**Calculus for Business / Economics**
**Chapter 1 and 2 Test Review**

1. Find limit using direct substitution:

| | |
|---|---|
| $\lim_{x->-2}\left(\frac{x^2+3x-1}{x-2}\right)$ | $\lim_{x->-1}\left(\frac{x^2-5x}{x+4}\right)$ |

2. Find limit using factor/cancel method:

| | |
|---|---|
| $\lim_{x->2}\frac{x^2-10x+16}{x^2-4}$ | $\lim_{x->-5}\frac{x^2+9x+20}{x^2-25}$ |
| $\lim_{x->2}\frac{x^2-12x+20}{x-2}$ | $\lim_{x->-3}\frac{x^2-6x-27}{x+3}$ |

3. Find limit using the conjugate method:

| | |
|---|---|
| $\lim_{x->0}\frac{\sqrt{x+4}-2}{x}$ | $\lim_{x->-2}\frac{\sqrt{x+6}-2}{x+2}$ |

4. Specify where the function is discontinuous:

| | |
|---|---|
| $f(x)=x^2+4x-\frac{1}{x}$ | $f(x)=\frac{9x-1}{x^2+7x+10}$ |
| $f(x)=x^2+\frac{4x}{x+5}-\frac{1}{x-4}$ | $f(x)=\frac{x}{x^2-4}$ |
| $f(x)=\begin{cases}4x-1, x\le 3\\ 7x+4, x>3\end{cases}$ | $f(x)=\begin{cases}2x+3, x\le 0\\ 8x+3, x>0\end{cases}$ |

**Calculus for Business / Economics**
**Chapter 1 and 2 Test Review**

5. Find the derivative using the power rule: $\frac{d}{dx}\left(x^n\right) = nx^{n-1}$

| | |
|---|---|
| $f(x) = x^4 - 2x^3 - \frac{5}{x^3}$ | $f(x) = \frac{x^9 - 3x^4 + 5}{x^6}$ |
| $f(x) = \sqrt{x} - \sqrt[5]{x}$ | |

6. Find the equation of the tangent line for the given function at the point

| | |
|---|---|
| $f(x) = 2x^2 - x + 3$ at (1, 4) | $f(x) = 3\sqrt{x}$ at (4, 6) |

7. Find the derivative using the product rule:

| | |
|---|---|
| $f(x) = (5x^2 + 4x - 2)(x^2 - 7x - \frac{1}{x})$ | $f(x) = \sqrt{5x-1}(x^2 - 8x - 2)$ |

8. Find the derivative using the quotient rule:

| | |
|---|---|
| $f(x) = \frac{4x^2 + 8x - 1}{x^2 - 3x}$ | $f(x) = \frac{7x^2 - 3x - 2}{x^2 - 5x}$ |

9. Find the derivative using the chain rule (may not actually say chain rule so you have to know when to use it):

| | |
|---|---|
| $f(x) = \left(4x^2 - 2x - 1\right)^5$ | $f(x) = \sqrt[3]{x^2 - 5x}$ |
| $f(x) = 2\left(9x^2 - 3x - 1\right)^3$ | $f(x) = \sqrt{x^2 - 3x}$ |

10. Find the second derivative of the given function:

| | |
|---|---|
| $f(x) = x^4 + 2x^3 - x^2 + 4x - 7$ | $f(x) = x^4 + x^3 - 4x^2 + 7x - 2$ |

11. Using implicit differentiation, find the derivative (be sure to solve for y'):

| | |
|---|---|
| $2x^4y^3 - y^5 = -x^2 + y$ | $\frac{9x+3}{4x-y} = 3x$ |
| $x^5y^2 - 2y^4 = -3x^5 + y$ | $\frac{5x-2}{x-2y} = 4x$ |