Math 221 Sec 003 Quiz 3 Solution

Name:_____

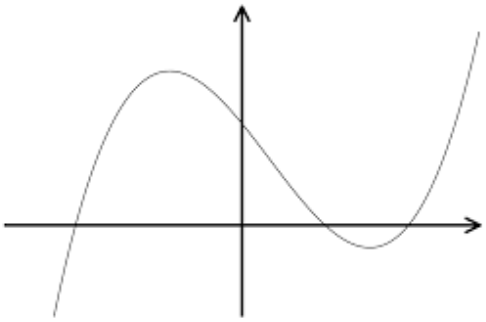
1. Use the definition of derivative to find $f'(2)$ for $f(x) = 7x^2 - 13$.

   Solution:

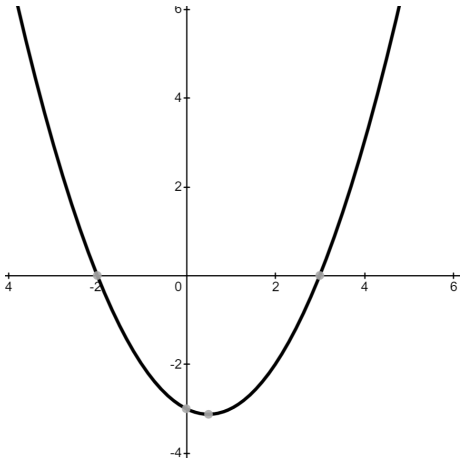
$$\begin{aligned} f'(2) &= \lim_{x\to 2} \frac{f(x) - f(2)}{x - 2} && \text{(correct definition +1)} \\ &= \lim_{x\to 2} \frac{(7x^2 - 13) - 15}{x - 2} && \text{(correct substitution +2)} \\ &= \lim_{x\to 2} \frac{7(x-2)(x+2)}{x - 2} \\ &= \lim_{x\to 2} 7(x+2) \\ &= 28 && \text{(answer +1)} \end{aligned}$$

2. Use the axes provided below to sketch $f'(x)$ for the following $f(x)$:

   $f(x)$

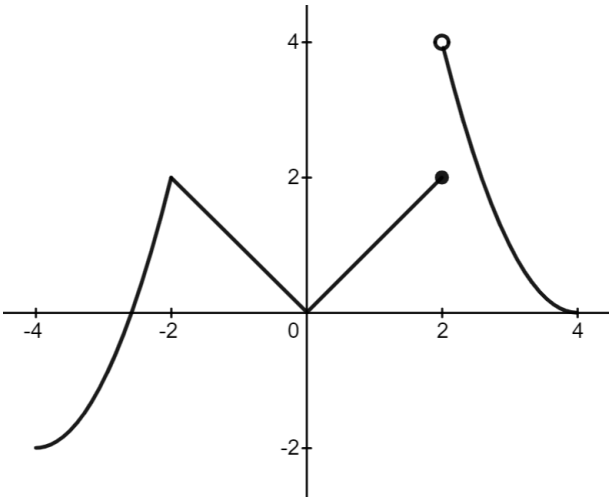


   $f'(x)$



   (correct 0's +1, correct shape +1)

3. Consider the following function:



(a) State the value(s) of x between -4 and 4 where the function is discontinuous.

(b) State the value(s) of x between -4 and 4 where the function is **NOT** differentiable.

Solution:

(a) $x = 2$ $(+1)$

(b) $x = -2, 0, 2$ $(+1$ each$)$

(-1 for each missing point or extra point, 0 min)