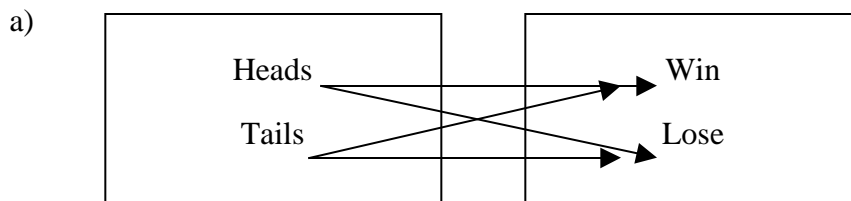


CHAPTER 8

Functions

8.1 What is a Function?

1)



b) No. This situation does not represent a function because every input value does not have a unique output value.

3)

a) Function Domain = {lab, husky, poodle} Range = {dog}

b) Not a function

5)

a) 0 sec and 2.5 sec

b) Domain = $\{t : 0 \leq t \leq 2.5\}$

c) 0 ft and -100 ft

d) Range = $\{h : -100 \leq h \leq 0\}$

e) The limits of the domain can be used to set values for Xmin and Xmax. The limits of the range can be used to set values for Ymin and Ymax.

f) Our domain consists of positive values and our range consists of negative values. A graph of this function would appear only in quadrant IV since this quadrant is the only quadrant with positive x -values and negative y values.

7) $f(-1) = 3$

$f(0) = 0$

$f(2) = 12$

$f(3) = 27$

9)

a) $f(x) = x - 5$

$f(2) = (2) - 5 = -3$

b) $g(x) = x^2 - 3x$






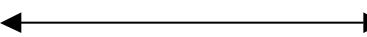
$g(-4) = (-4)^2 - 3(-4) = 16 - (-12) = 16 + 12 = 28$

c) $h(t) = -4.9t^2 + 10t + 5$


$$h(3) = -4.9(3)^2 + 10(3) + 5 = -44.1 + 30 + 5 = -9.1$$

11) $f(-2.15) = -16.641$

13)

- a) Domain:  x
 Range:  y
- b) Domain:  x
 Range:  y
- c) Domain:  x
 Range:  y

15)

- a) The range of the graph of $f(x) = x^2$ is the set of all non-negative numbers:
 Range:  y
- b) The domain of both functions is the set of all real numbers since both functions are defined for all real numbers. That is, you can't find a value for x that for some mathematical reason cannot be substituted for x . The range of both functions is the set of all nonnegative numbers (meaning 0 and all positive numbers) because the absolute value of any number and the square of any number results in a nonnegative number.

Skill and Review

17)

- a) $x = -4$
- b) $x^2 + 8x + 16 = 0$ Diagonal product = $16x^2$; $4x + 4x = 8x$
 $x^2 + 4x + 4x + 16 = 0$ Split the middle term
 $(x^2 + 4x) + (4x + 16) = 0$ Group the terms
 $x(x + 4) + 4(x + 4) = 0$ Factor out GCF of both groups
 $(x + 4)(x + 4) = 0$ Factor out common binomial
 $(x + 4)^2 = 0$
 $x + 4 = 0$
 $x = -4$
- c) $x^2 + 8x + 16 = 0$ Quadratic with $a = 1$, $b = 8$, $c = 16$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(8) \pm \sqrt{(8)^2 - 4(1)(16)}}{2(1) \pm \frac{2(1)}{2(1)}}$$

$$x = \frac{-8 \pm \sqrt{64 - 64}}{2 \pm \frac{2}{2}}$$

$$x = -4 \pm \frac{\sqrt{0}}{2}$$

$$x = -4 \pm 0$$

$$x = -4$$

19) $(x^3 y^4 z)(x^{-5} y^2 z^{-1})$

$= x^{3+(-5)} y^{4+2} z^{1+(-1)}$ Product law for exponents [Fact 6.1]

$= x^{-2} y^6 z^0$

$= x^{-2} y^6 \cdot 1$ $a^0 = 1, a \neq 0$

$= x^{-2} y^6$

$= \frac{y^6}{x^2}$ Definition 1.2