TOPIC 19-1: FUNCTIONS

The **domain** of a function is the set of input values (x-values).
x is your independent quantity.

The **range** of a function is the set of output values (y-values).
y is your dependent quantity.

A **function** is a relation in which each x-value corresponds to exactly one
y-value (All x values are different).

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EXAMPLE 1: State the domain and the range of the following relations and
determine if the relation is a function.

a) {(0, -2), (0, 2), (3, -1), (3, 1), (4, 0)}

   Domain = _____

   Range = _____

   Function   yes   no

b) {(1, 2), (2, 2), (3, 1), (4, 1)}

   Domain = _____

   Range = _____

   Function   yes   no

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EXAMPLE 2: Use the given domain to find the range for the following
function and then state the function as a set of ordered pairs.

   $y = -2x + 2$ Domain = {-4, -3, -2, 0, 3, 5}

   Range = _____

   Ordered pairs: _____

Function notation can be used to represent equations. The equation $y = 2x – 7$ can be written $f(x) = 2x – 7$. The symbol $f(x)$ means the "value of the function at x." You input a value for x and get out a value for $f(x)$. Another name for $f(x)$ is y.

$f(\mathbf{x}) = 5\mathbf{x} – 1$ $f(\mathbf{3}) = 5(\mathbf{3}) -1$
                              $f(\mathbf{3}) = \mathbf{14}$ *This represents the point (**3, 14**)*

x – input value – independent variable;
y or $f(x)$ – output value – dependent variable

The value of y or $f(x)$ depends on the value of x.
y is a function of x in the equation $y = 6x – 4$.

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EXAMPLE 3: Find the indicated value of $f(x)$.

a) $f(x) = 2 + x^2$; $f(-2)$

b) $f(x) = -x^2 + 2x – 3$; $f(-1)$

c) $f(x) = 3x^2 – 6$; $f(-3)$

d) $f(x) = x^2 + 2x – 4$; $f(3)$

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EXAMPLE 4: Write a function for the following situations.

a) On average, Jay can ride his bike 12 miles in one hour. Let *m* represent the number of miles he can ride in *h* hours.

b) Paul pays a $27 fee and $15 each hour he uses the sailboat. Let "c" represent the total cost of renting the sailboat for "h" hours.

c) Katie is sending flowers to her friend for her birthday. She pays 60 cents per lily and 7.50 for the vase used in the arrangement. Write the total cost, T, as a function of L, the number of lilies.