Math Models **Name**_____

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: _____

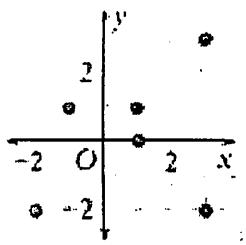
Domain: _____

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.



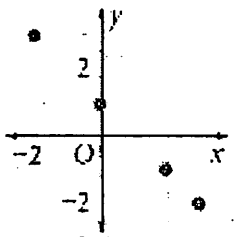
Relation: _____

Domain: _____

Range: _____

Function: _____

6.

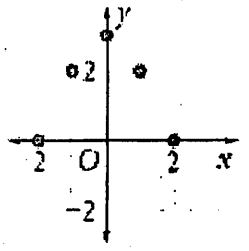


Relation: _____

Domain: _____

Range: _____

Function: _____

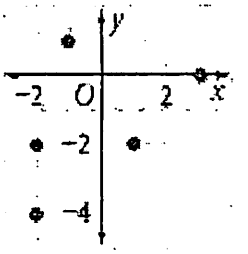
7. 

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)}

Domain: _____

Range: _____

Function: _____

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

Domain: _____

Range: _____

Function: _____

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

Domain: _____

Range: _____

Function: _____

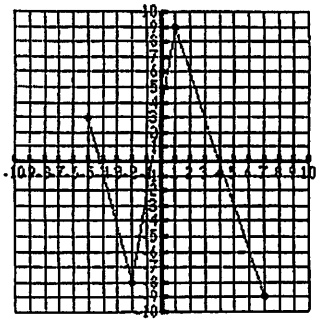
12. $\left\{\left(\frac{1}{2},2\right),\left(\frac{1}{4},2\right),\left(\frac{1}{8},2\right),\left(\frac{-1}{2},2\right)\right\}$

Domain: _____

Range: _____

Function: _____

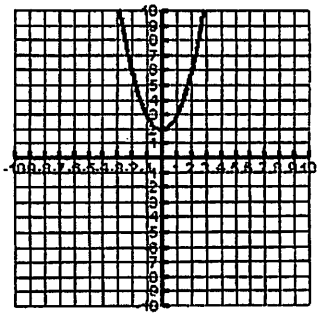
Determine if the graph is a function, then state the domain and range.

13. 

Domain: _____

Range: _____

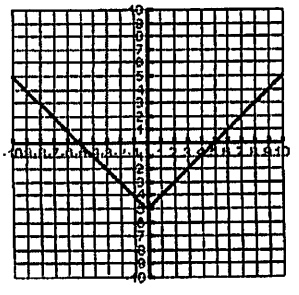
Function: _____

14. 

Domain: _____

Range: _____

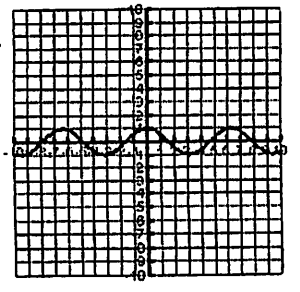
Function: _____

15. 

Domain: _____

Range: _____

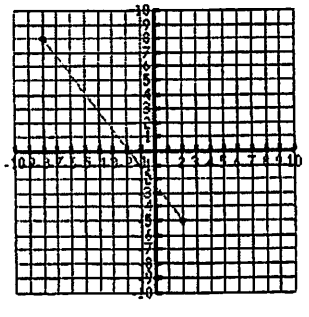
Function: _____

16. 

Domain: _____

Range: _____

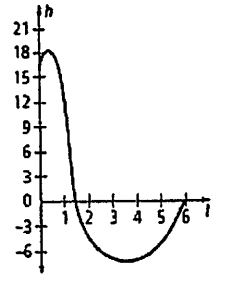
Function: _____

17. 

Domain: _____

Range: _____

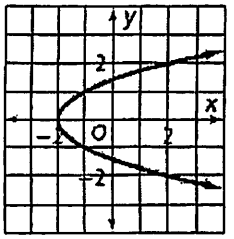
Function: _____

18. 

Domain: _____

Range: _____

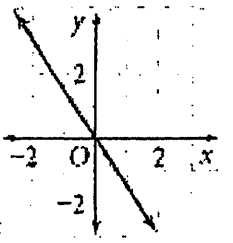
Function: _____

19. 

D: _____

R: _____

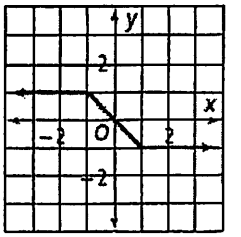
F: _____

20. 

D: _____

R: _____

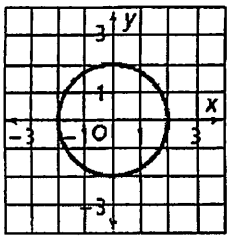
F: _____

21. 

D: _____

R: _____

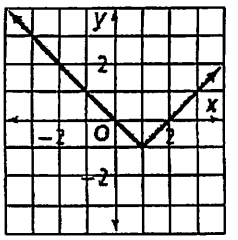
F: _____

22. 

D: _____

R: _____

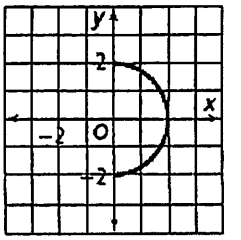
F: _____

23. 

D: _____

R: _____

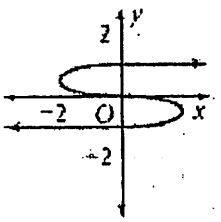
F: _____

24. 

D: _____

R: _____

F: _____

25. 

Domain: _____

Range: _____

Function: _____

Math Models Name_____

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: No

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

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

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

Function: Yes

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

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

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

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

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

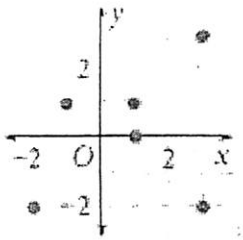
Domain: $\{-3, \frac{3}{2}, 5\}$

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

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.



(3, 3)
(3, -2)

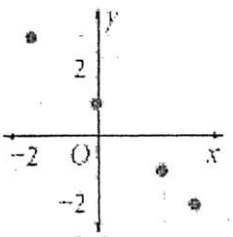
Relation: (-2,-2), (-1,1) (1,0) (1,1)

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

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

Function: No

6.



Relation: (-2,3), (0,1) (2,-1) (3,-2)

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

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

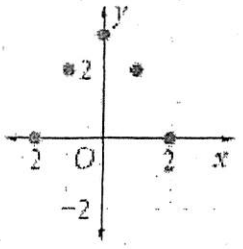
Function: Yes

Domain: x - values / input / $(0,)$] No Repeating when listing

Range: y - values / output / $(, 0)$]

Relation: a set of ordered pairs

Function: 1 output for every input → MO → VLT → Repeats in domain

7. 

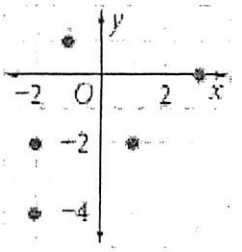
(0, 3)

Relation: (-2,0) (-1,2) (1,2) (2,0)

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

Range: {0, 2, 3}

Function: Yes

8. 

(3, 0)

Relation: (-2,-2) (-2,-4) (-1,1) (1,-2)

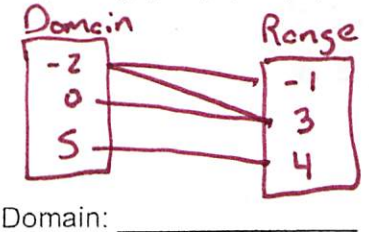
Domain: {-2, -1, 1, 3}

Range: {-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)}

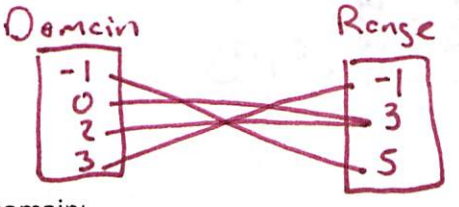


Domain: _____

Range: _____

Function: No

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

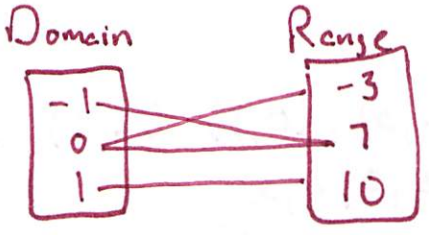


Domain: _____

Range: _____

Function: Yes

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

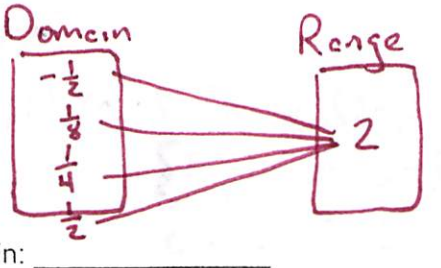


Domain: _____

Range: _____

Function: No

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



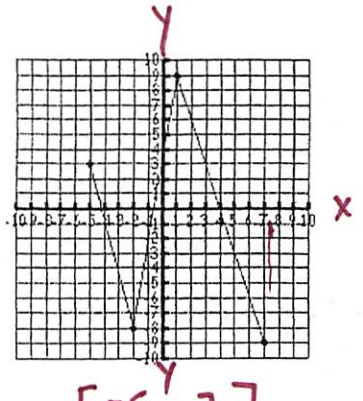
Domain: _____

Range: _____

Function: Yes

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

13.

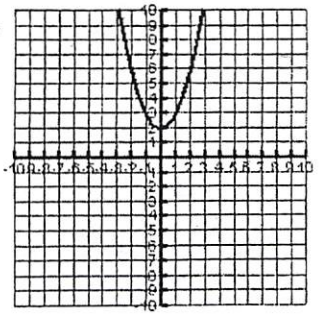


Domain: [-5, 7]

Range: [-9, 9]

Function: Yes

14.

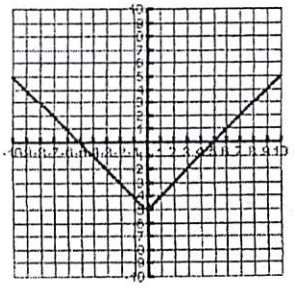


Domain: All Reals / [-3, 3]

Range: [2, ∞) / [2, 10]

Function: Yes

15.

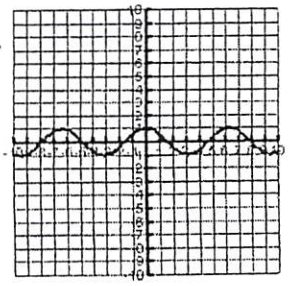


Domain: All Reals / [-10, 10]

Range: [-5, ∞) / [-5, 5]

Function: Yes

16.

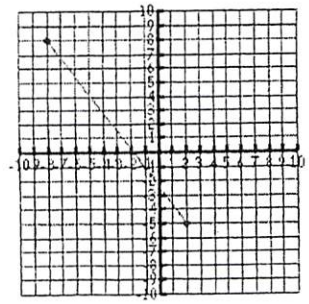


Domain: All Reals / [-10, 10]

Range: [-1, 1]

Function: Yes

17.

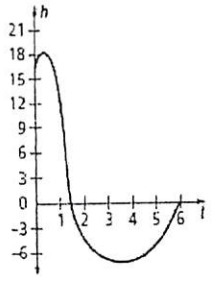


Domain: [-8, 2]

Range: [-5, 8]

Function: Yes

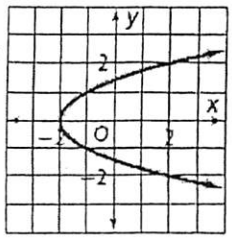
18.



Domain: [0, 6]

Range: [-6, 18]

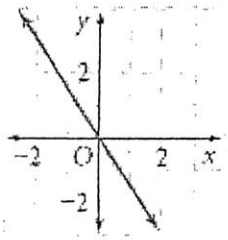
Function: Yes

19. 

D: $x \geq -2$

R: All Reals

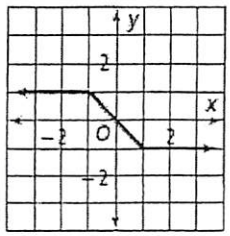
F: No

20. 

D: All Reals

R: All Reals

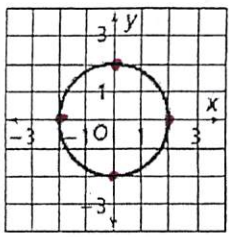
F: Yes

21. 

D: All Reals

R: $[-1, 1]$

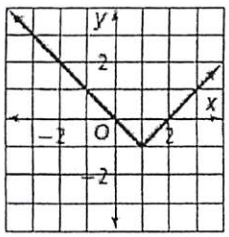
F: Yes

22. 

D: $-2 \leq x \leq 2$

R: $-2 \leq y \leq 2$

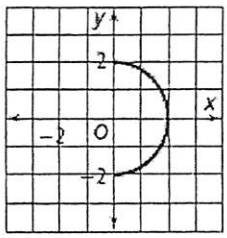
F: NO

23. 

D: All Reals

R: $y \geq -1$

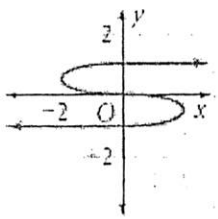
F: Yes

24. 

D: $0 \leq x \leq 2$

R: $-2 \leq y \leq 2$

F: No

25. 

Domain: All Reals

Range: $[-1, 1]$

Function: No