

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Differentiate the function $g(x) = x^2 + \frac{1}{x^2}$.

$$g(x) = x^2 + x^{-2}$$

$$g'(x) = 2x - 2x^{-3}$$

(Power Rule
+
Sum Rule)

$$g'(x) = 2x$$

(could also be written as $2x - \frac{2}{x^3}$)

Excellent!

2. Differentiate the function $y = \sqrt{x}(1 - 5x^2 + x^3)$.

$$y = x^{\frac{1}{2}}(1 - 5x^2 + x^3)$$

$$y = x^{\frac{1}{2}} - 5x^{\frac{5}{2}} + x^{\frac{7}{2}}$$

$$y' = \frac{1}{2}x^{-\frac{1}{2}} - \frac{25}{2}x^{\frac{3}{2}} + \frac{7}{2}x^{\frac{5}{2}}$$

$$y' = \frac{1}{2\sqrt{x}} - \frac{25}{2\sqrt{x^3}} + \frac{7}{2\sqrt{x^5}}$$

Great!