

Name:

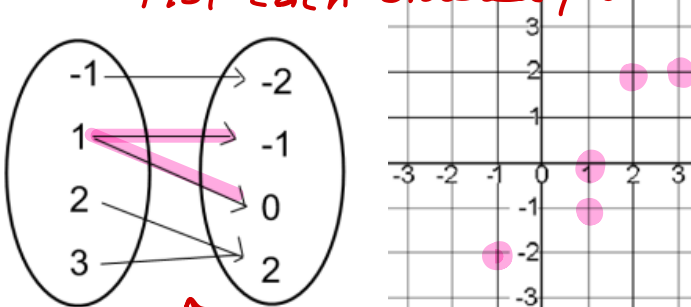
Period:

Date:

## Practice Worksheet: Relations & Functions

Use the given form of each relation to complete the other forms. Then determine if the relation is a function.

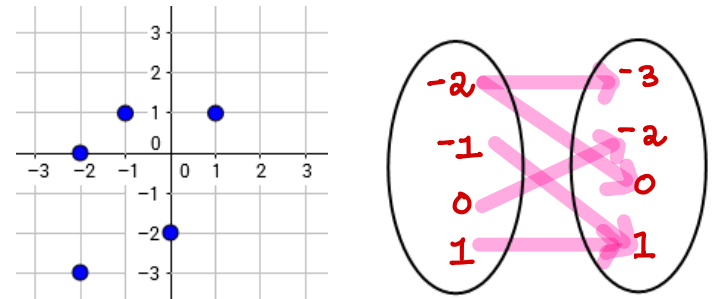
1] Rewrite the relation given in the mapping diagram as a scatterplot. *Plot each ordered pair*



Is the relation also a function?

*NO*

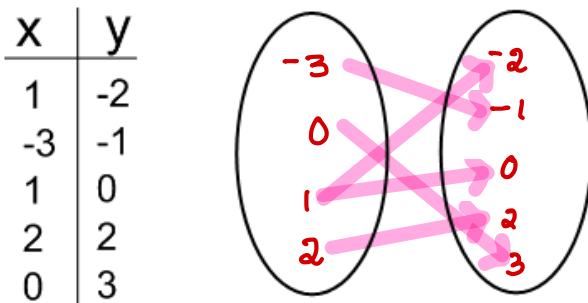
2] Rewrite the relation given in the scatterplot as a mapping diagram.



Is the relation also a function?

*NO*

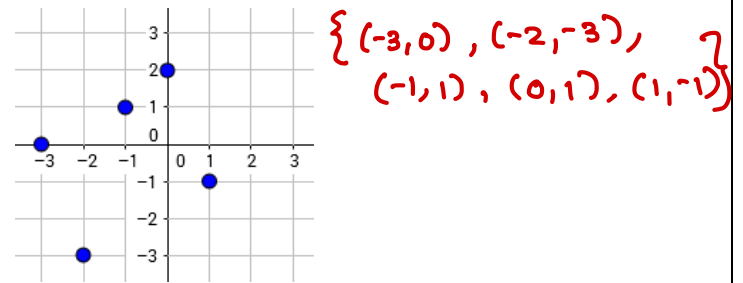
3] Rewrite the relation given in the table as a mapping diagram.



Is the relation also a function?

*NO*

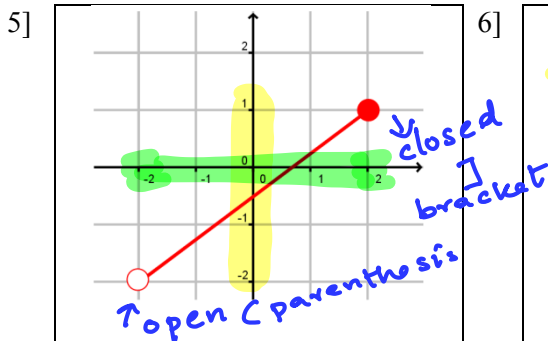
4] Rewrite the relation given in the scatterplot as a set of ordered pairs.



Is the relation also a function?

*Yes*

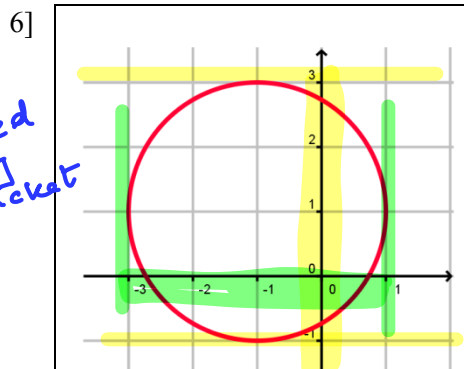
Determine if each graph shows a function or a relation only. Then identify the domain and range.



Domain:  $[-2, 2]$

Range:  $[-2, 1]$

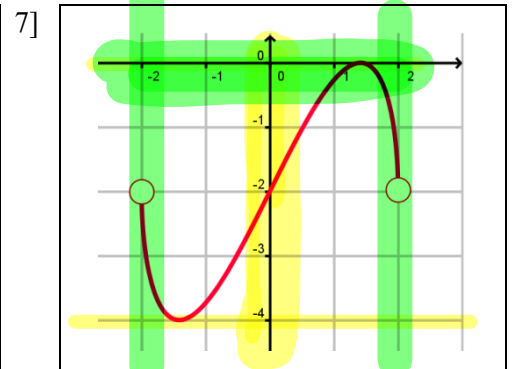
Function? *Yes*



Domain:  $[-1, 1]$

Range:  $[-1, 1]$

Function? *NO*



Domain:  $[-1, 1]$

Range:  $[-1, 1]$

Function? *yes*

Identify the domain and range, then evaluate each function for the given value of x.

→ Discrete function

8]  $f = \{(10,7), (-2,4), (5,3), (4,10)\}$

Domain:  $\{-2, 4, 5, 10\}$

Range:  $\{3, 4, 7, 10\}$

Find  $f(5)$ .  $= 3$  y value, when  $x = 5$

9]

Domain:  $\{-3, -1, 0, 1\}$

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

Find  $f(1)$ .  $= 1$

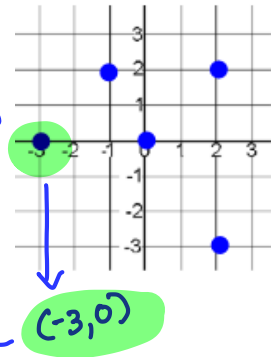
x	y
-3	3
-1	1
0	0
1	1

10]

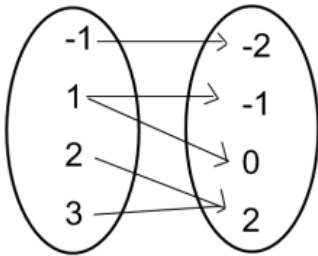
Domain:  $\{-3, -1, 0, 2\}$

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

Find  $f(-3)$ .  $= 0$



11]

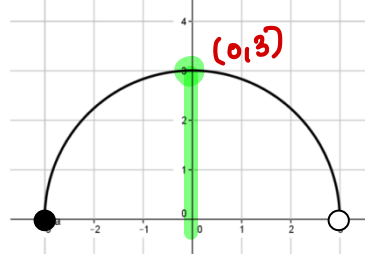


Domain:  $\{-1, 1, 2, 3\}$

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

Find  $f(3)$ .  $= 2$

12]

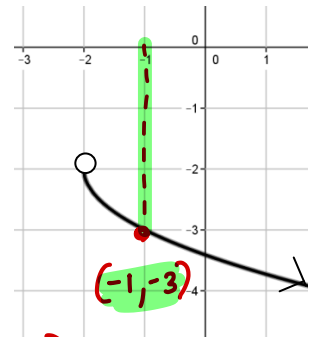


Domain:  $[-3, 3]$

Range:  $[0, 3]$

Find  $f(0)$ .  $= 3$

13]



Domain:  $[-1, \infty)$

Range:  $[-3, \infty)$

Find  $f(-1)$ .  $= -3$

Evaluate each function for the given value of x. Show your work.

14]  $f(x) = 3\sqrt{x} - 5$ ;  $f(9)$

$$\begin{aligned} f(9) &= 3\sqrt{9} - 5 \\ &= 3(3) - 5 \\ &= 9 - 5 \\ &= 4 \end{aligned}$$

15]  $f(x) = 4x^2 + x - 2$ ;  $f(-2)$

$$\begin{aligned} f(-2) &= 4(-2)^2 + (-2) - 2 \\ &= 4(4) + (-2) - 2 \\ &= 16 - 2 - 2 \\ &= 12 \end{aligned}$$

16]  $f(x) = 3 - 3x$ ;  $f\left(\frac{1}{6}\right)$

$$\begin{aligned} f\left(\frac{1}{6}\right) &= 3 - 3\left(\frac{1}{6}\right) \\ &= 3 - \frac{1}{2} \\ &= \frac{5}{2} \end{aligned}$$

Handwritten work shows:  $3\left(\frac{1}{6}\right) = \frac{3}{6} = \frac{1}{2}$  and  $\frac{3}{1} - \frac{1}{2} = \frac{6}{2} - \frac{1}{2} = \frac{5}{2}$

17]  $f(x) = |x + 2|$ ;  $f(-4)$

$$\begin{aligned} f(-4) &= |-4 + 2| \\ &= |-2| \\ &= 2 \end{aligned}$$

18]  $f(x) = \frac{2}{x-2}$ ;  $f(6)$

$$\begin{aligned} f(6) &= \frac{2}{6-2} \\ &= \frac{2}{4} \\ &= \frac{1}{2} \end{aligned}$$

19]  $f(x) = \frac{2}{3}x - 5$ ;  $f\left(-\frac{9}{2}\right)$

$$\begin{aligned} f\left(-\frac{9}{2}\right) &= \frac{2}{3}\left(-\frac{9}{2}\right) - 5 \\ &= -\frac{18}{6} - 5 \\ &= -3 - 5 \\ &= -8 \end{aligned}$$

**Finding the Domain of a Function:** If a function  $f$  is given by an equation and the domain is not given, find the domain by choosing all real numbers except:

- Any  $x$ -value that makes a denominator equal to zero,
- Any  $x$ -value that results in a negative number under a square root (or any other even root)
- Any  $x$ -value that makes the argument of a logarithmic function negative or zero (We will study these functions in chapter 12).

Example 1: Find the domain of each function:

a.  $f(x) = x + 7$


b.  $f(x) = \sqrt{x-1}$

c.  $f(x) = \frac{x}{x^2-1}$

d.  $f(x) = \frac{1}{\sqrt{2x-7}}$

e.  $f(x) = \frac{2x-4}{x^2-2x-3}$

①  $f(x) = x + 7$  no denomi  
 ↙ no even radica  
 D: All real numbers  
 D:  $(-\infty, \infty)$

②  $f(x) = \sqrt{x-1}$  no denominator  
 But even radical  
 (Radicand  $\geq 0$ )  
 $x-1 \geq 0$   
 $x \geq 1$   
  
 D:  $[1, \infty)$

③  $f(x) = \frac{x}{x^2-1}$

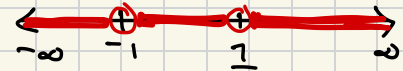
denominator - yes  
 ↪ cannot be zero  
 ↪ solve the denominator

$x^2-1=0$

$(x+1)(x-1)=0$

$x=1, x=-1$

↪ These two values  
 must be excluded



D:  $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

④  $f(x) = \frac{1}{\sqrt{2x-1}}$

deno  $\neq 0$   
 Rad  $\geq 0$  }  $> 0$

$\Rightarrow 2x-1 > 0$

$2x > 1$

$x > \frac{1}{2}$



D:  $[\frac{1}{2}, \infty)$