

Worksheet 4.1 Relations and Functions

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: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

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

Function: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

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: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

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: \_\_\_\_\_

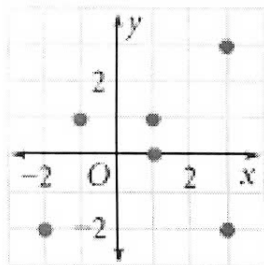
Domain: \_\_\_\_\_

Range: \_\_\_\_\_

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.



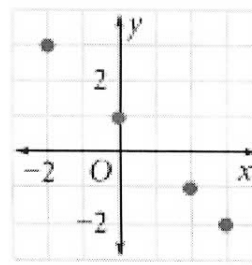
Relation: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Function: \_\_\_\_\_

6.



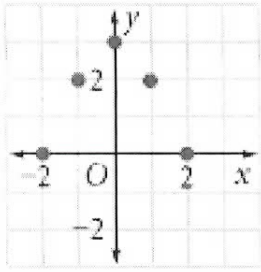
Relation: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Function: \_\_\_\_\_

7.



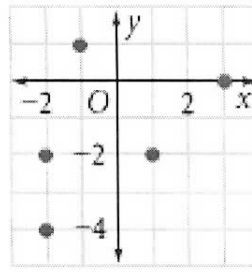
Relation: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Function: \_\_\_\_\_

8.



Relation: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Function: \_\_\_\_\_

**Relations Expressed as Mappings**

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

9.  $\{(-2, -1), (0, 3), (5, 4), (-2, 3)\}$

10.  $\{(-1, 5), (0, 3), (2, 3), (3, -1)\}$

Domain: \_\_\_\_\_

Domain: \_\_\_\_\_

Range: \_\_\_\_\_

Range: \_\_\_\_\_

Function: \_\_\_\_\_

Function: \_\_\_\_\_

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

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: \_\_\_\_\_

Domain: \_\_\_\_\_

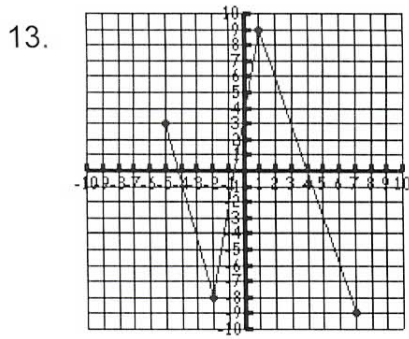
Range: \_\_\_\_\_

Range: \_\_\_\_\_

Function: \_\_\_\_\_

Function: \_\_\_\_\_

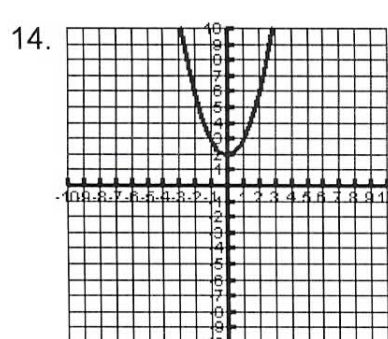
Determine if the graph is a function, then state the domain and range.



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

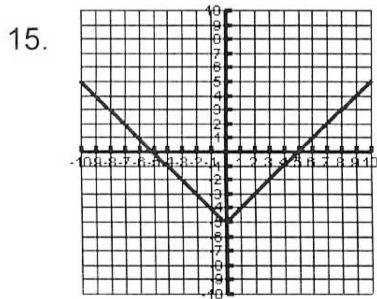
Function: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

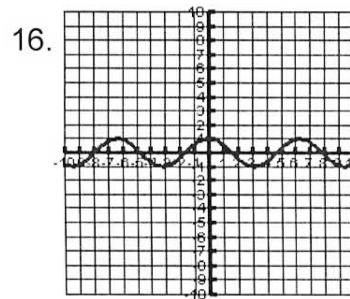
Function: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

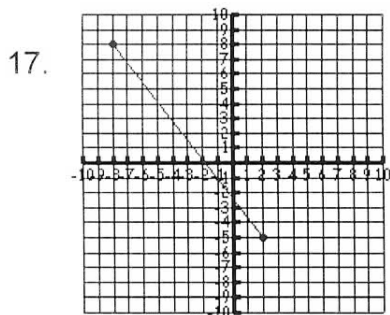
Function: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

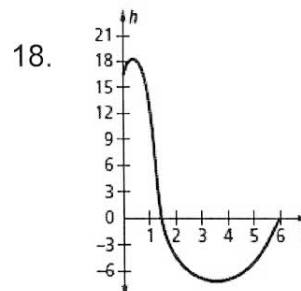
Function: \_\_\_\_\_



Domain: \_\_\_\_\_

Range: \_\_\_\_\_

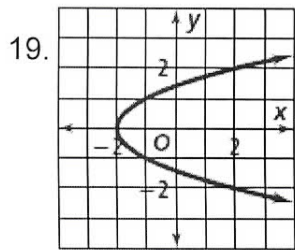
Function: \_\_\_\_\_



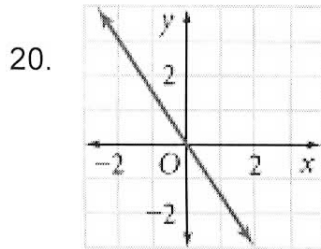
Domain: \_\_\_\_\_

Range: \_\_\_\_\_

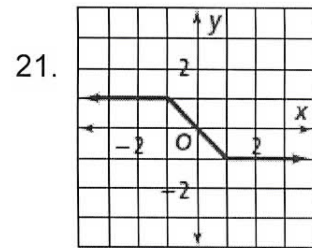
Function: \_\_\_\_\_



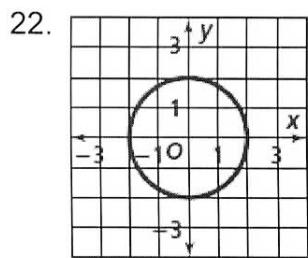
D: \_\_\_\_\_  
 R: \_\_\_\_\_  
 F: \_\_\_\_\_



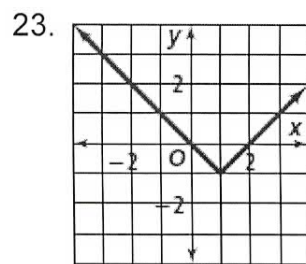
D: \_\_\_\_\_  
 R: \_\_\_\_\_  
 F: \_\_\_\_\_



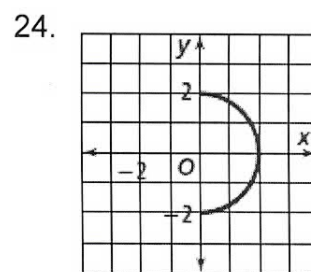
D: \_\_\_\_\_  
 R: \_\_\_\_\_  
 F: \_\_\_\_\_



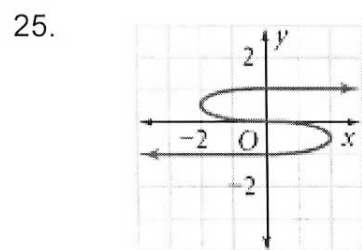
D: \_\_\_\_\_  
 R: \_\_\_\_\_  
 F: \_\_\_\_\_



D: \_\_\_\_\_  
 R: \_\_\_\_\_  
 F: \_\_\_\_\_



D: \_\_\_\_\_  
 R: \_\_\_\_\_  
 F: \_\_\_\_\_



Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_  
 Function: \_\_\_\_\_

Worksheet 4.1 Relations and Functions

Relations Expressed as Ordered Pairs

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

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

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

Function: NO

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

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

*Discrete*

Function: Yes

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

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

*Discrete*

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

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: yes

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

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

Function: NO

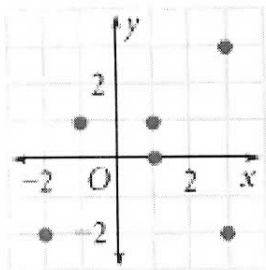
Domain:  $\{-3, \frac{3}{2}, 5\}$

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

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.



*Discrete*

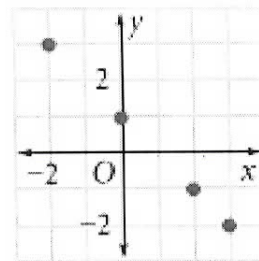
Relation:  $\{(-2, -2), (-1, 1), (0, 0), (1, 1), (3, 3), (3, -3)\}$

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

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

Function: NO

6.



*Discrete*

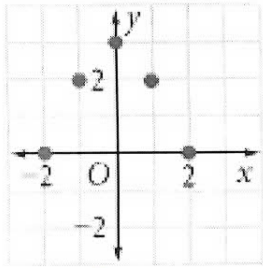
Relation:  $\{(-2, 3), (0, 1), (2, -1), (3, -2)\}$

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

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

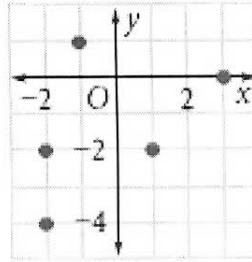
Function: Yes

7.



Relation:  $\{(-2, 0), (-1, 2), (0, 3), (1, 2), (2, 0)\}$   
 Domain:  $\{-2, -1, 0, 1, 2\}$   
 Range:  $\{0, 2, 3\}$   
 Function: Yes

8.

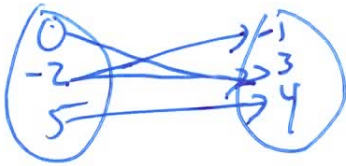


Relation:  $\{(-2, -2), (-2, -4), (-1, 1), (1, -2)\}$   
 Domain:  $\{-2, -1, 1\}$   
 Range:  $\{-2, -4, 1, -2\}$   
 Function: NO

**Relations Expressed as Mappings**

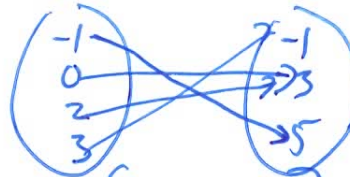
Express the following relations as a mapping, state the domain and range, then determine if is a function.

9.  $\{(-2, -1), (0, 3), (5, 4), (-2, 3)\}$



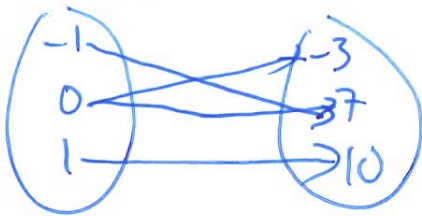
Domain:  $\{-2, 0, 5\}$   
 Range:  $\{-1, 3, 4\}$   
 Function: NO

10.  $\{(-1, 5), (0, 3), (2, 3), (3, -1)\}$



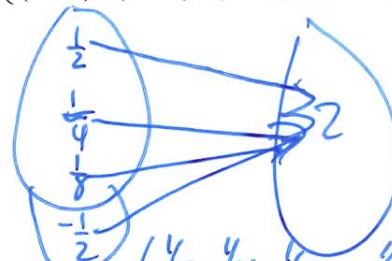
Domain:  $\{-1, 0, 2, 3\}$   
 Range:  $\{5, 3, -1\}$   
 Function: Yes

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



Domain:  ~~$\{-1, 0, 1\}$~~   $\{-1, 0, 1\}$   
 Range:  $\{-3, 7, 10\}$   
 Function: NO

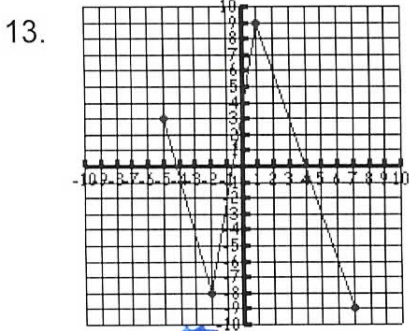
12.  $\left\{\left(\frac{1}{2}, 2\right), \left(\frac{1}{4}, 2\right), \left(\frac{1}{8}, 2\right), \left(-\frac{1}{2}, 2\right)\right\}$



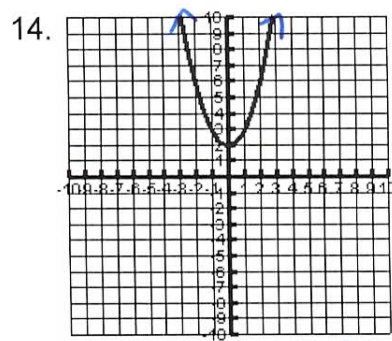
Domain:  $\{\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, -\frac{1}{2}\}$   
 Range:  $\{2\}$   
 Function: Yes

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

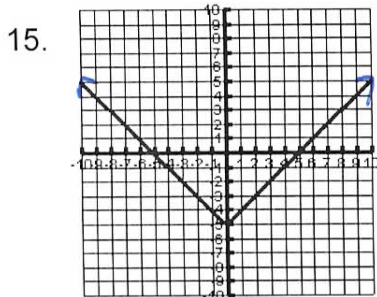
*Continuous functions*



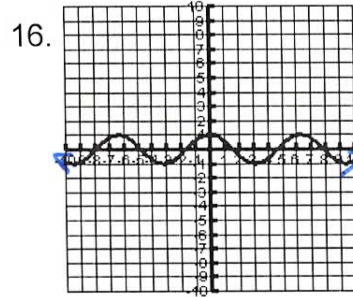
Domain:  $[-5, 7]$   
 Range:  $[-9, 9]$   
 Function: yes



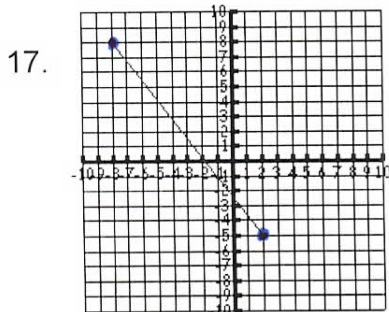
Domain:  $(-\infty, \infty)$   
 Range:  $[-2, \infty)$   
 Function: yes



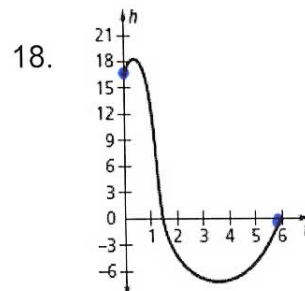
Domain:  $(-\infty, \infty)$   
 Range:  $[-5, \infty)$   
 Function: yes



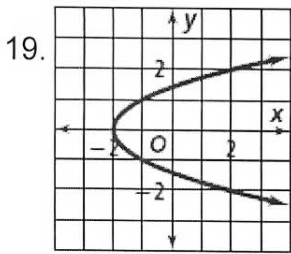
Domain:  $(-\infty, \infty)$   
 Range:  $[-1, 1]$   
 Function: yes



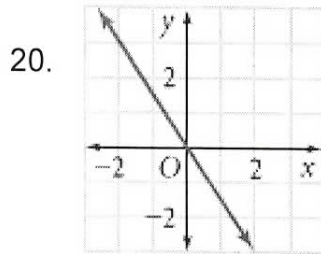
Domain:  $[-8, 2]$   
 Range:  $[-5, 8]$   
 Function: yes



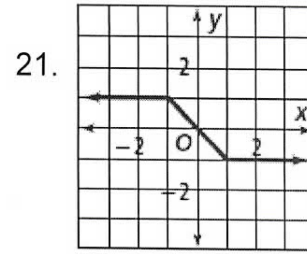
Domain:  $[0, 6]$   
 Range:  $[-6, 17]$   
 Function: yes



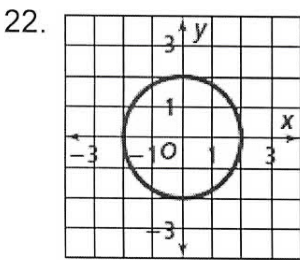
D:  $[-2, \infty)$   
 R:  $[-\infty, \infty)$   
 F: NO



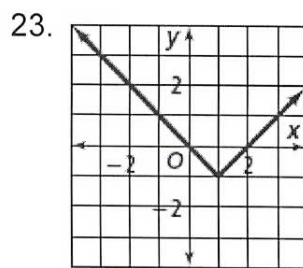
D:  $(-\infty, \infty)$   
 R:  $(-\infty, \infty)$   
 F: Yes



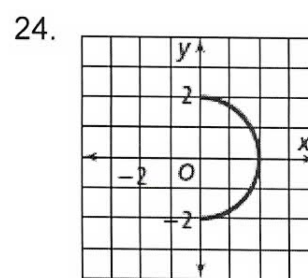
D:  $(-\infty, \infty)$   
 R:  $[-1, 1]$   
 F: Yes



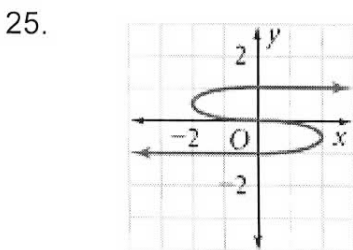
D:  $[-2, 2]$   
 R:  $[-2, 2]$   
 F: NO



D:  $(-\infty, \infty)$   
 R:  $[-1, \infty)$   
 F: Yes



D:  $[0, 2]$   
 R:  $[-2, 2]$   
 F: ~~NO~~ NO



Domain:  $(-\infty, \infty)$   
 Range:  $[-1, 1]$   
 Function: NO