Functions

Warm-up

1. Find the domain of $f(x)=\sqrt{\dfrac{x^2-49}{x+8}}$

2. Write as a piecewise function:

$f(x)=\left|x^2-7x+12\right|$

Composition of Functions: $(f\circ g)(x)=f(g(x))$

Example 1: Let $f(x)=x^2+3$ and $g(x)=\sqrt{x}$. Find

a) $(f\circ g)(x)$

b) $(g\circ f)(x)$

Practice Problem 1: Let $f(x)=\sqrt{x}$, $g(x)=\dfrac{1}{x}$, $h(x)=x^3$. Find

a) $(g\circ f)(x)$

b) $(h\circ g)(x)$

c) $(f\circ g\circ h)(x)$

Decomposition of Functions: Express $h(x)$ as a composition: $h(x)=f(g(x))$

Examples:

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

Practice Problems:

1. $h(x)=(x^2+1)^{10}$

Functions

Examples:

2. $h(x) = \sqrt{4-3x}$

3. $h(x) = (\sin x)^3$

Practice Problems:

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

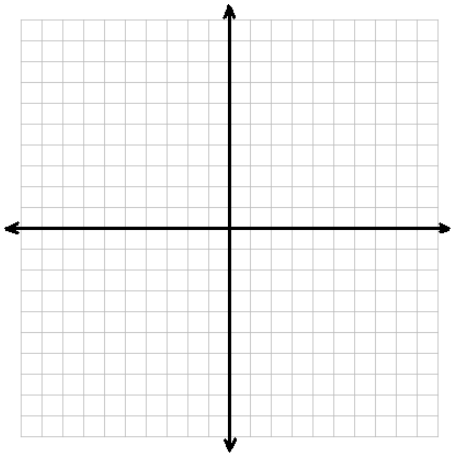
3. $h(x) = \sin(x^3)$

Evaluating Piecewise Functions

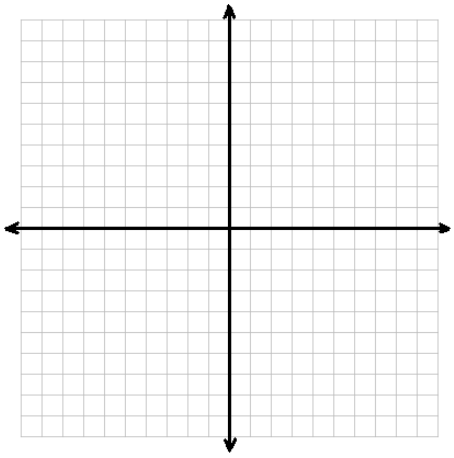
Example 4: Given $f(x) = \begin{cases} 0, x \le -1 \\ \sqrt{1-x^2}, -1 < x < 1 \\ x, x \ge 1 \end{cases}$, Find

a) $f(-3)$ b) $f(1)$ c) $f(0)$ d) $f(7)$

Example 5: Graph $f(x) = \begin{cases} 2x-1, x > 4 \\ 3, x \le 4 \end{cases}$



Practice Problem 5: Graph $f(x) = \begin{cases} x-3, x \ge 2 \\ -3x+1, x < 2 \end{cases}$



Functions

Inequalities versus Interval Notation

	Inequality	Interval Notation
1	$x < 5$	
2	$x \geq -3$	
3		$(4, 7]$
4	$-2 < x \leq 5$	
5		$(-\infty, 6]$