Score: /20

Learning Activity
Sections 1.1 and 1.2

MthSc 106

1. Use interval notation to write the domain of each of the following functions.

a. $f(x) = \sqrt{x^2 - 5}$

$x^2 - 5 \geq 0 \rightarrow x^2 \geq 5 \rightarrow x \leq -\sqrt{5}$ or $x \geq \sqrt{5}$

The domain is $\left(-\infty, -\sqrt{5}\right] \cup \left[\sqrt{5}, \infty\right)$.

b. $f(x) = \dfrac{1}{\sqrt{x^2 - 5}}$

Same as above, but denominator cannot be zero. Exclude $x = -\sqrt{5}$ and $\sqrt{5}$.

The domain is $\left(-\infty, -\sqrt{5}\right) \cup \left(\sqrt{5}, \infty\right)$.

2. Let $f(x) = 2x - 1$, $g(x) = x^2$ and $h(x) = \sin(x)$. Find

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

$(f \circ g)(x) = f(g(x)) = f\left(x^2\right) = 2\left(x^2\right) - 1 = 2x^2 - 1$

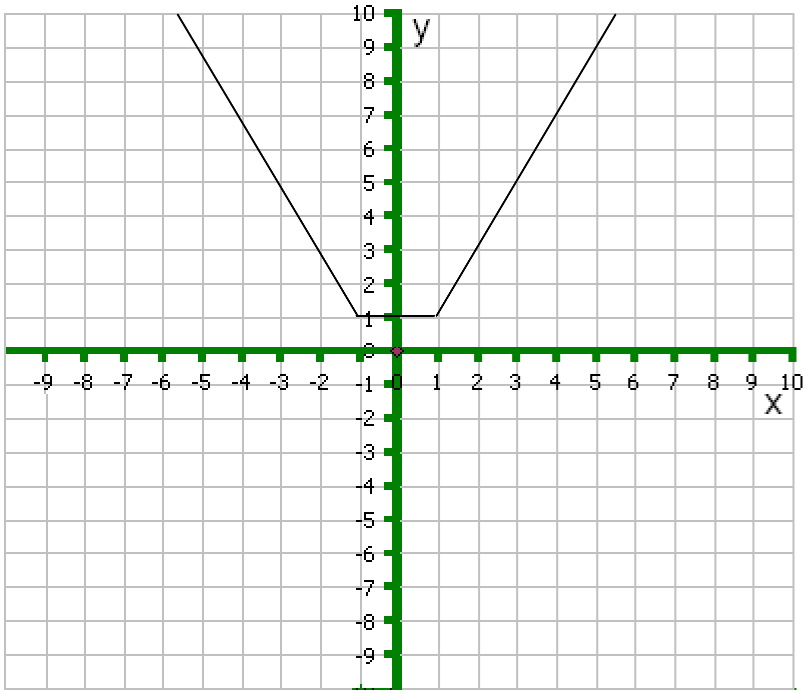
b. $(f \circ h)(x)$

$(f \circ h)(x) = f(h(x)) = f\left(\sin x\right) = 2\sin x - 1$

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

$(f \circ g \circ h)(x) = f(g(h(x))) = f(g(\sin x)) = f(\sin^2 x) = 2\sin^2 x - 1$

3. Graph the following function: $f(x) = \begin{cases} -2x-1 & \text{if } x < -1 \\ 1 & \text{if } -1 \le x \le 1 \\ 2x-1 & \text{if } x > 1 \end{cases}$.



4. If you have the graph $y = f(x)$, how do you obtain:

a. $y = f(x+2)$

Shift $y = f(x)$ to the left by 2 units.

b. $y = -3f(x)$

Steepen $y = f(x)$ vertically by a factor of 3 and reflect about the x-axis.

c. $y = f(3x)$

Steepen $y = f(x)$ horizontally by a factor of 3.

d. $y = 4f(x-6)+9$

Shift $y = f(x)$ to the right by 6 units and up by 9 units.
Then, steepen by a factor of 4.