

Math 2143 - Brief Calculus with Applications

Quiz #5 - 2008.03.03

Solutions

Compute the following derivatives:

1.

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

This is a simple extended power rule problem:

$$\frac{d}{dx} \sqrt{2x^3 - 3\sqrt{x} + 1} = \frac{1}{2\sqrt{2x^3 - 3\sqrt{x} + 1}} \cdot \left(6x^2 - \frac{3}{2\sqrt{x}} \right)$$

2.

$$\frac{d}{dw} \frac{(w^3 - 2w + 1)^3}{(6w^2 + w - 2)^2}$$

The major operation here is division, so we use the quotient rule:

$$\frac{d}{dw} \frac{(w^3 - 2w + 1)^3}{(6w^2 + w - 2)^2} = \frac{\left[\frac{d}{dw} (w^3 - 2w + 1)^3 \right] \cdot (6w^2 + w - 2)^2 - (w^3 - 2w + 1)^3 \cdot \left[\frac{d}{dw} (6w^2 + w - 2)^2 \right]}{(6w^2 + w - 2)^4}$$

And we can compute the two derivatives in the numerator by the extended power rule:

$$\frac{d}{dw} (w^3 - 2w + 1)^3 = 3(w^3 - 2w + 1)^2 \cdot (3w^2 - 2)$$

$$\frac{d}{dw} (6w^2 + w - 2)^2 = 2(6w^2 + w - 2) \cdot (12w + 1)$$

We would plug these two back into our quotient rule formula above to get the final answer.