

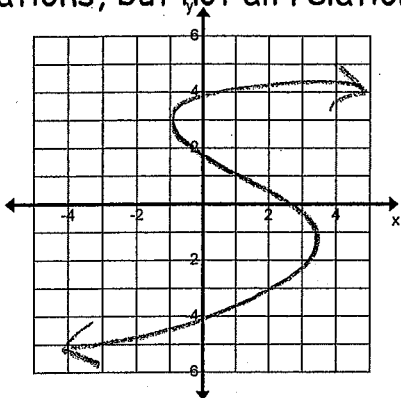
Functions Unit Study Guide

As a result of this unit, you should know and be able to:

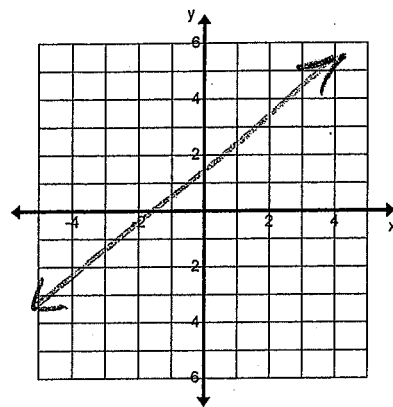
...identify the difference between a relation and a function

1. Draw an example of a relation and an example of a function. Remember, all functions are relations, but not all relations are functions.

Only a relation:



Function:



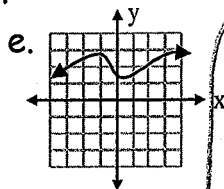
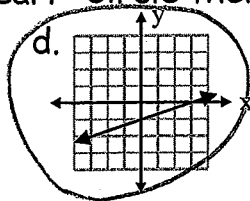
...identify if a function is linear.

2. Which of the following are linear? Circle them.

a. $y=x$ (circled)

b. $y=x^2$

c. $y=\frac{1}{x}$



f.

x	y
2	5
3	7
4	9
5	11

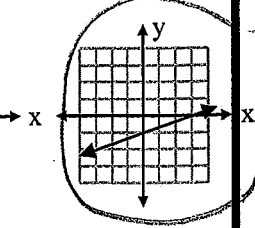
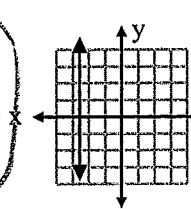
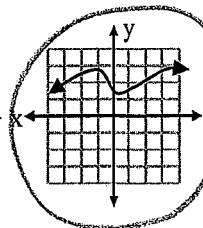
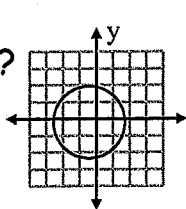
 (circled)

g.

x	y
1	1
2	6
3	10
4	20

...determine when a relation is a function by examining ordered pairs, looking at a table, or using the line test on a graph.

3. Which of the following are functions? Circle them.



4. $\{(4, 3), (9, 1), (4, 6)\}$ Does the set of ordered pairs for a function? (yes or no)

5.

x	y
0	0
0	1
0	2

x	y
3	6
4	6
7	6

 (circled)

x	f(x)
2	5
5	5
9	9

 (circled)

x	y
0	9
5	6
0	4

 No

Circle which of the tables to the left are functions.

...explain domain and range in terms of input and output values.

6. Define domain. set of input values

7. Define range. set of output values

Write a function given a table of values or real life situation

8. Write a function for the real-life situation. You decide to start a lanyard making business. It costs you \$150 for materials and you will charge \$6 per lanyard. Write a function to express this situation if n represents the number of lanyards sold and p represents the profit made.

Function: $p = 6n - 150$

Name the independent variable. # of lanyards "n"

Name the dependent variable. profit made "p"

What is the initial value? - 150

What does this represent? \$150 must be paid back before making a profit

What is the rate of change? 6

What does this represent? earn \$6 for every 1 lanyard sold

10. Write a function for the real-life situation. You start a savings account with \$100 and deposit \$10 in it each week. Let w represent the number of weeks and let t represent the total amount in the bank account.

Function: $t = 10w + 100$

Name the independent variable. # of weeks

Name the dependent variable. total amount in account

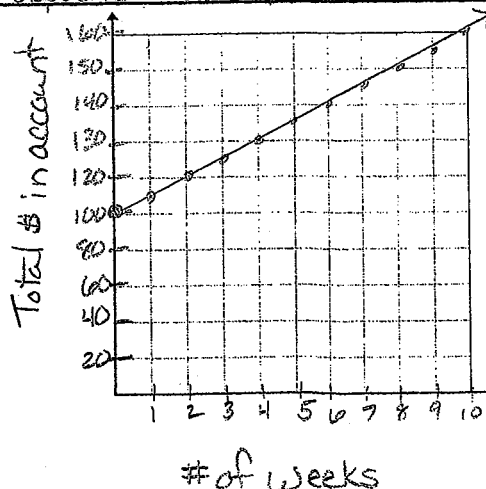
What is the initial value? 100

What does this represent? the amount deposited to open the account

What is the rate of change? 10

What does this represent? \$10 deposited each week

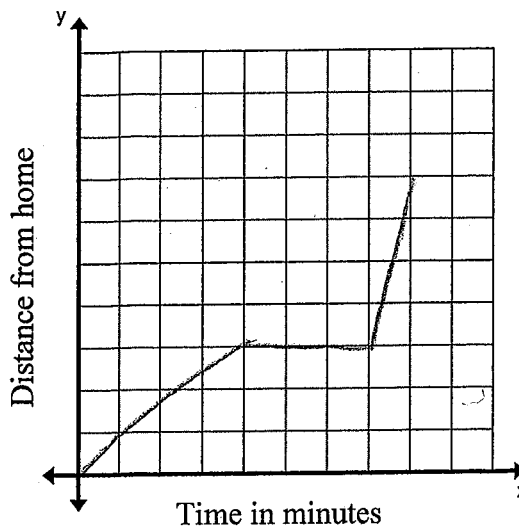
Graph this function.



...sketch or identify an appropriate graph for a function given a real life situation and create a possible situation for a given graph.

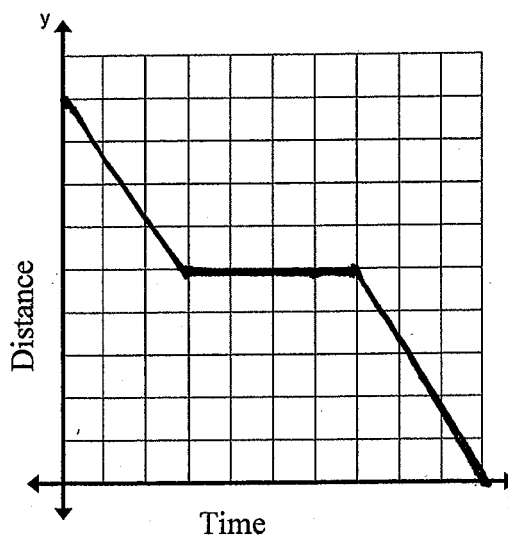
10. Sketch a graph for the situation below.

Jason and his dog Spot went for a walk to the park. They started from home and walked slowly toward the park. They saw a friend and stopped to talk for a few minutes. Next, Spot got very excited and ran the rest of the way dragging Jason with him.



11. Write a few sentences describing what could be happening in the graph below. Describe a real life situation.

Sarah was at the top of Bristol Mountain. She began to ski down the mountain when she stopped at the halfway point to talk to her friends.



After several minutes, she skied the rest of the way down.

...calculate slope given two points, a graph of a line, or the equation of a line in any form. way down.

12. (5, 6) and (4, -7) $m = ?$

$$m = \frac{\Delta y}{\Delta x} = \frac{6 - (-7)}{5 - 4} = \frac{13}{1} = \boxed{13}$$

13. (-3, 8) (3, 10) $m = ?$

$$m = \frac{\Delta y}{\Delta x} = \frac{8 - 10}{-3 - 3} = \frac{-2}{-6} = \boxed{\frac{1}{3}}$$

14. $9 - y = 2x$ What is the slope?

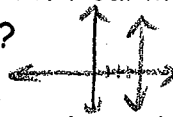
$$\begin{array}{r} +y \quad +y \\ 9 = y + 2x \\ -2x \quad -2x \\ \hline \end{array}$$

$$y = -2x + 9$$

$$\boxed{m = -2}$$

...identify the slopes of horizontal and vertical lines.

15. What is the slope of the line $x = 4$?



No Slope or Undefined

16. What is slope of the line that passes through $(-2, -6)$ and $(3, -6)$? What is the equation of this line?



Zero Slope

...identify the slopes of parallel lines.

17. What is the slope of the line parallel to $y = -3x + 1$?

$m = -3$

18. What is the slope of the line parallel to $2y = 4x + 5$?

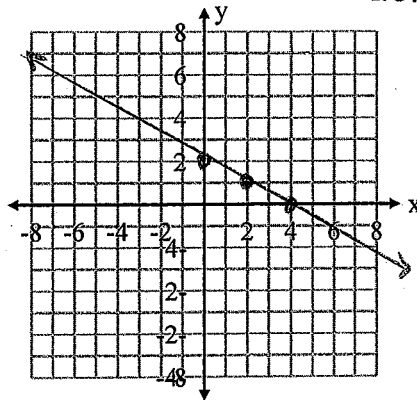
$y = 2x + 2.5$ $m = 2$

...graph a line given a table of values, equation of the line, and/or a word description.

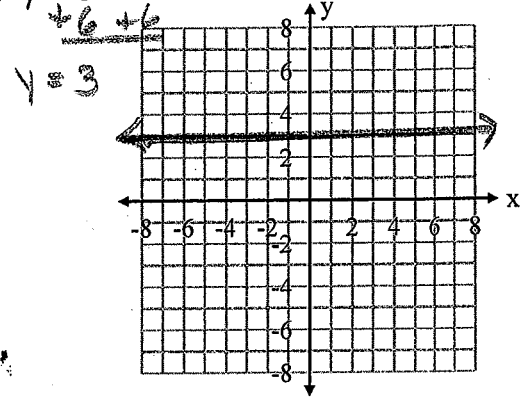
19. Graph $2y = -x + 4$

x	y
0	2
2	1
4	0

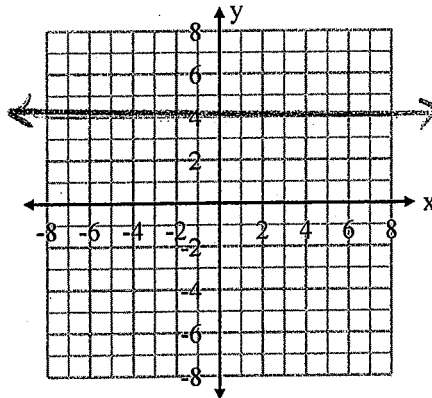
$y = -\frac{1}{2}x + 2$



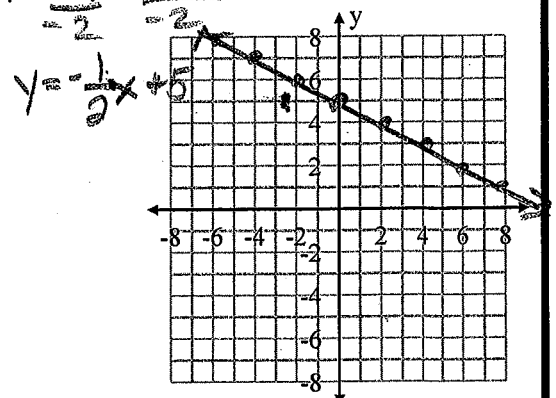
20. Graph $y - 6 = -3$



21. Graph $y = 4$

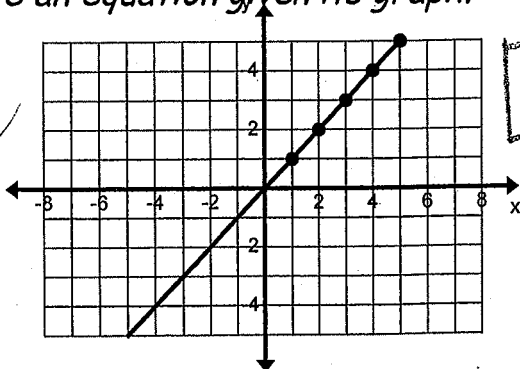


22. Graph $-2y = x - 10$



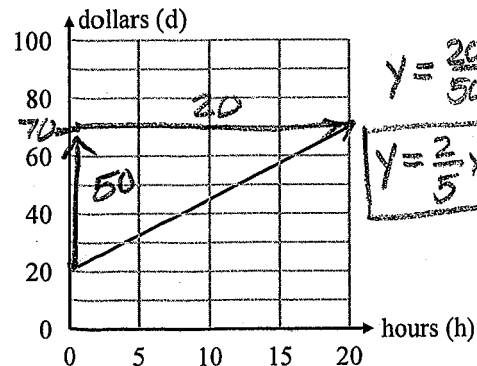
...write an equation given its graph.

23.



$y = x$

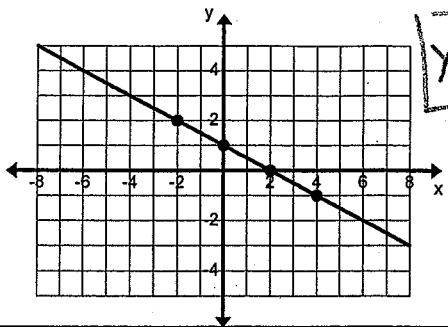
24.



$y = \frac{20}{50}x + 20$

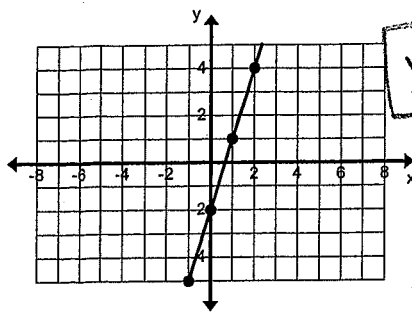
$y = \frac{2}{5}x + 20$

25.



$$Y = -\frac{1}{2}x + 1$$

26.



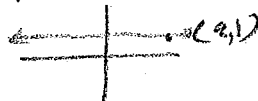
$$Y = 3x - 2$$

...write the equation of a line parallel or perpendicular to the x or y-axis.

27. Write the equation of the line parallel to the x-axis that passes through the point

(9, 1).

$$Y = 1$$



28. Write the equation of the vertical line that passes through the point (-2, 5).

$$X = -2$$

29. Write the equation of the horizontal line that passes through the point (8, 7).

$$Y = 7$$

30. Write the equation of the line with a zero slope that passes through (-6, 7).

Zero

$$Y = 7$$

...write the equation of a line given the slope and a point on the line.

31. $m = -\frac{5}{2}$ and passes through (6, -4)

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (-4) &= -\frac{5}{2}(x - 6) \\ y + 4 &= -\frac{5}{2}x + 15 \\ -4 & \qquad \qquad -4 \end{aligned}$$

$$Y = -\frac{5}{2}x + 11$$

32. $m = \frac{2}{3}$ and passes through (-2, 7)

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 7 &= \frac{2}{3}(x - (-2)) \\ y - 7 &= \frac{2}{3}x + \frac{4}{3} \end{aligned}$$

$$\begin{aligned} y - 7 &= \frac{2}{3}x + \frac{4}{3} \\ +7 & \qquad \qquad +7 \end{aligned}$$

$$Y = \frac{2}{3}x + 8\frac{1}{3}$$

...write the equation of a line given two points on the line.

33. (4, 2) and (3, 5)

$$m = \frac{\Delta y}{\Delta x} = \frac{2-5}{4-3} = \frac{-3}{1}$$

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 2 &= -3(x - 4) \\ y - 2 &= -3x + 12 \\ +2 & \qquad \qquad +2 \end{aligned}$$

$$Y = -3x + 14$$

34. (-5, 6) and (-6, 1)

$$m = \frac{\Delta y}{\Delta x} = \frac{6-1}{-5-(-6)} = \frac{5}{1}$$

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 6 &= 5(x - (-5)) \\ y - 6 &= 5x + 25 \\ +6 & \qquad \qquad +6 \end{aligned}$$

$$Y = 5x + 31$$