

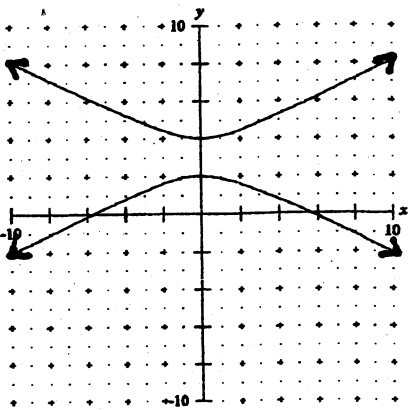
Part A: Functions

- Define Function: only one output (y) for every input (x)
- Write a rule to describe the following functions:

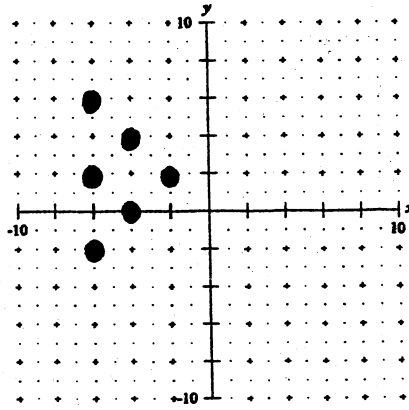
a. (-2, 7), (-1, 3), (1, -5), (2, -9)  
 $y = -4x - 1$

b. (-2, 5), (-1, 2), (0, 1), (1, 2), (2, 5), (3, 10)  
 $y = x^2 + 1$

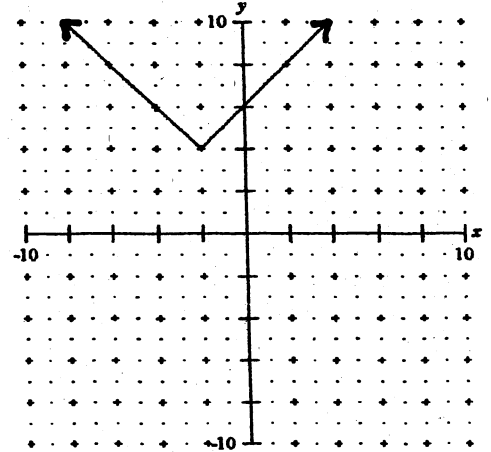
Part B: State the domain (D), range (R) and whether or not the graph is a function (F) Yes/No



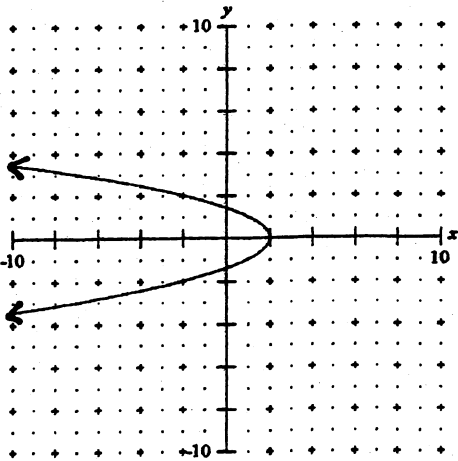
D:  $\mathbb{R}, x \in \mathbb{R}$   
 R:  $y \leq 2, y \geq 4$   
 F: No



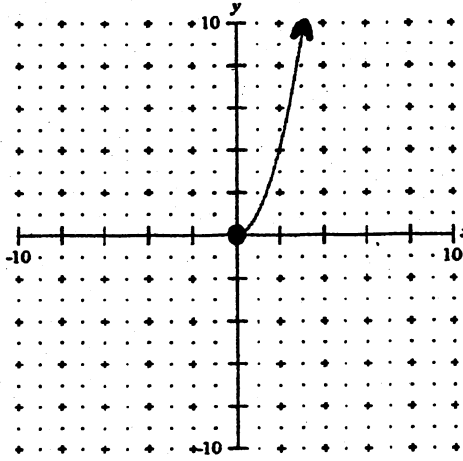
D:  $\{-6, -4, -2\}$   
 R:  $\{-2, 0, 2, 4, 6\}$   
 F: No



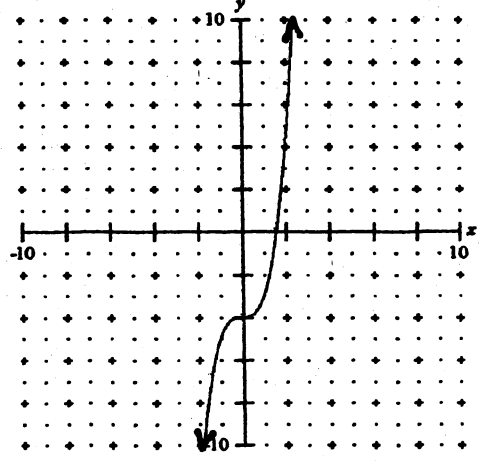
D:  $\mathbb{R}, x \in \mathbb{R}$   
 R:  $y \geq 4$   
 F: Yes



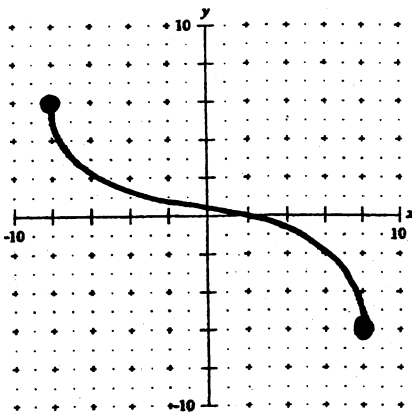
D:  $x \leq 2$   
 R:  $\mathbb{R}, y \in \mathbb{R}$   
 F: No



D:  $x \geq 0$   
 R:  $y \geq 0$   
 F: Yes



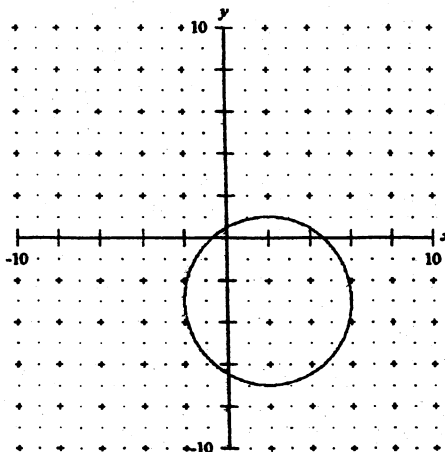
D:  $\mathbb{R}$   
 R:  $\mathbb{R}$   
 F: Yes



D:  $-8 \leq x \leq 8$

R:  $-6 \leq y \leq 6$

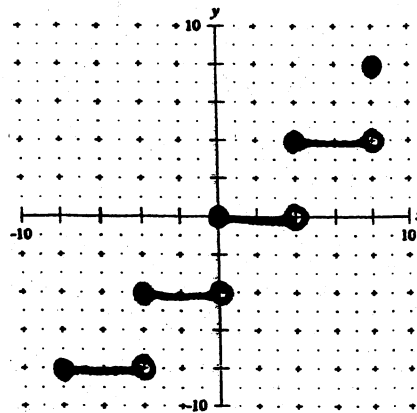
F: yes



$-2 \leq x \leq 6$

$-7 \leq y \leq 1$

No



$-8 \leq x \leq 8$

$-8 \leq y \leq 8$

yes

**Part C: Linear Functions:**

1. Given the following equations, circle the ones that are linear.

$y = 6 - 7x$

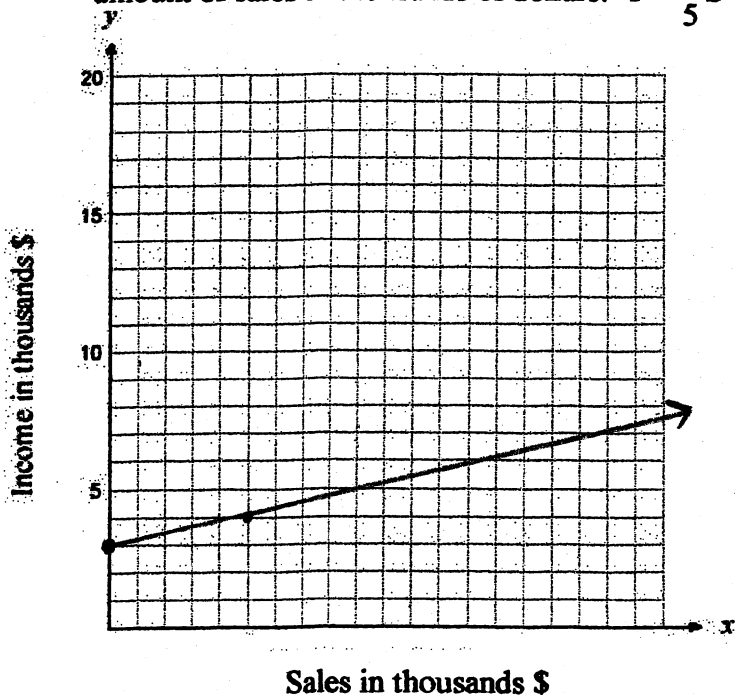
$y = \frac{x+4}{2}$

$y = x^2 + x$

$5x + 7y = -14$

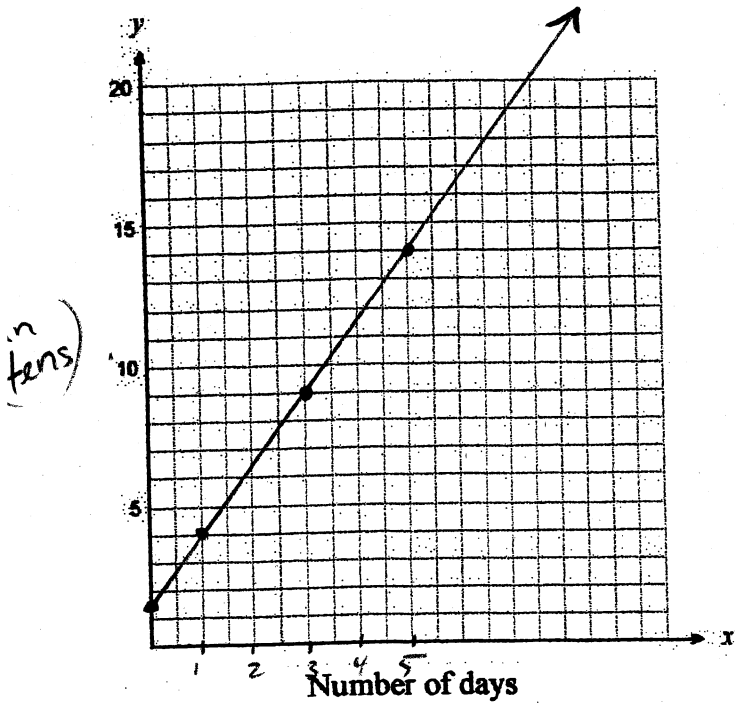
$y = \frac{2x}{1-3x}$

2. The following equation represents an employee's income at a car dealership each month where  $I$  represents the total Income up to date in thousands of dollars and  $S$  represents the amount of sales in thousands of dollars:  $I = \frac{1}{5}S + 3$



- a) Graph the equation.
- b) State the slope & y-intercept of the graph.  $m = \frac{1}{5}$ ,  $b = 3000$
- c) Give the domain and range of the graph.  
D:  $S \geq 0$  R:  $I \geq 3000$
- d) Is this a function or not?  
yes
- e) Is this an example of direct or partial variation? How do you know?  
Partial (y int is NOT 0)
- f) What is the constant of variation?  
 $\frac{1}{5}$  (slope)

3. Blackcomb Bob's Ski Shop rents skis by the day charging an additional fixed cost that includes an insurance premium. The total cost to rent skis for 3 days is \$90. The total cost to rent skis for 5 days is \$140. Determine the fixed cost and the daily rate to rent the ski by graphing the function.



$$m = \frac{140 - 90}{5 - 2}$$

$$m = \frac{50}{2}$$

$$m = \underline{\underline{\$25/\text{day}}}$$
 (daily rate)

Fixed rate is  $\sim \$15.00$

Part D: Variation

1) If y varies directly as x and y = 4 when x = 10

a) Find k

$$y = kx \quad \therefore y = \frac{2}{5}x$$

$$4 = 10k$$

$$\frac{2}{5} = k$$

b) Find y when x = 10.

$$y = \frac{2}{5}(10)$$

$$\therefore y = 4$$

2) It is estimated that the volume of blood in the human body varies directly as the body mass. A 96 kg person has a blood volume of about 7.2 L. Calculate the blood volume of a 120 kg boxer.

$$BV = kBM \quad BV = 0.075BM$$

$$7.2 = 96k \quad \therefore BV = 0.075(120)$$

$$\underline{\underline{0.075 = k}} \quad \underline{\underline{BV = 9.0L}}$$

3) Any working part time at McDonald's earns \$86.90 in one week, working 11 hours. The amount she earns varies directly as the number of hours worked. During another week she earned \$59.25. How many hours did she work that week?

$$\frac{\$86.90}{11 \text{ hours}} = \$7.90/\text{hr} \quad \therefore \frac{\$59.25}{\$7.90/\text{hr}} = \underline{\underline{7.5 \text{ hours}}}$$

A  
value

} Did not need  
to use an equation }

4) In the following table,  $y$  varies directly as  $x$ . Complete the table:

$x$	0	2	6	12	30
$y$	0	$\frac{2}{3}$	8	16	40

$$8 = 6k$$

$$\frac{4}{3} = k$$

$$\therefore y = \frac{4}{3}x$$

**Part E: Function Notation**

1. For  $f(x) = 3 - 2x^2$ , evaluate  $f(2)$  and  $f(-4)$ .

$$f(2) = 3 - 8 = \underline{-5}$$

$$f(-4) = 3 - 32 = \underline{-29}$$

2. For  $g(x) = 20x - 2$ , evaluate  $g\left(\frac{1}{2}\right)$ .

$$g\left(\frac{1}{2}\right) = 20\left(\frac{1}{2}\right) - 2 = \underline{8}$$

3. For  $f(x) = 8x - 12$  determine  $-\frac{1}{2}f(x)$ .

$$-\frac{1}{2}(8x - 12) = \underline{-4x + 6}$$

4. If  $f(x) = 6x + 18$ , find  $x$  if  $f(x) = -12$

$$6x + 18 = -12 \quad 6x = -30 \quad \underline{x = -5}$$

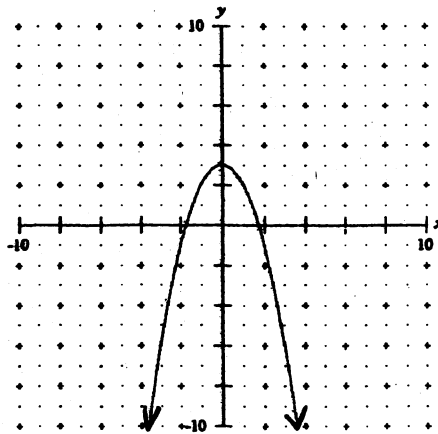
5. For  $f(x) = x^2 + 3$ , determine  $f(x-4)$ . Simplify completely.

6. For the following graph find  $f(-2)$ ,  $f(0)$  and  $f(2)$ :

$$(x-4)^2 + 3 = f(x-4)$$

$$x^2 - 8x + 16 + 3 = f(x-4)$$

$$x^2 - 8x + 19 = f(x-4)$$



$$f(-2) = -1$$

$$f(0) = 3$$

$$f(2) = -1$$