

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: _____

Function: _____

Domain: _____

Domain: _____

Range: _____

Range: _____

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

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: _____

Function: _____

Domain: _____

Domain: _____

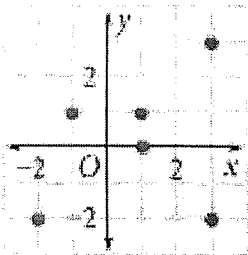
Range: _____

Range: _____

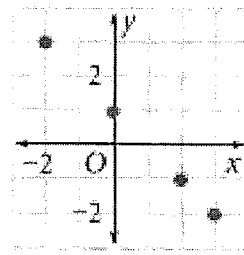
Relations Expressed as Graphing

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

5.



6.



Relation: _____

Relation: _____

Domain: _____

Domain: _____

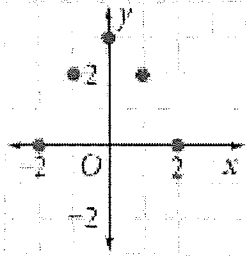
Range: _____

Range: _____

Function: _____

Function: _____

7.



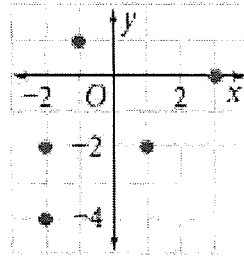
Relation: _____

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: _____

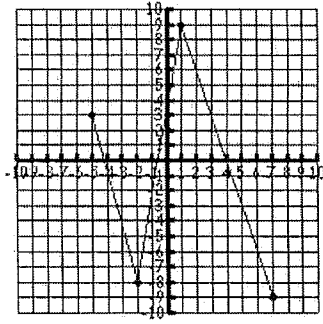
Range: _____

Function: _____

Function: _____

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

13.

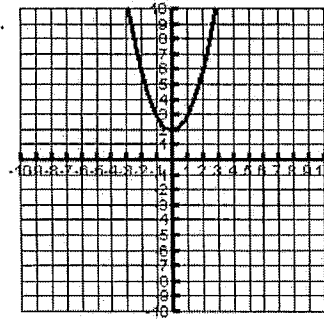


Domain: _____

Range: _____

Function: _____

14.

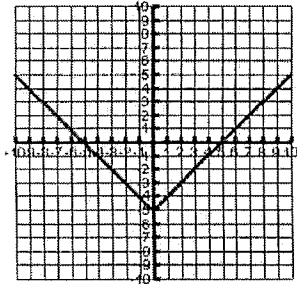


Domain: _____

Range: _____

Function: _____

15.

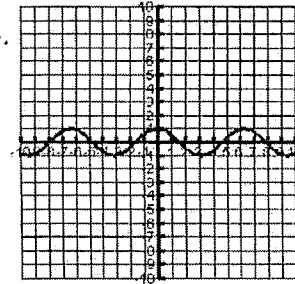


Domain: _____

Range: _____

Function: _____

16.

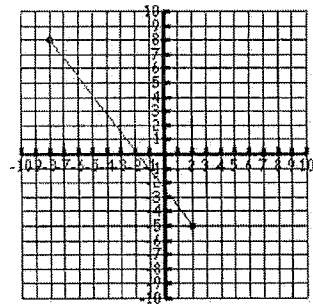


Domain: _____

Range: _____

Function: _____

17.

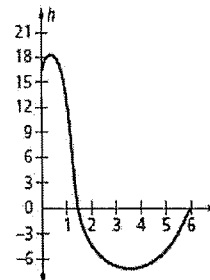


Domain: _____

Range: _____

Function: _____

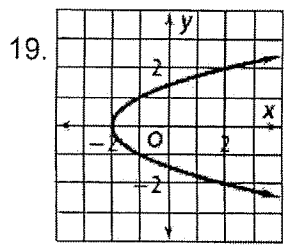
18.



Domain: _____

Range: _____

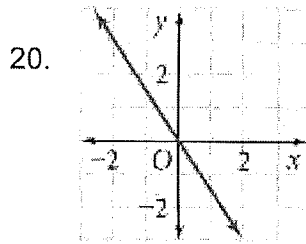
Function: _____



D: _____

R: _____

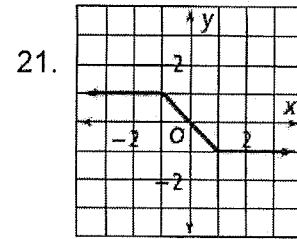
F: _____



D: _____

R: _____

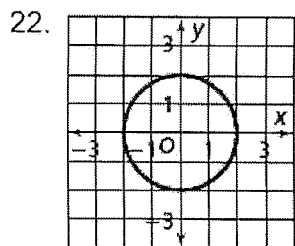
F: _____



D: _____

R: _____

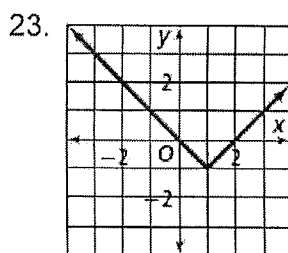
F: _____



D: _____

R: _____

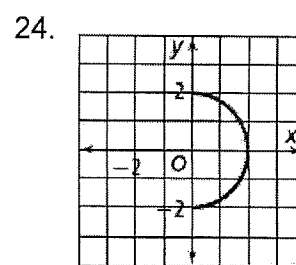
F: _____



D: _____

R: _____

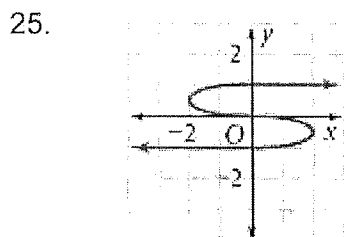
F: _____



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

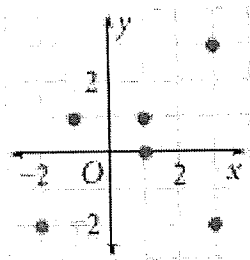
Function: yes
 Domain: $\{17, \frac{15}{4}, 15, \frac{17}{4}\}$
 Range: $\{\frac{15}{4}, 17, \frac{12}{4}, 15\}$

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.

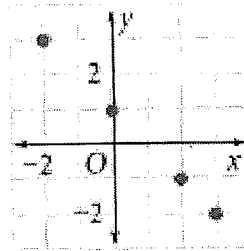
5.



Discrete

Relation: $\{(-2, 2), (-1, 1), (0, 0), (1, 1), (2, 2), (2, -2)\}$
 Domain: $\{-2, -1, 1, 3\}$
 Range: $\{-2, 1, 0, 1, 3, -3\}$
 Function: NO

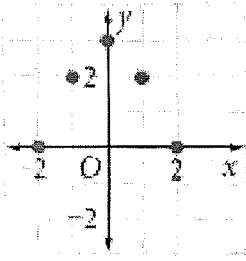
6.



Discrete

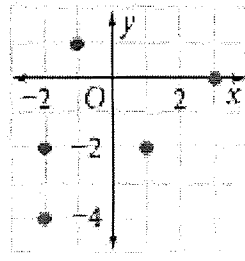
Relation: $\{(-2, 3), (0, 1), (2, -1), (3, -2)\}$
 Domain: $\{-2, 0, 2, 3\}$
 Range: $\{3, 1, -1, -2\}$
 Function: Yes

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.

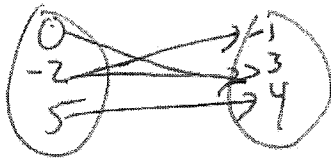


Relation: $\{(-2, -2), (-2, -4), (-1, 1), (1, -2)\}$
 Domain: $\{-2, -1, 1\}$
 Range: $\{-2, -4, 1, -2\}$
 Function: NO

Relations Expressed as Mappings

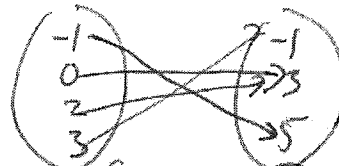
Express the following relations as a mapping, state the domain and range, then determine if is a function.

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



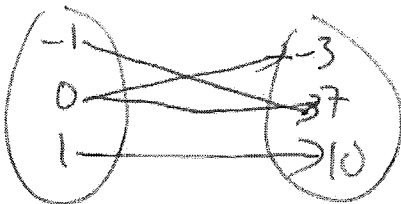
Domain: $-2, 0, 5$
 Range: $-1, 3, 4$
 Function: NO

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



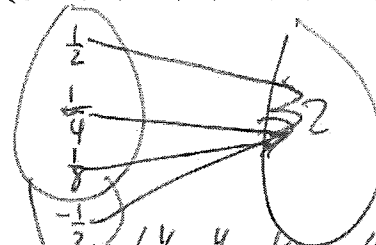
Domain: $\{-1, 0, 2, 3\}$
 Range: $\{5, 3, -1\}$
 Function: Yes

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



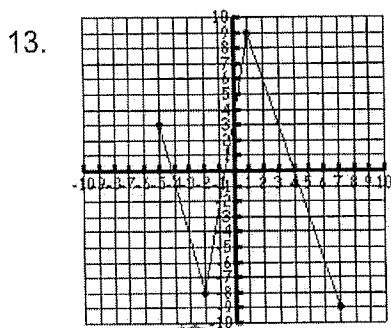
Domain: $\{-1, 0, 1\}$
 Range: $\{-3, 7, 10\}$
 Function: NO

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

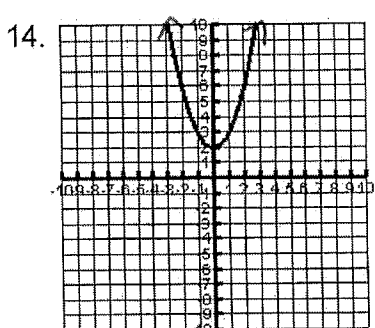


Domain: $\{1/2, 1/4, 1/8, -1/2\}$
 Range: $\{2\}$
 Function: Yes

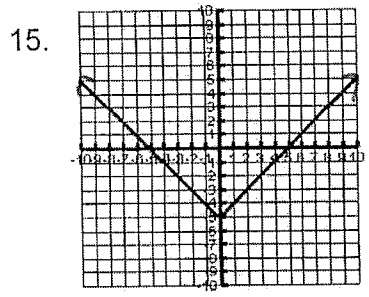
Determine if the graph is a function, then state the domain and range. *Continuous functions*



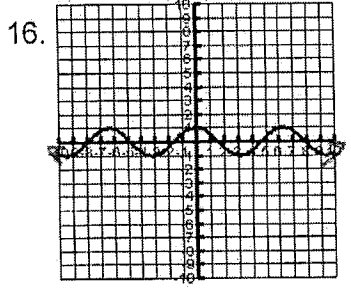
Domain: $[-5, 7]$
 Range: $[-9, 9]$
 Function: yes



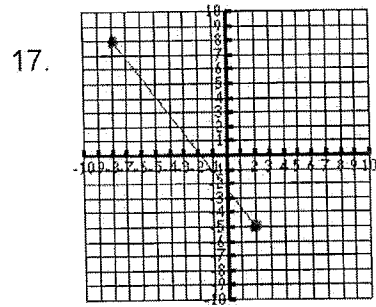
Domain: $(-\infty, \infty)$
 Range: $[-2, \infty)$
 Function: yes



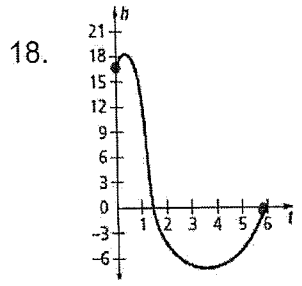
Domain: $(-\infty, \infty)$
 Range: $[-5, \infty)$
 Function: yes



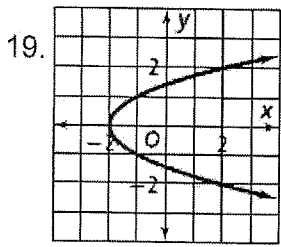
Domain: $(-\infty, \infty)$
 Range: $[-1, 1]$
 Function: yes



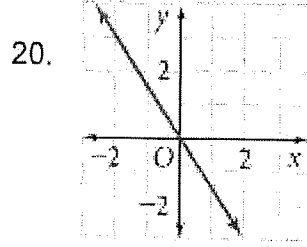
Domain: $[-8, 2]$
 Range: $[-5, 8]$
 Function: yes



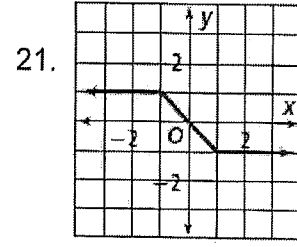
Domain: $[0, 6]$
 Range: $[-6, 17]$
 Function: yes



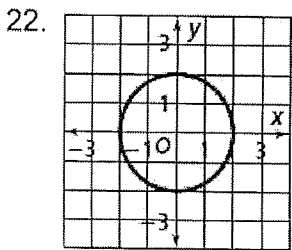
D: $[-2, \infty)$
 R: $(-\infty, \infty)$
 F: NO



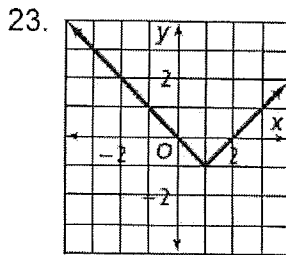
D: $(-\infty, \infty)$
 R: $(-\infty, \infty)$
 F: Yes



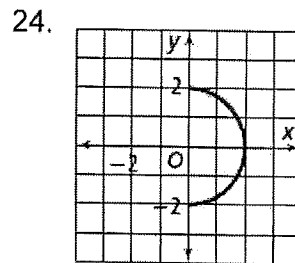
D: $(-\infty, \infty)$
 R: $[-2, 2]$
 F: Yes



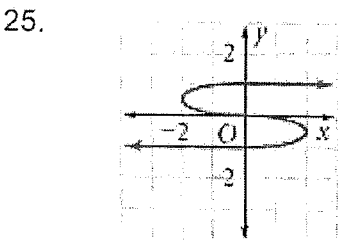
D: $[-2, 2]$
 R: $[-2, 2]$
 F: NO



D: $(-\infty, \infty)$
 R: $[-2, \infty)$
 F: Yes



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



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