Day 12

2.1 Relations and Functions

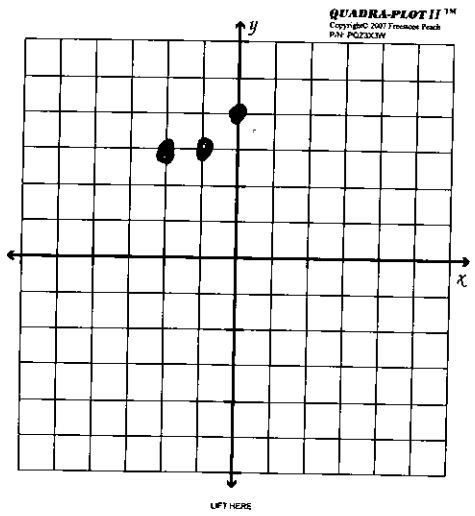
A relation is a set of ordered pairs that have an input (x) and an output of y-values.

Domain is the set of x-values.
Range is the set of all y-values.

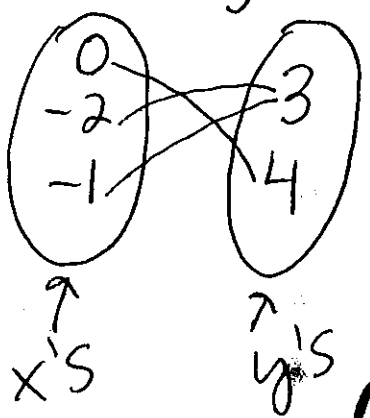
5 ways to represent a relation:

1. A set of ordered pairs (ex) $\{(0,4),(-2,3),(-1,3)\}$
2. A table of values
3. Graph

x	y
0	4
-2	3
-1	3



4. Equation
5. Mapping



Domain: $\{-2,-1,0\}$

Range: $\{3,4\}$ ← only list once if it repeats

NON-connected points.

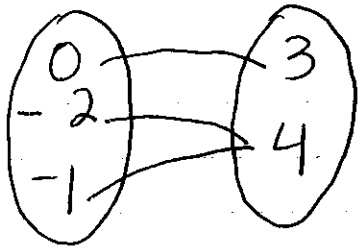
Only use { } For listing ordered pairs in Domain + Range!

A function is a relation in which each element of the domain is paired with exactly one element of the range.

This means x-values cannot repeat!
If they do, the relation is NOT a function.

y-values can repeat!

ex



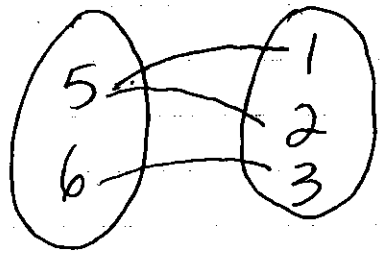
$\{(0,3),(-2,4),(-1,4)\}$

yes, it is a Function!

D: $\{0,-2,-1\}$

R: $\{3,4\}$

ex



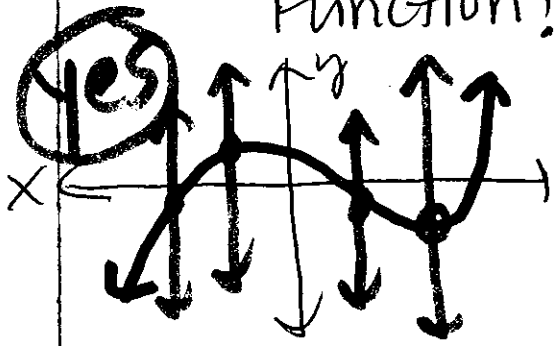
$\{(5,1),(5,2)(6,3)\}$

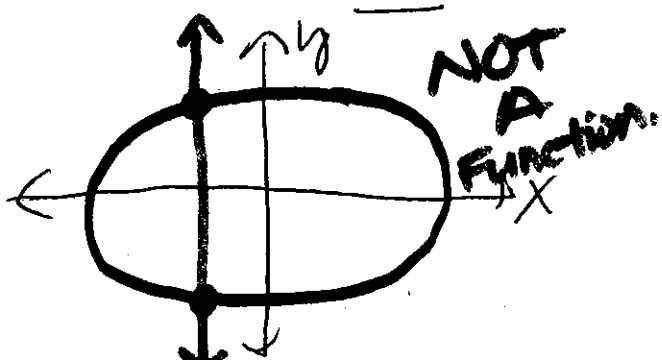
NOT a Function!
x-repeats

D: $\{5,6\}$

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

Vertical Line Test: Use when you have a graph. If you draw a vertical line thru the graph and it crosses more than once, then it is NOT a Function!





Name _____ Class _____ Date _____

Alg. 2 Practice 2-1

Relations and Functions

For each function, find $f(-2)$, $f\left(-\frac{1}{2}\right)$, $f(3)$, and $f(7)$.

1. $f(x) = 5x + 2$

$f(-2) = 5(-2)+2$
$= -10+2$
$f(-2) = -8$ $(-2, -8)$

2. $f(x) = -\frac{1}{3}x + 1$

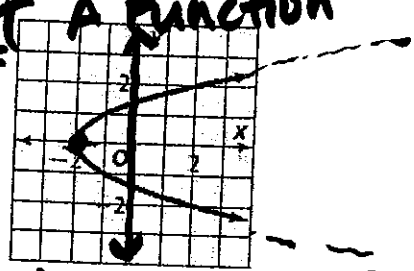
$f(3) = -\frac{1}{3}(3)+1$
$= -1+1$
$f(3) = 0$ $(3, 0)$

3. $f(x) = -3x + 1.8$

$f(7) = -3(7)+1.8$
$= -21 + 1.8$
$f(7) = -19.2$

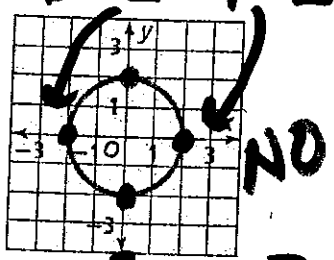
Use the vertical line test to determine whether each graph represents a function. Also, Find the domain and range.

4. NOT A Function



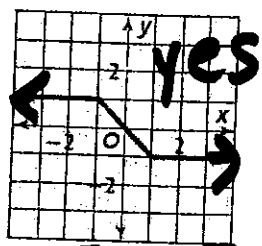
$x = -2$
D: $[-2, \infty)$ R: $(-\infty, \infty)$

5. D: $[-2, 2]$



NO
R: $[-2, 2]$

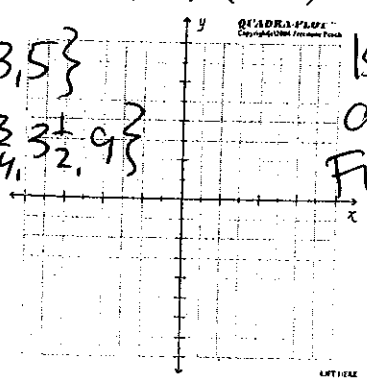
6. D: $(-\infty, \infty)$



yes
R: $[-1, 1]$
$-1 \le y \le 1$

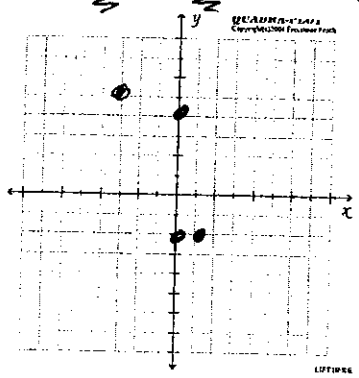
Graph each relation. Find the domain and range.

7. $\left\{(1, -2), \left(2, \frac{3}{4}\right), \left(3, 3\frac{1}{2}\right), (5, 9)\right\}$



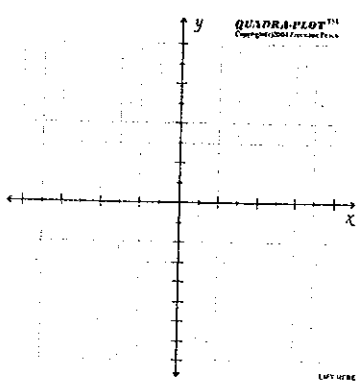
D: $\{1, 2, 3, 5\}$
R: $\{-2, \frac{3}{4}, 3\frac{1}{2}, 9\}$
Is a Function

8. $\{(-3, 5), (0, -2), (0, 4), (1, -2)\}$

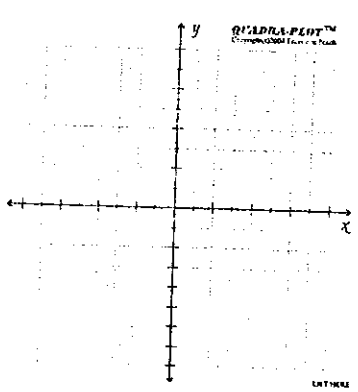


D: $\{-3, 0, 1\}$
R: $\{5, -2, 4\}$
NOT a Function

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

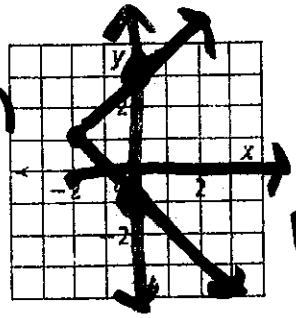


10. $\{(0.5, -1), (0.5, 0), (0.5, 1), (0.5, 3)\}$



For D + R: connected : [ ] equals ( ) doesn't equal

Determine whether each graph represents y as a function of x. Find domain and range.

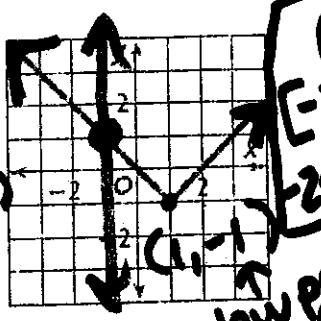


R: $(-\infty,\infty)$

NOT

D: $[-2,\infty)$ OR $x \geq -2$

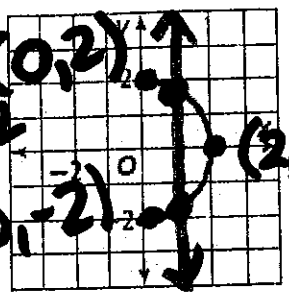
12.



R: $[-1,\infty)$ OR $y \geq -1$

yes

D: $(-\infty,\infty)$ or All R #'s



R: $[-2,2]$ OR $-2 \leq y \leq 2$

low point (left)

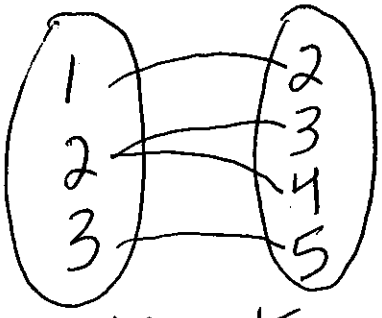
NOT

D: $[0,2]$ OR $0 \leq x \leq 2$

Make a mapping diagram for each relation, and determine whether it is a function.

14. $\{(1, 2), (2, 3), (2, 4), (3, 5)\}$

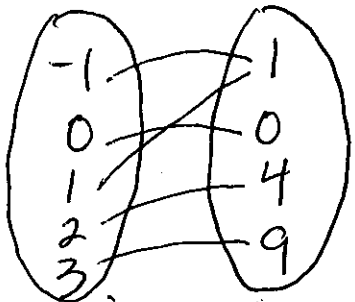
X Y X Y X Y X Y



x - repeats

NOT a Function

15. $\{(-1, 1), (0, 0), (1, 1), (2, 4), (3, 9)\}$



it is a Function

Suppose $f(x) = -3x + 2$ and $g(x) = \frac{1}{2}x - 1$. Find each value.

16. $f\left(\frac{1}{3}\right)$ = 1

$f(\frac{1}{3}) = -3(\frac{1}{3}) + 2$

$= -1 + 2$

$= 1$

17. $3g(4)$ -3

$3g(4) = 3(\frac{1}{2} \cdot 4 - 1)$

$3(2-1)$

$3(-1)$

18. $\frac{g(-2)}{f(3)}$ 2/7

$= \frac{\frac{1}{2}(-2) - 1}{-3(3) + 2}$

$= \frac{-1-1}{-9+2} = \frac{-2}{-7} = \frac{2}{7}$

19. $\frac{f(-1)}{g(5)}$

$\frac{-3(-1)+2}{\frac{1}{2}(5)-1} = \frac{3+2}{2.5-1} = \frac{5}{1.5}$

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