

Quiz 3

Monday, February 4

1. For a function $f(x)$, the derivative of $f(x)$, $f'(x)$, is a function that is defined by

Solution:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

provided this limit exists. □

2. Differentiate $f(x) = 7x^3$. State any rules that you use.

Solution:

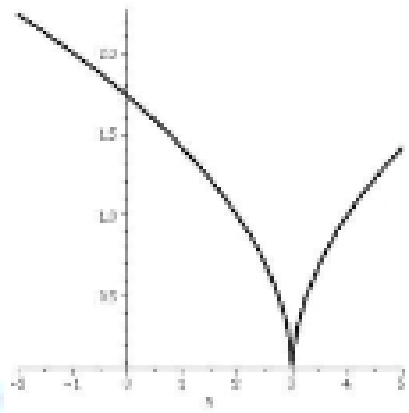
$$\begin{aligned} \frac{d}{dx}(7x^3) &= 7 \frac{d}{dx}(x^3) \text{ (constant multiple rule)} \\ &= 7(3x^2) \text{ (Power Rule)} \\ &= \boxed{21x^2}. \end{aligned}$$
□

3. Find $\frac{d}{dx}(3 + x^{2/3})$. State any rules that you use.

Solution:

$$\begin{aligned} \frac{d}{dx}(3 + x^{2/3}) &= \frac{d}{dx}(3) + \frac{d}{dx}(x^{2/3}) \text{ (sum rule)} \\ &= 0 + (2/3)x^{2/3-1} \text{ (Power Rule)} \\ &= \boxed{2/3x^{-1/3}}. \end{aligned}$$
□

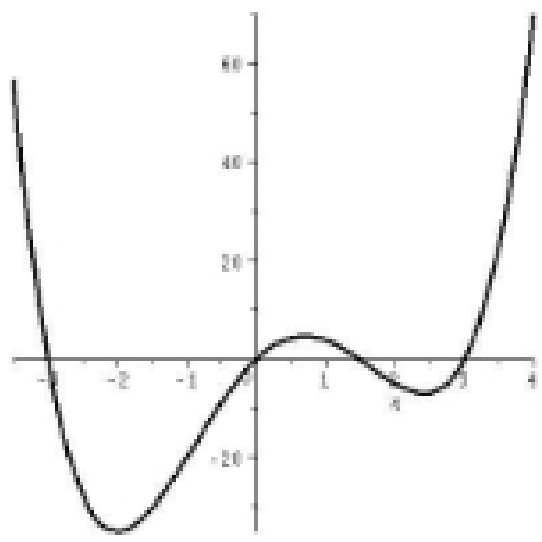
4. Which of the following graphs is not differentiable at $x = 3$?



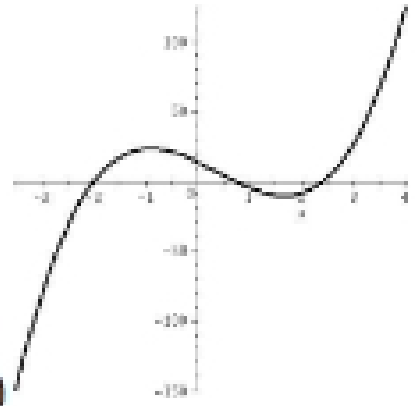
Solution: (b)

□

5. Which of the following graphs could be the graph of $f'(x)$ where the graph of $f(x)$ is:



$f(x)$:



Solution: (a)

□