

# Algebra I

8-7

## Functions Defined by Equations

Function - A rule or a map which assigns each value of the domain to exactly one value of the range.

Domain - set of all possible inputs, usually  $x$ 's.

Range - set of all possible outputs, usually  $y$ 's

$(x, y)$   
 $(1, 2)$   $(-1, 2)$   $(-2, 2)$

$f$  of  $x$        $g$  of  $x$

$f(x) = 6x + 3$        $g(x) = 2x + 1$

input variable      rule

output, acts like  $y$

input

$g(2) = 2x + 1$        $(2, 5)$   
 $= 2(2) + 1$   
 $= 5 \rightarrow$  output

$f(2) = 6x + 3$        $(2, 15)$   
 $= 6(2) + 3$   
 $= 15 \rightarrow$  output

Find the Range of each function.

1)  $g: x \rightarrow 5x + 1$        $D = \{-1, 0, 1\}$

~~Outdated format, rewrite~~  
 $g(x) = 5x + 1$

$g(-1) = 5(-1) + 1 = -4$

$g(0) = 5(0) + 1 = 1$

$g(1) = 5(1) + 1 = 6$

$R = \{-4, 1, 6\}$

9)  $P(z) = z^2 - 5z - 6$        $D = \{2, 3, 4\}$

$P(2) = (2)^2 - 5(2) - 6$   
 $4 - 10 - 6$   
 $-12$

$P(3) = (3)^2 - 5(3) - 6 = 9 - 15 - 6 = -12$

$P(4) = (4)^2 - 5(4) - 6 = 16 - 20 - 6 = -10$

$R = \{-12, -10\}$

Find the values for each given function with the set of real numbers as the domain.

23)  ~~$f: x \rightarrow x^2 + 3x$~~        $F(x) = x^2 + 3x$

a)  $f(7) = (7)^2 + 3(7)$   
 $49 + 21$   
 $70$

b)  $f(-7) = (-7)^2 + 3(-7)$   
 $49 - 21$   
 $28$

c)  $f(-3) = (-3)^2 + 3(-3)$   
 $9 - 9$   
 $0$

For each function,

(a) find  $f(0)$  → input

(b) solve  $f(x) = 0$ . → output

acts like  $y$

29)  $f(x) = 3x - 12$

(a)  $F(0) = 3(0) - 12$   
 $= -12$

(b)  $0 = 3x - 12$

$0 + 12 = 3x - 12 + 12$

$\frac{12}{3} = \frac{3x}{3}$

$4 = x$

$\{4\}$

Pg 380

2-34 even