**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: _____

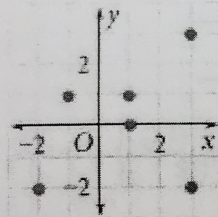Domain: _____
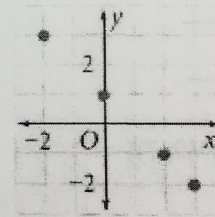
Range: _____

**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.



6.



Relation: _____

Domain: _____

Range: _____

Function: _____

Relation: _____

Domain: _____
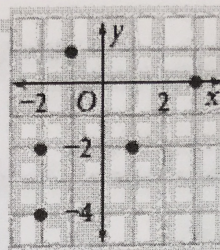
Range: _____

Function: _____

**7.**
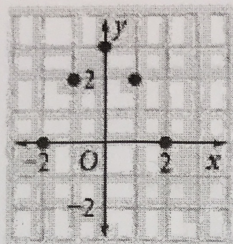


Relation: _____

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: _____

Range: _____

Function: _____

Domain: _____

Range: _____

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: _____

Range: _____

Function: _____

Domain: _____

Range: _____

Function: _____