King Fahd University of Petroleum & Minerals Section # Serial #
Department of Mathematics & Statistics ID #
MATH 132/ Exam I/ 121 Name

Write clearly, explain and simplify your answers

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1. **[7pts]** Let $f(x) = \begin{cases} 1+2x & \text{if } x < 1 \\ x^2+2 & \text{if } x > 1 \end{cases}$.

Find $\lim_{x\to 2} f(x)$, $\lim_{x\to 1^+} f(x)$, $\lim_{x\to 1^-} f(x)$, $\lim_{x\to 1} f(x)$, $\lim_{x\to\infty} f(x)$, $\lim_{x\to-\infty} f(x)$. Is f continuous at $x = 1$?

2. **[6pts]** Find, if they exist:

(a) $\lim_{x\to 2} \dfrac{x^2+3x-10}{x^2-6x+8}$

(b) $\lim_{x\to-\infty} \dfrac{x(3-x^2)}{x^3+x+1}$

3. **[6pts]** Let $y = x^2 + 3x - 4$. Find
(a) The rate of change of y w.r.t. x when $x = 3$
(b) The relative rate of change and the percentage rate of change when $x = 3$.

4. **[4pts]** The total cost function for a manufacturer is $c = \dfrac{(q+1)^2}{q+2} + 600$. Find the marginal cost function.

5. [**6pts**] A manufacturer has determined that that m

6. [**4pts**] Find an equation of the tangent line to the curve $y = x\,(\ln(x) - 1)$ when $x = e^2$.

7. [**4pts**] Find $f'(1)$ if $f(t) = 5^{2t^2+2t-3}$.

8. [**4pts**] Find y' if $e^y = (y+1)e^x$.