Name: _____ Date: _____

PCH: Domains of Compositions Ms. Loughran

Do Now:

Find the domain of each of the following.

1. $y = 5 - x$

2. $y = x^2 - x - 6$

3. $y = \dfrac{1}{x^2 - x - 6}$

4. $y = \sqrt{x^2 - x - 6}$

5. $y = \dfrac{1}{\sqrt{x^2 - x - 6}}$

6. $y = \sqrt{12 - x} - \dfrac{2x + 1}{x - 8}$

7. $y = \sqrt{x^2 - 1} + \sqrt{9 - x^2}$

Domain of a composition of 2 functions:

$(f \circ g)(x)$ is defined whenever both $g(x)$ and $(f \circ g)(x)$ are defined.

Examples:

1. Let $f(x) = x^2$ and $g(x) = x + 5$

   (a) Find the function $f \circ g$ and state its domain.

   (b) Find the function $g \circ f$ and state its domain.

2. Let $f(x) = \sqrt{x}$ and $g(x) = \sqrt{4 - x}$

   (a) Find the function $f \circ g$ and state its domain.

(b) Find the function $g \circ f$ and state its domain.

(c) Find the function $f \circ f$ and state its domain.

(d) Find the function $g \circ g$ and state its domain.

For questions 3 -5, find the functions $f \circ g,\ g \circ f,\ f \circ f,$ and $g \circ g$ and their domains.

3. $f(x) = 6x - 5$, $g(x) = \dfrac{x}{2}$

4. $f(x) = \sqrt{x}$, $g(x) = \sqrt{2 - x}$

5. $f(x) = \frac{1}{\sqrt{x}}$, $g(x) = x^2 - 4x$