Name: Key
Date:

Use the questions below to keep track of key concepts from this lesson's study activity.

Page 2:

a. A function is a special kind of relation in which each value of the independent variable is paired with exactly one value of the dependent variable.

b. Pedro is shopping for clothes online. When he inputs a price, the Web site displays the products that cost that amount. The table below summarizes what Pedro has found.

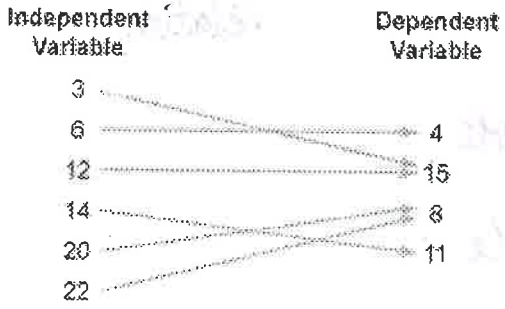
Price	Product
$25	tie
$30	belt
$40	jeans
$40	shirt
$50	slacks
$55	shoes
$55	sweater
$55	jacket

No, $40 and $55 are both paired with more than one product.

Is this a function? Why or why not?

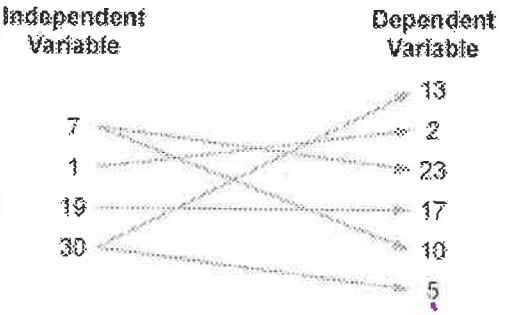
Page 4:

a. Is this a function? Why or why not?



YES, each independent variable is paired with exactly one dependent variable.

b. Is this a function? Why or why not?



No, some independent variables are paired with more than one dependent variable.

Page 7:

If $n = p(m)$, p is the function name, m is the independent variable, and n is the dependent variable.

Page 8:

a. Suppose you are given the function $f(x) = 7x$ and asked for $f(-6)$. This is the same as asking for the value of the function at $x =$ -6.

b. Suppose you are given the function $g(x) = x - 9$ and asked for $g(8)$. This is the same as asking for the value of the function at $x =$ 8.

c. Suppose you are given the function $h(x) = -2x + 3$ and asked for $h(4)$. This is the same as asking for the value of the function at $x =$ 4.

Page 9:

a. If $f(x) = 10x - 1$, the value of $f(-2)$ is $f(-2) = 10(-2) - 1 = -20 - 1 = -21$

b. If $g(x) = -5x + 13$, the value of $g(1)$ is $g(1) = -5(1) + 13 = -5 + 13 = 8$

c. If $h(x) = x^2 - x - 12$, the value of $h(3)$ is $h(3) = (3)^2 - 3 - 12 = 9 - 3 - 12 = -6$

Page 10:

In the function $n = p(m)$, the Domain is all the possible values of m, and the range is all the possible values of n.

Page 11:

The table below shows a dog's age at various points throughout its life in both human years, which is the independent variable, and dog years, which is the dependent variable.

Age (Human Years)	1	2	3	4	5	6	7
Age (Dog Years)	15	24	28	32	36	40	44

a. What is the domain of the function?

Domain = {1, 2, 3, 4, 5, 6, 7}

b. How about the range?

Range = {15, 24, 28, 32, 36, 40, 44}

Pages 12-13:

x values

Write the domain of each of the following functions in interval notation.

∞, ∪, etc.

a. $f(x) = \frac{1}{13 - x}$

denominator can't be 0.

$13 - x \neq 0$

$x \neq 13$

Domain $f(x) = (-\infty, 13) \cup (13, \infty)$

b. $g(x) = \sqrt{9 + x}$

can't be negative

$9 + x \geq 0$

$x \geq -9$ translates: $[-9, \infty)$ = Domain $g(x)$

included ↓ not included ↓

c. $h(x) = \frac{1}{2x+1}$

denom. can't be 0.

$2x+1 \neq 0$

$2x \neq -1$

$x \neq -\frac{1}{2}$

Domain $h(x) = (-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, \infty)$

d. $l(x) = \sqrt{4x-3}$

can't be negative

$4x-3 \geq 0$

$4x \geq 3$

$x \geq \frac{3}{4}$

Domain $l(x) = [\frac{3}{4}, \infty)$

Pages 15-16:

Write the range of each of the following functions in interval notation.

a. $f(x) = x^2 - 7$

Solve for x by itself

$y = x^2 - 7$

$y+7 = x^2$

$\sqrt{y+7} = x$ ← can't be negative

$y+7 \geq 0$

$y \geq -7$

$[-7, \infty)$ = Range $f(x)$

b. $g(x) = \sqrt{x} + 5$

$y = \sqrt{x} + 5$

$y-5 = \sqrt{x}$ ← positive

$\pm(y-5)^2 = x$ (y must be positive)

$y-5 \geq 0$

$y \geq 5$

$[5, \infty)$ = Range $g(x)$

c. $h(x) = 3x^2 + 1$

$y = 3x^2 + 1$

$y - 1 = 3x^2$

$\frac{y}{3} - \frac{1}{3} = x^2$ ← positive

$\sqrt{\frac{y}{3} - \frac{1}{3}} = x$

≥ 0

$\frac{1}{3}y - \frac{1}{3} \geq 0$

$\frac{1}{3}y \geq \frac{1}{3}$

$y \geq 1$

$[1, \infty)$ = Range $h(x)$

d. $l(x) = 2\sqrt{x} - 19$

$y = 2\sqrt{x} - 19$

$y + 19 = 2\sqrt{x}$

$\frac{y}{2} + \frac{19}{2} = \sqrt{x}$ ← positive

y must be positive. → $\left(\frac{y}{2} + \frac{19}{2}\right)^2 = x$

$\frac{y}{2} + \frac{19}{2} \geq 0$

$\frac{y}{2} \geq -\frac{19}{2}$

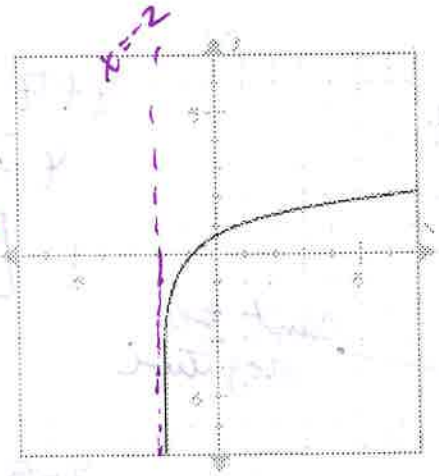
$y \geq -19$

$[-19, \infty)$ = Range $l(x)$

Page 18:

What is the domain (x values) in interval notation of the function graphed below? Note: As x is approaching -2, the graph is getting closer and closer to a line but not touching it.

Never touches! infinitely close.

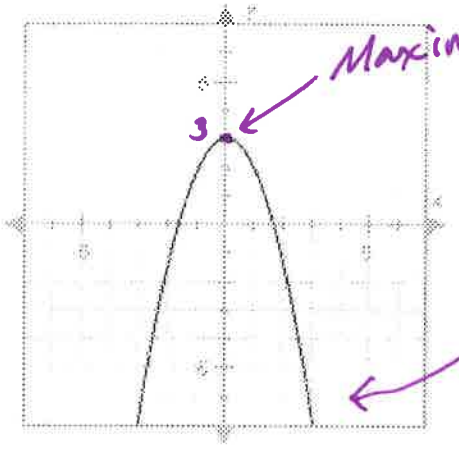


Domain = $(-2, \infty)$

Page 20:

y values.

What is the range in interval notation of the function graphed below?



Maximum.

shooting off to negative infinity.

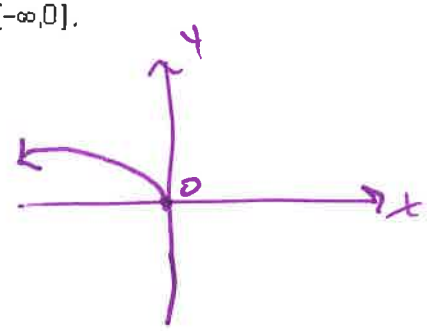
$(-\infty, 3]$

Page 22:

x values

a. Give an example of a function with a domain of $(-\infty,0]$.

$f(x) = \sqrt{-x}$



y values

b. Give an example of a function with a range of $[4,\infty)$.

$f(x) = x^2 + 4$