine the vertical and horizontal intercepts

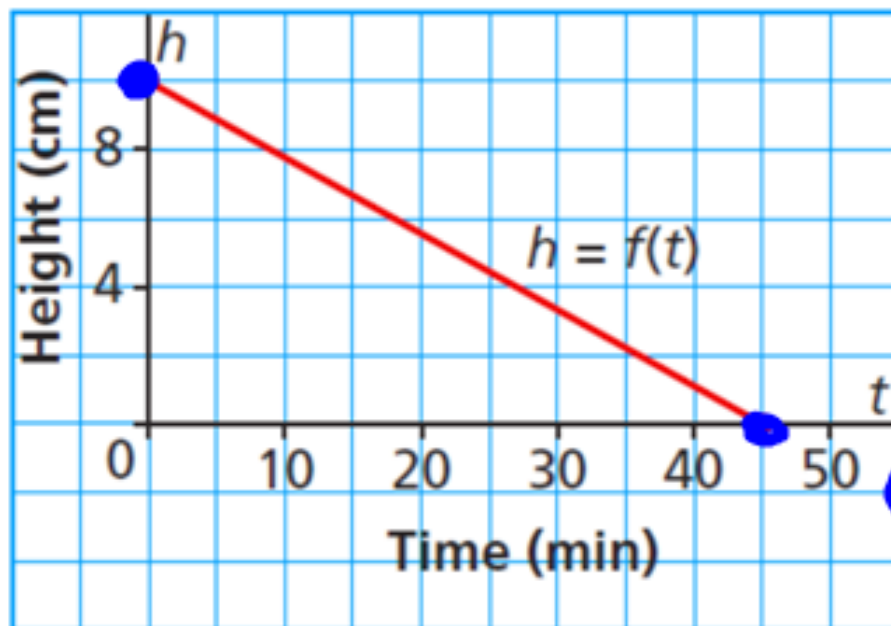
What are the domain and range of this function?

$$D: 0 \leq d \leq 200$$

$$R: 0 \leq v \leq 8$$

# Example – Your Turn

Height of a Burning Candle



Write the coordinate of the points where the graph intersects the axes.

Determine the vertical and horizontal intercepts

What are the domain and range of this function?

$ROC = \frac{0 - 10 \text{ cm}}{45 - 0 \text{ min}} = -\frac{2}{9} \text{ cm/min}$

$D: 0 \leq t \leq 45$

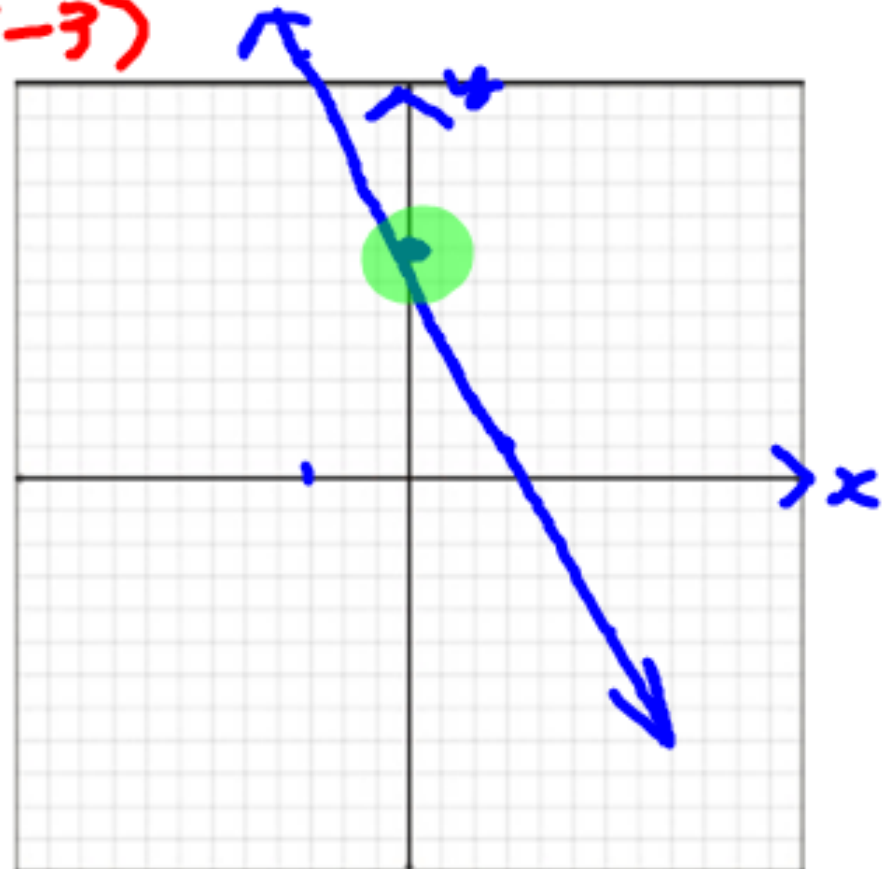
$R: 0 \leq h \leq 10$

# Example

Sketch a graph of the linear function  $f(x) = -2x + 7$ .

x	y
-3	13
0	7
3	1

$$\begin{aligned} \text{ROC} &= \frac{7-13}{0-(-3)} \\ &= \frac{-6}{3} \\ &= -2 \end{aligned}$$

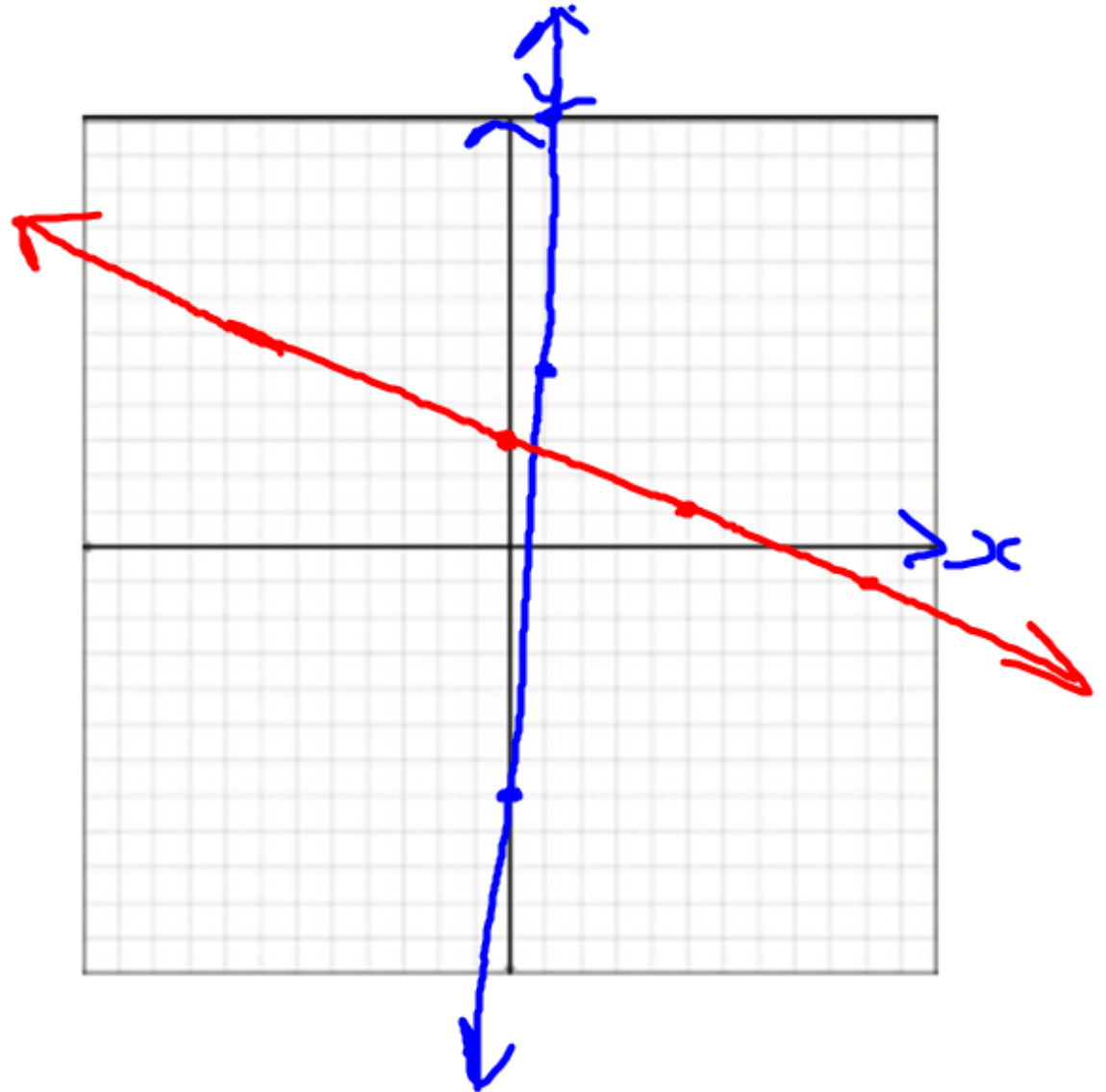


## Your Turn

Sketch the functions  $f(x) = (-2/5)x + 3$  and  $f(x) = 12x - 7$  in different colours on the same grid. Label each on the graph.

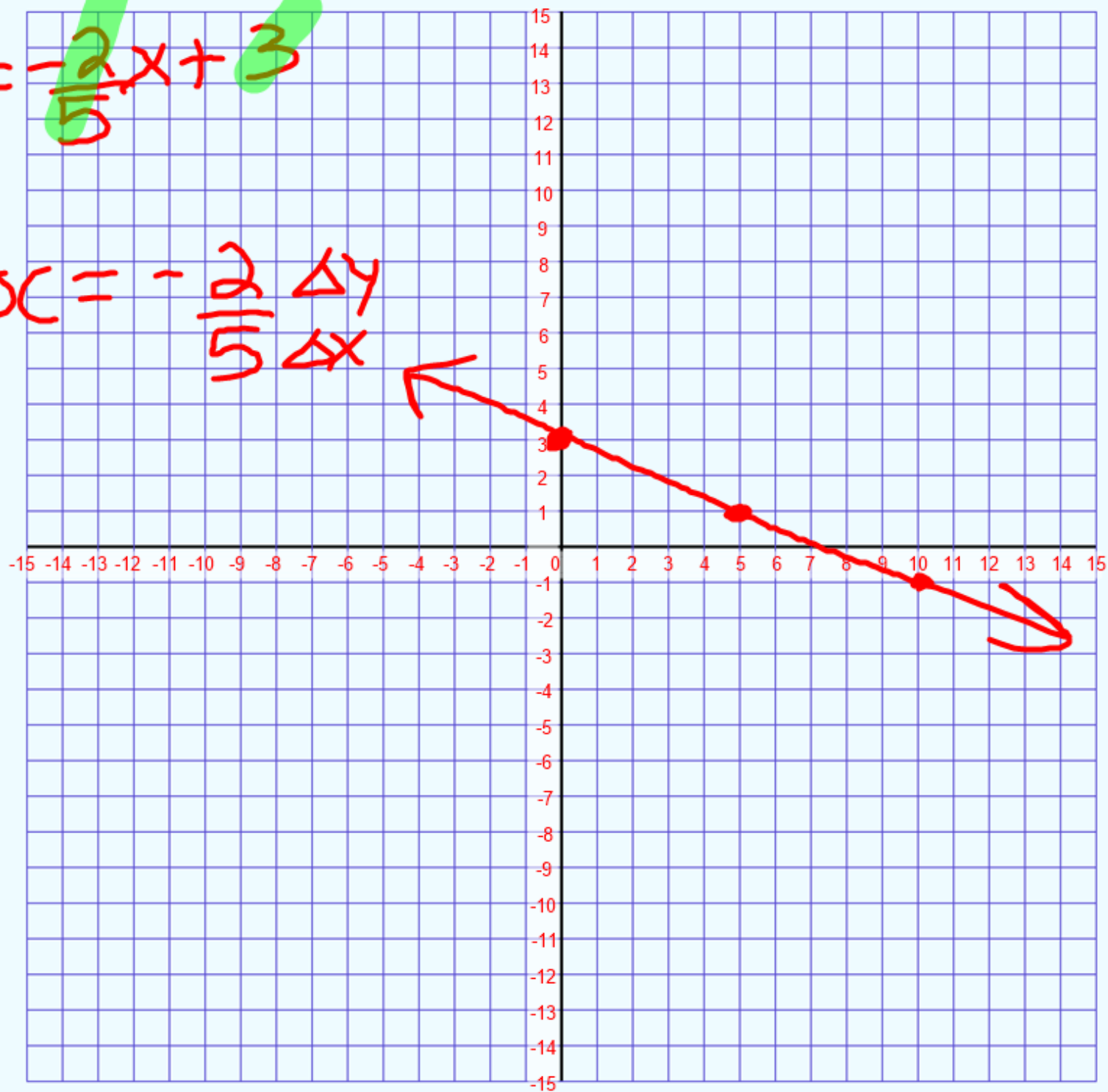
x	y
0	-7
-1	5
-1	-19

x	y
0	3
5	-1
10	-1



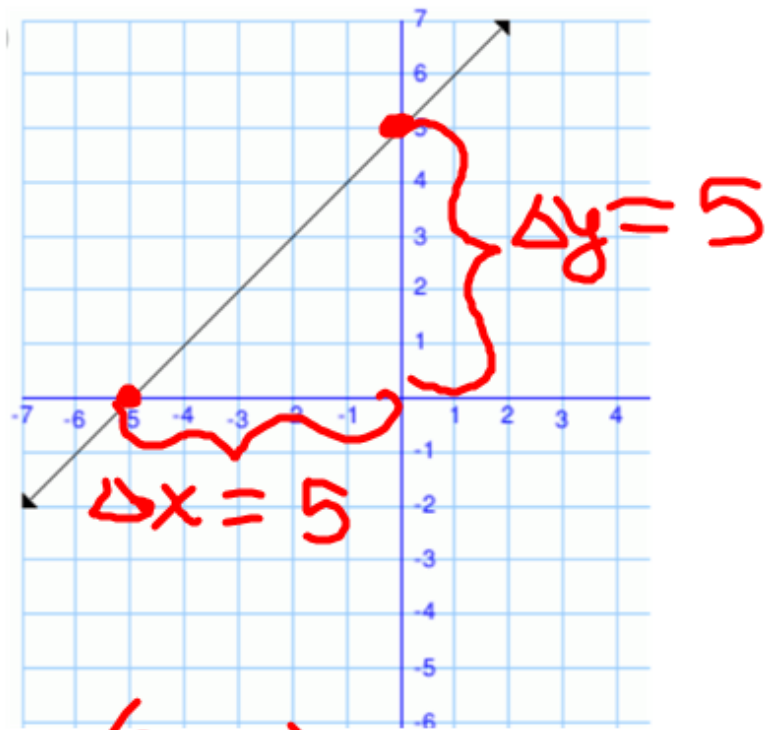
$$y = -\frac{2}{5}x + 3$$

$$\text{ROC} = -\frac{2 \Delta y}{5 \Delta x}$$



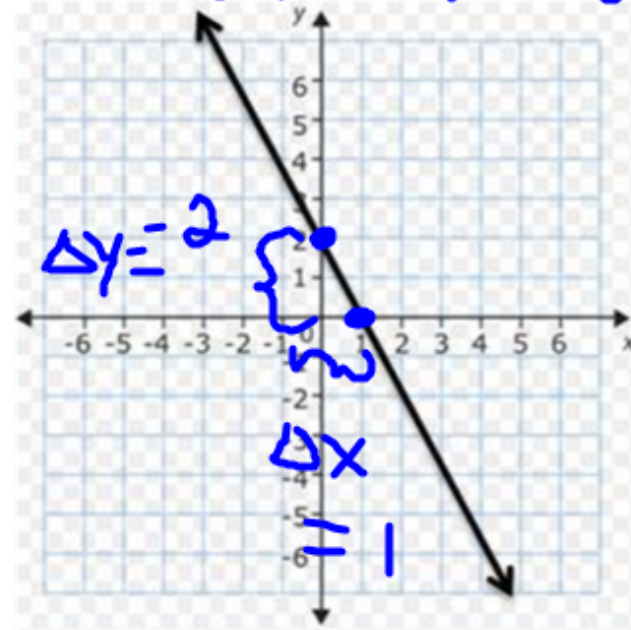


Given the following graphs, write the equation of the function in function notation.



$$y = (\text{ROC})x + (\text{vert. int})$$
$$y = 1x + 5$$

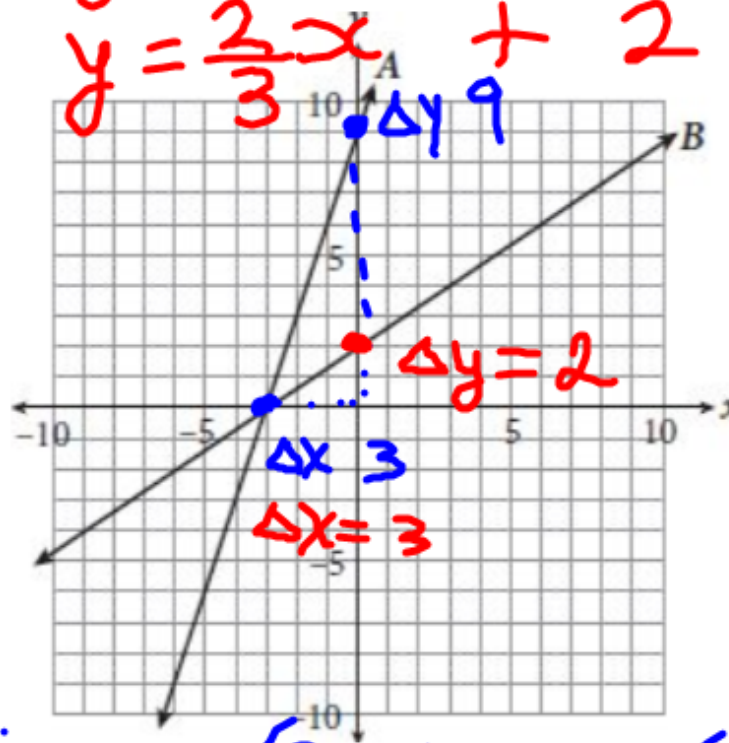
$$y = (\text{ROC})x + (\text{vert int})$$
$$y = -2x + 2$$



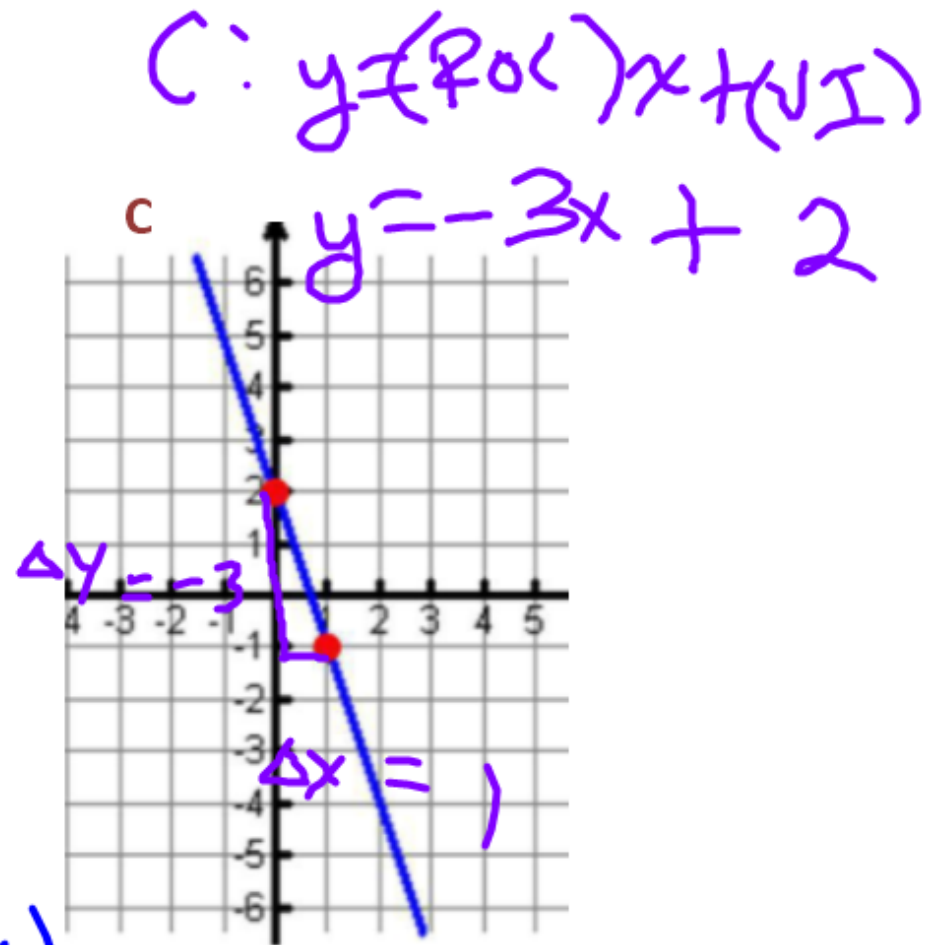
## Your Turn

Given the following graphs, write the equation of the graphs A, B, C in function notation.

B:  $y = (\text{ROC})x + (\text{vert int})$   
 $y = \frac{2}{3}x + 2$



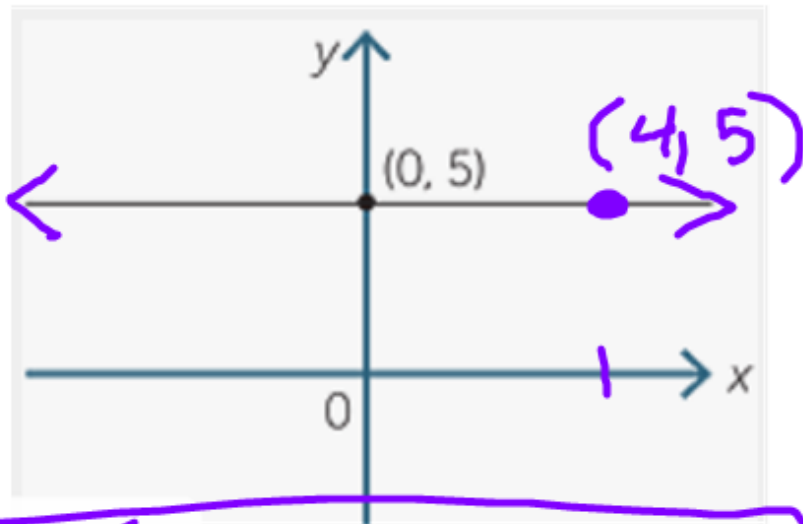
A:  $y = (\text{ROC})x + (\text{vert int})$   
 $y = 3x + 9$



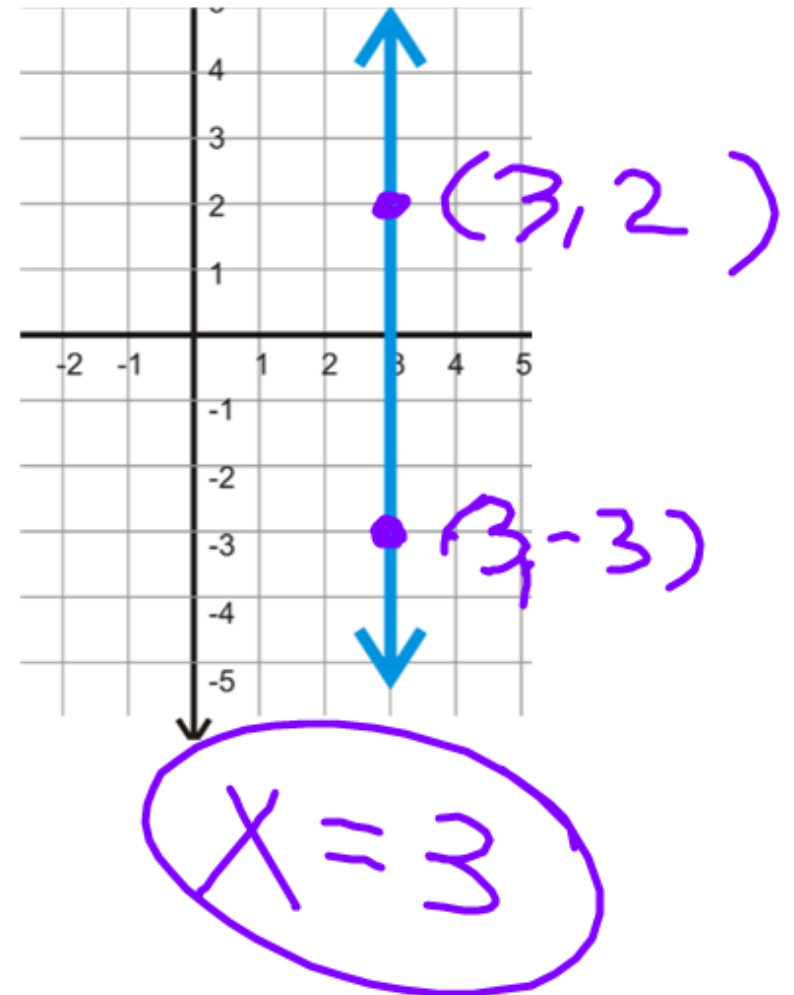
Hoy Vux

Given the following graphs, write the equation of the graphs in function notation.

$$m = \frac{\Delta y}{\Delta x} = \frac{5}{0}$$

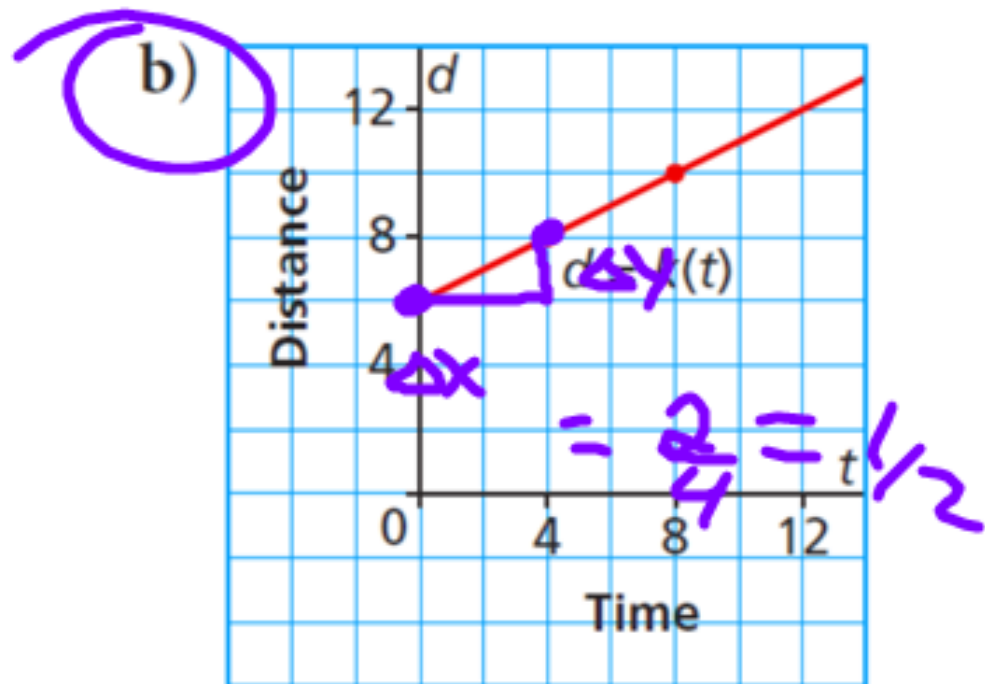
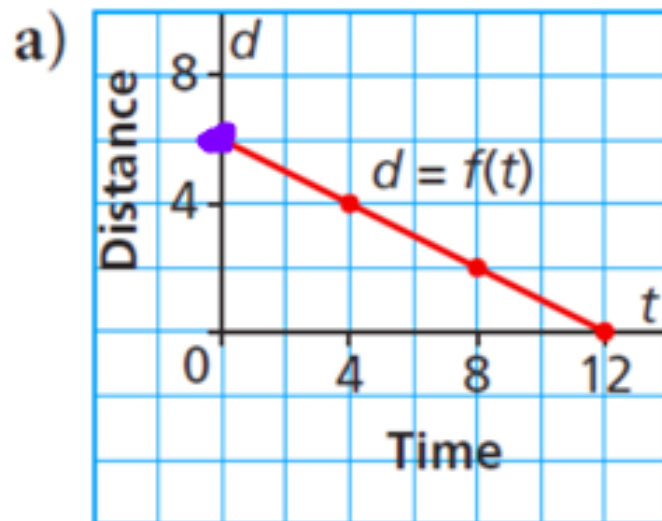


$$y = (0) x + (5)$$
$$y = 0x + 5$$
$$y = 5$$



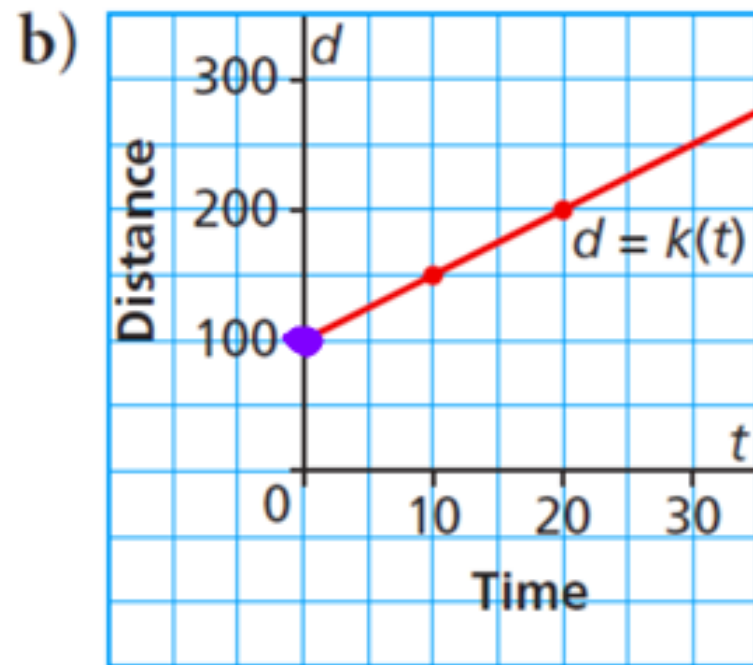
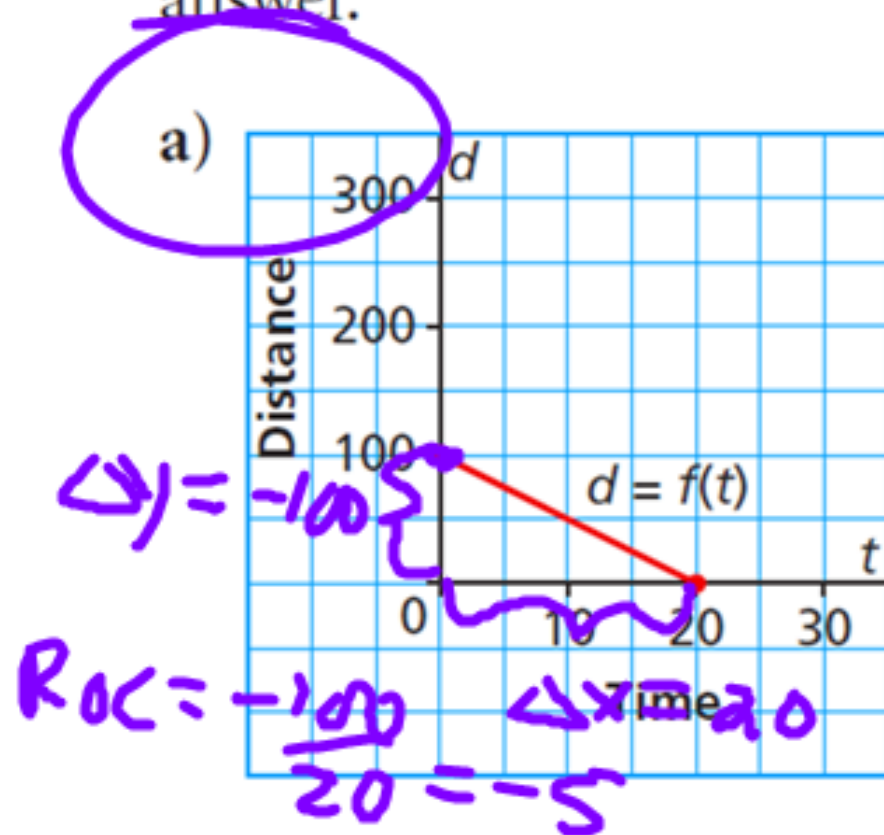
# Example

Which graph has a rate of change of  $\frac{1}{2}$  and a vertical intercept of 6? Justify the answer.



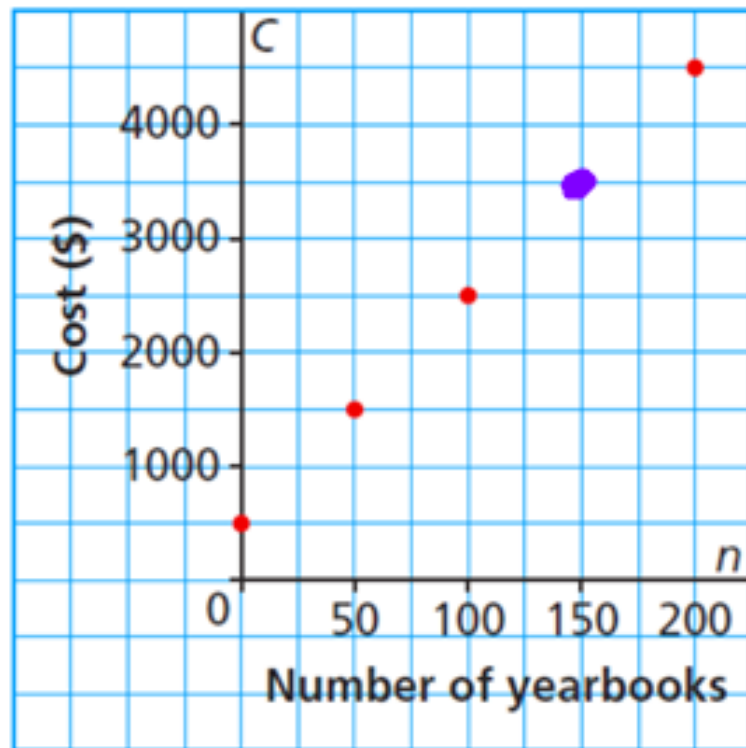
# Example – Your Turn

Which graph has a rate of change of  $-5$  and a vertical intercept of  $100$ ? Justify your answer.



# Example

Cost of Publishing a Yearbook



Why are the points on this graph not joined?

Can't have partial yearbooks

What are the domain and range of this function?

$D: \{0, 50, 100, 150, 200\}$   
 $R: \{500, 1500, 2500, 3500, 4500\}$

The budget for publishing costs is \$4200. What is the maximum number of books that can be printed?

150

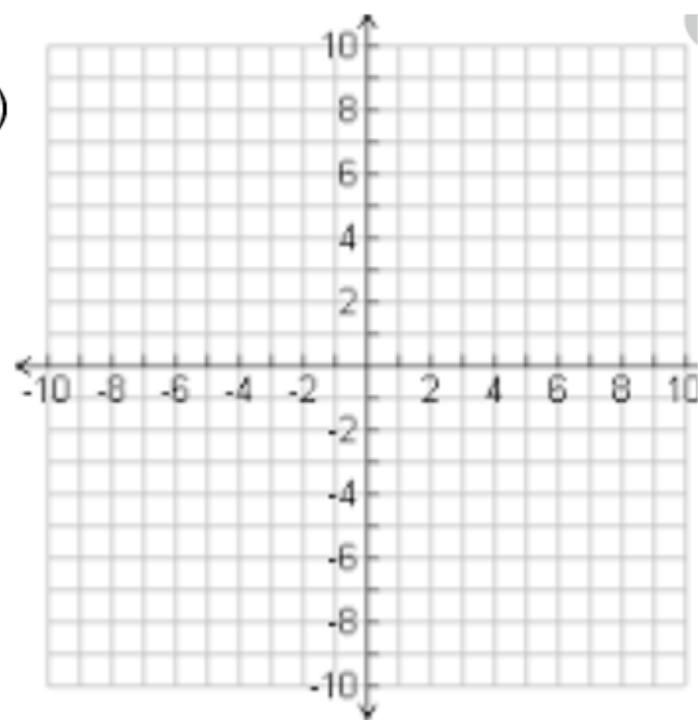
# Homework

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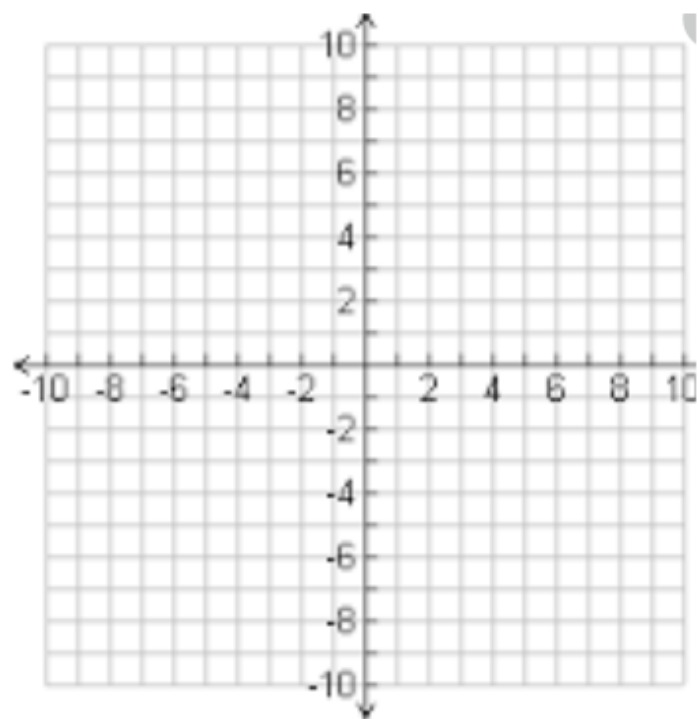
**# 4, 6 (a, d), 7, 8, 11, 12, 15 (a, d) 17, 19**

**Handouts**

6. a)



d)

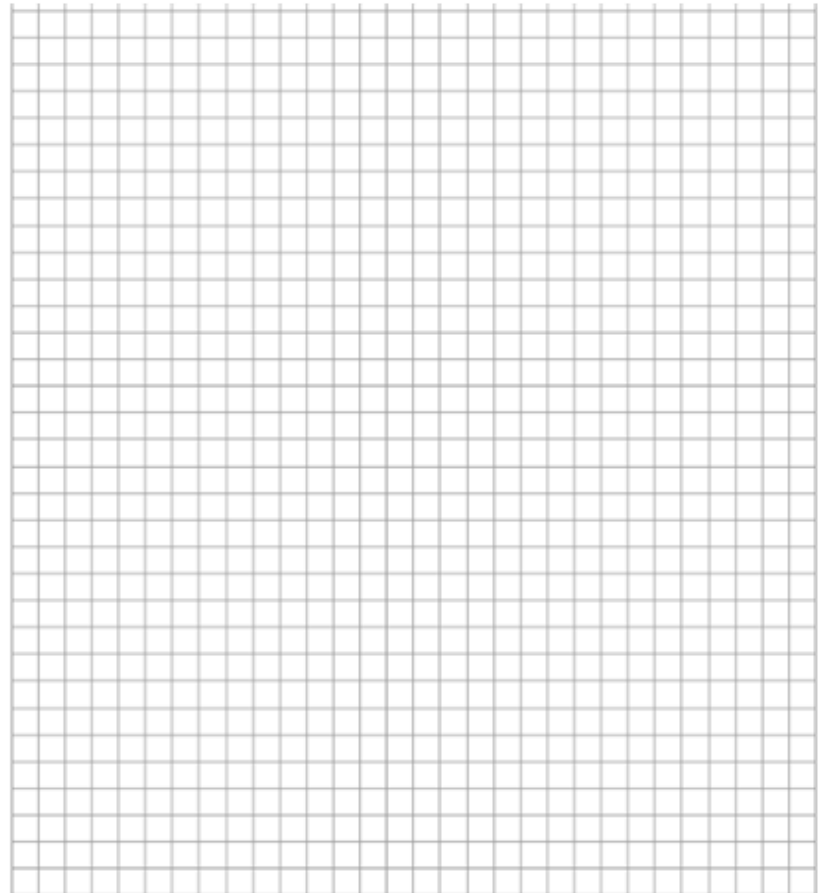




15. a)



d)



19.

