

Relations Expressed as Ordered Pairs

Determine if the following relations are functions. Then state the domain and range.

1. $\{(1, -2), (-2, 0), (-1, 2), (1, 3)\}$

Function: No

Domain: $D: \{-2, -1, 1\}$

Range: $R: \{-2, 0, 2, 3\}$

2. $\{(1, 1), (2, 2), (3, 5), (4, 10), (5, 15)\}$

Function: Yes

Domain: $D: \{1, 2, 3, 4, 5\}$

Range: $R: \{1, 2, 5, 10, 15\}$

3. $\left\{ \left(17, \frac{15}{4} \right), \left(\frac{15}{4}, 17 \right), \left(15, \frac{17}{4} \right), \left(\frac{17}{4}, 15 \right) \right\}$

Function: Yes

Domain: $D: \{ \frac{15}{4}, \frac{17}{4}, 15, 17 \}$

Range: $R: \{ \frac{15}{4}, \frac{17}{4}, 15, 17 \}$

4. $\left\{ \left(-3, \frac{2}{5} \right), \left(-3, \frac{3}{5} \right), \left(\frac{3}{2}, -5 \right), \left(5, \frac{2}{5} \right) \right\}$

Function: No

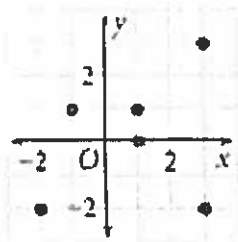
Domain: $D: \{-3, \frac{3}{2}, 5\}$

Range: $R: \{-5, \frac{2}{5}, \frac{3}{5}\}$

Relations Expressed as Graphing

Write each of the following as a relation, state the domain and range, then determine if it is a function.

5.

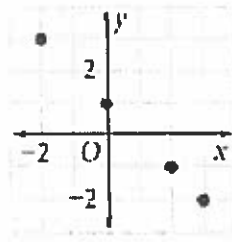


Domain: $D: \{-2, -1, 1, 3\}$

Range: $R: \{-3, -2, 0, 1, 3\}$

Function: No

6.

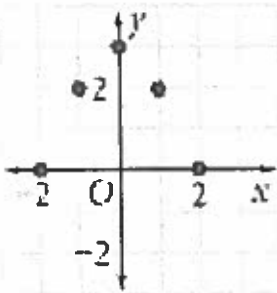


Domain: $D: \{-2, 0, 2, 3\}$

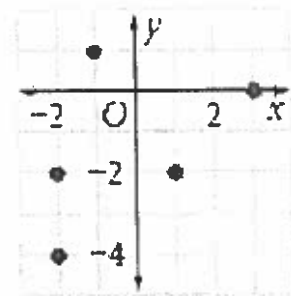
Range: $R: \{-2, -1, 1, 3\}$

Function: Yes

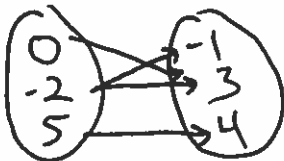
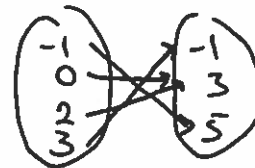
7.

Domain: $D: \{-2, -1, 0, 1, 2\}$ Range: $R: \{0, 2, 3\}$ Function: Yes

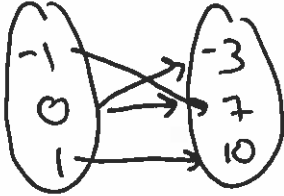
8.

Domain: $D: \{-2, -1, 1, 3\}$ Range: $R: \{-4, -2, 0, 1\}$ Function: No**Relations Expressed as Mappings**

Express the following relations as a mapping, state the domain and range, then determine if is a function.

9. $\{(-2, -1), (0, 3), (5, 4), (-2, 3)\}$ Domain: $D: \{-2, 0, 5\}$ Range: $R: \{-1, 3, 4\}$ Function: No10. $\{(-1, 5), (0, 3), (2, 3), (3, -1)\}$ Domain: $D: \{-1, 0, 2, 3\}$ Range: $R: \{-1, 3, 5\}$ Function: Yes

11. $\{(-1, 7), (0, -3), (1, 10), (0, 7)\}$

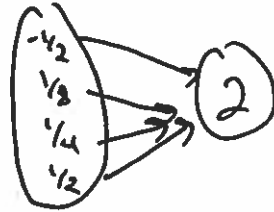


Domain: $D: \{-1, 0, 1\}$

Range: $R: \{-3, 7, 10\}$

Function: No

12. $\left\{\left(\frac{1}{2}, 2\right), \left(\frac{1}{4}, 2\right), \left(\frac{1}{8}, 2\right), \left(\frac{-1}{2}, 2\right)\right\}$



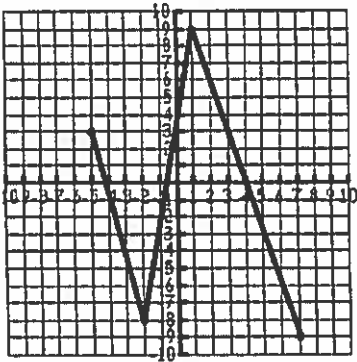
Domain: $D: \{-\frac{1}{2}, \frac{1}{8}, \frac{1}{4}, \frac{1}{2}\}$

Range: $R: \{2\}$

Function: Yes

Determine if the graph is a function, then state the domain and range.

13.

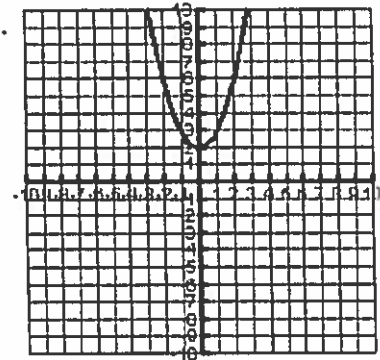


Domain: $D: \{-5 \leq x \leq 7\}$

Range: $R: \{-9 \leq y \leq 9\}$

Function: Yes

14.

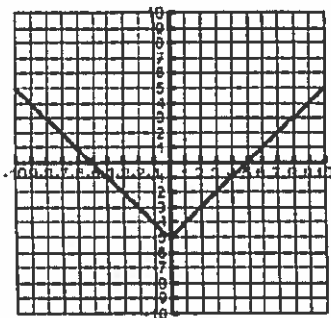


Domain: $D: \{x \in \mathbb{R}\}$

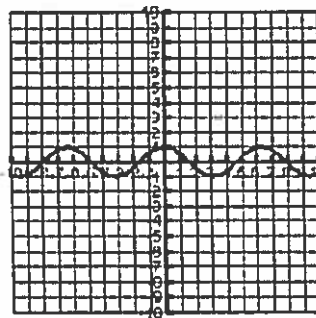
Range: $R: \{y \geq 2\}$

Function: Yes

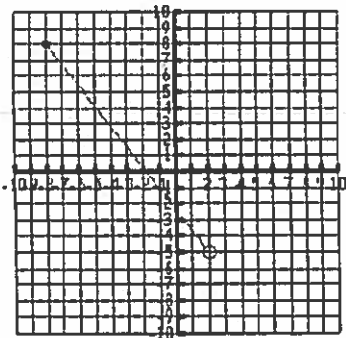
15.

Domain: $D: \{x \in \mathbb{R}\}$ Range: $R: \{y \geq -5\}$ Function: Yes

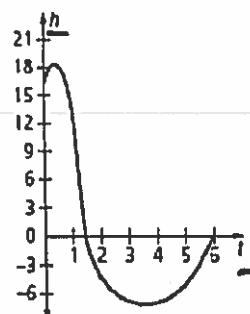
16.

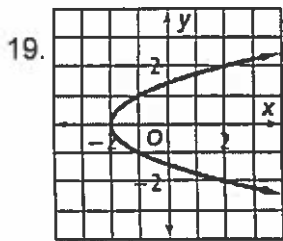
Domain: $D: \{x \in \mathbb{R}\}$ Range: $R: \{-1 \leq y \leq 1\}$ Function: yes

17.

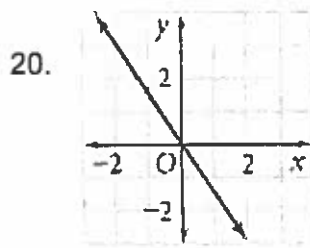
Domain: $D: \{-8 \leq x \leq 6\}$ Range: $R: \{-8 \leq y \leq 8\}$ Function: yes

18.

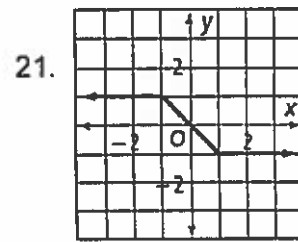
Domain: $D: \{0 \leq x \leq 6\}$ Range: $R: \{-7 \leq y \leq 18\}$ Function: yes



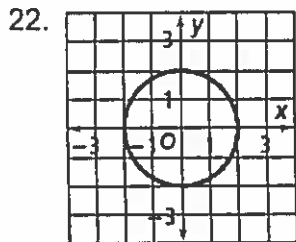
D: $\{x \geq -2\}$
 R: $\{y \in \mathbb{R}\}$
 F: No



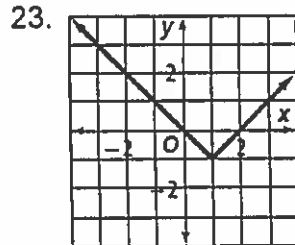
D: $\{x \in \mathbb{R}\}$
 R: $\{y \in \mathbb{R}\}$
 F: yes



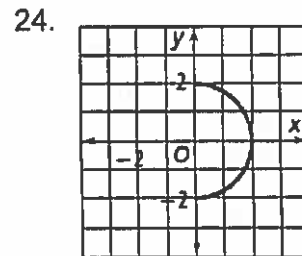
D: $\{x \in \mathbb{R}\}$
 R: $\{-1 \leq y \leq 1\}$
 F: yes



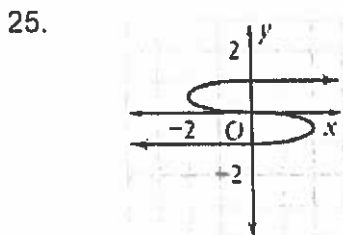
D: $\{-2 \leq x \leq 2\}$
 R: $\{-2 \leq y \leq 2\}$
 F: No



D: $\{x \in \mathbb{R}\}$
 R: $\{y \geq -1\}$
 F: yes



D: $\{0 \leq x \leq 2\}$
 R: $\{-2 \leq y \leq 2\}$
 F: No



Domain: $\{x \in \mathbb{R}\}$
 Range: $\{-1 \leq y \leq 1\}$
 Function: No

1. Evaluate the following expressions given the functions below:

$$g(x) = -3x + 1$$

$$f(x) = x^2 + 7$$

$$h(x) = \frac{12}{x}$$

$$j(x) = 2x + 9$$

a. $g(10) = -29$

b. $f(3) = 16$

c. $h(-2) = -6$

d. $j(7) = 23$

e. $h(a) = \frac{12}{a}$

f. Find x if $g(x) = 16$

$$16 = -3x + 1$$

$$\boxed{x = -5}$$

g. Find x if $h(x) = -2$

$$-2 = \frac{12}{x}$$

$$\boxed{x = -6}$$

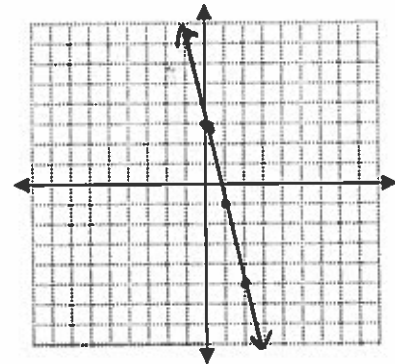
h. Find x if $f(x) = 23$

$$23 = x^2 + 7$$

$$\boxed{x = 4}$$

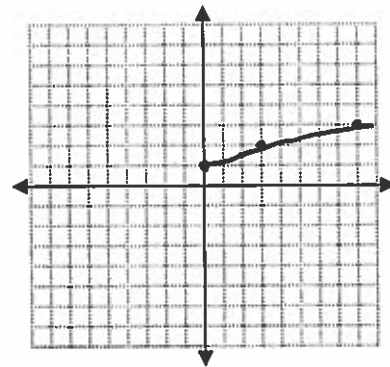
2. Given $f(x) = 3 - 4x$. Fill in the table and then sketch a graph.

x	$f(x)$
-6	27
-3	15
0	3
1	-1
2	-5



3. Given $f(x) = \sqrt{x+1}$. Fill in the table and then sketch a graph.

x	$f(x)$
3	2
0	1
8	3
2	1.732...
15	4



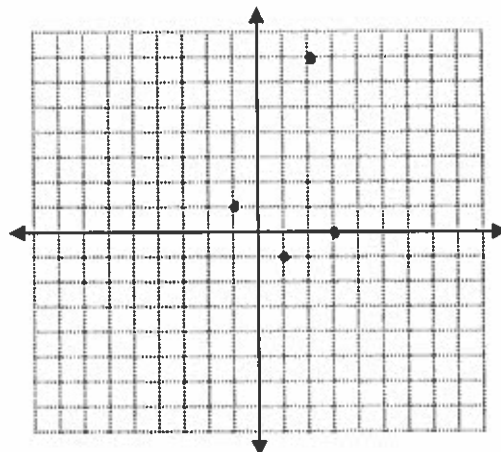
4. Translate the following statements into coordinate points, then plot them!

a. $f(-1) = 1$

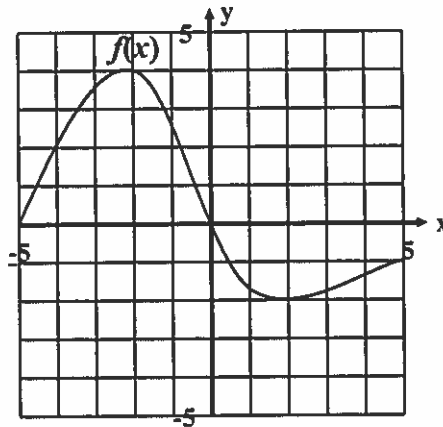
b. $f(2) = 7$

c. $f(1) = -1$

d. $f(3) = 0$



5. Given this graph of the function $f(x)$:



Find:

approximately

a. $f(-4) = 2$

b. $f(0) = 0$

c. $f(3) = -1.8$

d. $f(-5) = 0$

e. x when $f(x) = 2$

f. x when $f(x) = 0$

$x = -4$ or -0.9
approximately

$x = 0$

APPLICATION

6. Bird flu is attacking Birdopolis. The function below determines how many people have bird flu where t = time in days and S = the number of people in thousands.

$$S(t) = 9t - 4$$

a. Find $S(4)$. 32

b. What does $S(4)$ mean?
after 4 days 32,000 people have bird flu

c. Find t when $S(t) = 23$.

$$9t - 4 = 23$$

$$t = 3$$

d. What does $S(t) = 23$ mean?
23,000 people have bird flu after 3 days

e. Graph the function.

