Function Diagnostic Quiz

Take this quiz to see if you need Lecture 2 (Function Fundamentals). Answers are on page 2.

Important: Pencil or pen only. **No calculators**.

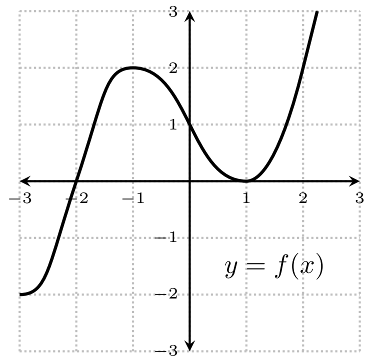
1. Answer the questions about the function $f(x)$ graphed below.

   (a) $f(-3) =$

   (b) $f(0) =$

   (c) $f(2) =$

   (d) Solve: $f(x) = 0$



2. Find the domain of the function $f(x) = \dfrac{\sqrt{x+5}}{x^2 - 5x + 6}$.

3. Suppose $f(x) = \dfrac{x+2}{1-x}$ and $g(x) = x + \sqrt{x} - 1$.

   (a) $f\big(g(x)\big) =$

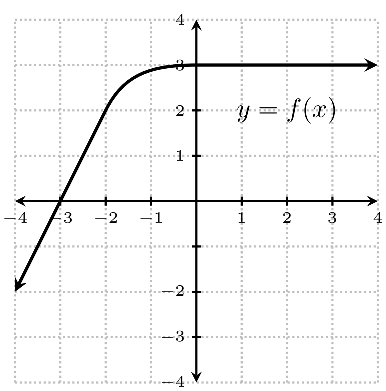
   (b) $g\big(f(x)\big) =$

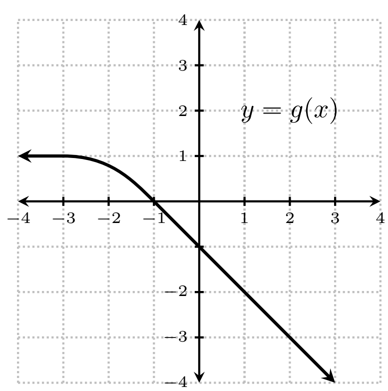
4. Answer the following questions for the two functions f and g graphed below.

   (a) $f\big(g(2)\big) =$

   (b) $f\big(g(-1)\big) =$

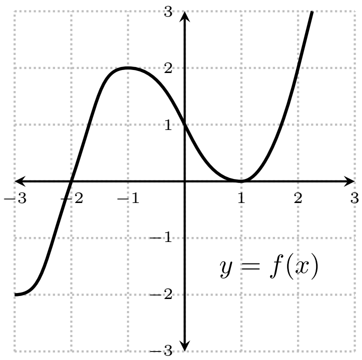
   (c) Draw the graph of $y = f(-x) - 1$.





Here are the solutions. If your answers are not all correct, then you probably need Lecture 2.

1. Answer the questions about the function $f(x)$ graphed below.



   (a) $f(-3) = -2$

   (b) $f(0) = 1$

   (c) $f(2) = 2$

   (d) Solve: $f(x) = 0$

   Answer: $x = -2$ and $x = 1$.

2. Find the domain of the function $f(x) = \dfrac{\sqrt{x+5}}{x^2 - 5x + 6}$.

   Notice $f(x) = \dfrac{\sqrt{x+5}}{(x-2)(x-3)}$. Thus x cannot equal 2 or 3, for that would entail division by 0.
   Also we must have $x + 5 \geq 0$ so that the radical is defined. Hence $-5 \leq x$.
   Any other value of x is allowable. Therefore the domain is $\boxed{[-5, 2) \cup (2, 3) \cup (3, \infty)}$.

3. Suppose $f(x) = \dfrac{x+2}{1-x}$ and $g(x) = x + \sqrt{x} - 1$.

   (a) $f\big(g(x)\big) = f\left(x + \sqrt{x} - 1\right) = \dfrac{(x + \sqrt{x} - 1) + 2}{1 - (x + \sqrt{x} - 1)} = \boxed{\dfrac{x + \sqrt{x} + 1}{2 - x - \sqrt{x}}}$

   (b) $g\big(f(x)\big) = g\left(\dfrac{x+2}{1-x}\right) = \boxed{\dfrac{x+2}{1-x} + \sqrt{\dfrac{x+2}{1-x}} - 1}$

4. Answer the following questions for the two functions f and g graphed below.

   (a) $f\big(g(2)\big) = f(-3) = \boxed{0}$

   (b) $f\big(g(-1)\big) = f(0) = \boxed{3}$

   (c) Draw the graph of $y = f(-x) - 1$.
   This is the graph of $y = f(x)$ reflected across the y-axis and moved down one unit, shown red below.