

Math 2143 - Brief Calculus with Applications

Quiz #14 - 2008.04.01

Solutions

1. Compute the following limit.

$$\lim_{x \rightarrow 1} \frac{\sqrt{x^2 + 4x - 1} - 5}{x + 1} = -\frac{3}{2}$$

2. Compute the following derivative.

$$\frac{d}{dx} \frac{4x^2 + 3x - 1}{7x^3 + 2x - 1} = \frac{(8x + 3)(7x^3 + 2x - 1) - (4x^2 + 3x - 1)(21x^2 + 2)}{(7x^3 + 2x - 1)^2}$$

3. Fill in the blanks for the following statements.

a) If $f(x)$ is increasing and concave down at $x = a$, then $f'(a) > 0$ and $f''(a) < 0$.

b) If $f(x)$ is decreasing and concave up at $x = b$, then $f'(b) < 0$ and $f''(b) > 0$.

c) If $f'(c) = 0$ and $f''(c) > 0$, then $f(x)$ has a local minimum at $x = c$.

d) If $f'(d) = 0$ and $f''(d) < 0$, then $f(x)$ has a local maximum at $x = d$.