

Math 2143 - Brief Calculus with Applications

Exam #1 - 2020.02.12

Name: _____

1. (a) State the definition of a function $f(x)$ being continuous at $x = x_0$.

(b) State the limit formula for the definition of the derivative $f'(x)$ of a function $f(x)$.

2. Compute the following limits:

(a) $\lim_{x \rightarrow 1} 2x^2 - x - 1$

(b) $\lim_{x \rightarrow 1} \frac{2x^2 - x - 1}{x - 1}$

2. Compute the following limits (cont...):

$$(c) \lim_{h \rightarrow 0} \frac{\frac{1}{2h+3} - \frac{1}{3}}{h}$$

$$(d) \lim_{h \rightarrow 0} \frac{\sqrt{4+h} - 2}{h}$$

3. Find the equation of the tangent line to the function $f(x) = 4x^2 - 2x + \frac{1}{x}$ at $x = 1$.

4. Compute the following derivatives:

(a) $\frac{d^2}{dw^2} \left(w^3 - \frac{4}{w^2} + 2 \right)$

(b) $\frac{d}{dx} (7^4)$

(c) $\frac{d}{dx} \sqrt{2x^3 - 3\sqrt{x} + 1}$

4. Compute the following derivatives (cont...):

(d) $\frac{d}{dx} \left(\frac{x^3 - 4x^2}{3x^2 - 1} \right)$

(e) $\frac{d}{dx} ((3x^2 - 1)^2 \cdot \sqrt{2x + 1})$