Name: _____ Date: _____

Learning Goal 1.1	Understanding new ideas about functions and applying that to previously knowledge.

More Questions – Solutions

1. Find the domain of the following functions.

a. $f(x) = \dfrac{2x-1}{x^2+1}$

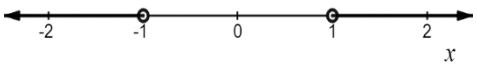
$x^2 + 1 \neq 0$
$x^2 \neq -1$
$x \neq \sqrt{-1}$

$\{x | x \in \mathbb{R}\}$

b. $g(x) = \dfrac{x^2+3x+2}{\sqrt{3x^2-3}}$

$3x^2 - 3 \neq 0$ $\quad$ $3x^2 - 3 \geq 0$
$3(x^2-1) \neq 0$ $\quad$ $3(x^2-1) \geq 0$
$x^2 - 1 \neq 0$ $\quad$ $x^2 - 1 \geq 0$
$x^2 \neq 1$
$x \neq \pm 1$ $\quad$ $x \leq -1$
$x \geq 1$

$\{x | x < -1, x > 1, x \in \mathbb{R}\}$



c. $h(x) = \sqrt{x^2-1} + \sqrt{4-x}$

$x^2 - 1 \geq 0$ $\quad$ $4 - x \geq 0$
$x \leq -1$ $\quad$ $4 \geq x$
$x \geq 1$

$\{x | x \leq -1, 1 \leq x \leq 4, x \in \mathbb{R}\}$

2. If $f(x)$ and $g(x)$ are defined as follows, find the composition of functions.

$f(x) = x^2 - 1$ $\qquad$ $g(x) = 2x$

a. $g(g(5))$
$= 2(2(5))$
$= 2(10)$
$= 20$

b. $(g \circ f)(x)$
$= g(f(x))$
$= 2(x^2 - 1)$
$= 2x^2 - 2$

c. $f(g(x))$
$= (f \circ g)(x)$
$= (2x)^2 - 1$
$= 4x^2 - 1$

d. $(f \circ f)(x)$
$= f(f(x))$
$= (x^2-1)^2 - 1$
$= (x^4 - 2x^2 + 1) - 1$
$= x^4 - 2x^2$
$= x^2(x^2 - 2)$

3. If $f(x)$ and $g(x)$ are defined as follows, find the composition of functions.

$f(x) = \sqrt{x}$ $\qquad$ $g(x) = \sqrt[3]{1-x}$

a. $g(g(x))$
$= (g \circ g)(x)$
$= \sqrt[3]{1 - \sqrt[3]{1-x}}$

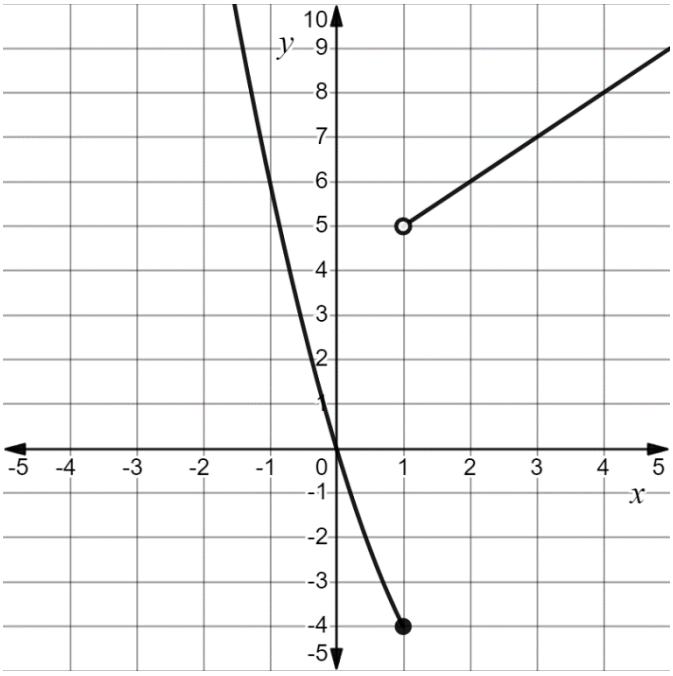
b. $(g \circ f)(x)$
$= g(f(x))$
$= \sqrt[3]{1 - \sqrt{x}}$

c. $f(g(x))$
$= (f \circ g)(x)$
$= \sqrt{\sqrt[3]{1-x}}$
$= \sqrt[6]{1-x}$

d. $(f \circ f)(x)$
$= f(f(x))$
$= \sqrt{\sqrt{x}}$
$= \sqrt[4]{x}$

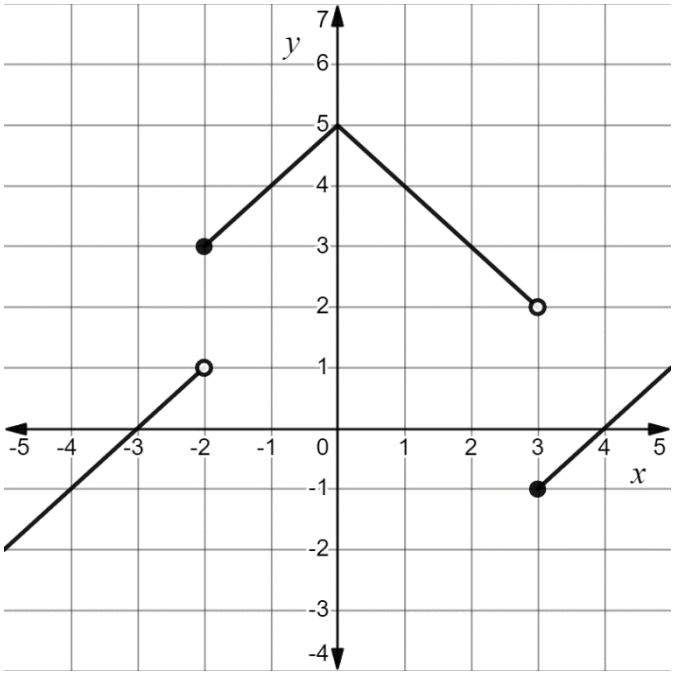
4. Sketch the functions. State the range.

a. $f(x) = \begin{cases} x^2 - 5x, & x \leq 1 \\ x + 4, & x > 1 \end{cases}$



$\{y | y \geq -4, y \epsilon \mathbb{R}\}$

b. $g(x) = \begin{cases} x + 3, & x < -2 \\ -|x| + 5, & -2 \leq x < 3 \\ x - 4, & x \geq 3 \end{cases}$



$\{y | \ y \epsilon \mathbb{R}\}$