Math 2143 - Brief Calculus with Applications

Exam #2 - 2020.03.24

Name: _____

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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 $f(x)$.

(c) State the product rule formula for differentiation.

(d) State the quotient rule formula for differentiation.

(e) State the chain rule formula for differentiation.

(f) State the domain and range of the function $f(x) = e^x$.

(g) State the domain and range of the function $f(x) = \ln(x)$.

2. Compute the equation of the tangent line to the function $f(x) = 2x^3 - 3x^2 + 6x - 2$ at $x = -1$.

3. Compute the following derivatives.

   (a) $\dfrac{\mathrm{d}}{\mathrm{d}x}\left(x^2 e^{3x-1} + 7x\right)$

   (b) $\dfrac{\mathrm{d}}{\mathrm{d}z}\dfrac{\ln(2z)}{z^2+1}$

(c) $\dfrac{\mathrm{d}}{\mathrm{d}w} 2^{3w-1}$

(d) $\dfrac{\mathrm{d}}{\mathrm{d}x}(x\ln(x)-x)$

5. Solve the following equations for the given variable:

(a) $e^{2x+1} = 4$

(b) $\ln(x)+\ln(x-1) = \ln(2)$