Derivative Rules

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1. $\frac{d}{dx}(c) = 0$

2. Power Rule $\frac{d}{dx}\left[x^n\right] = nx^{(n-1)}$

3. Constant Multiple Rule $\frac{d}{dx}\left[c\,f(x)\right] = c\,f'(x)$

4. Sum & Difference Rule $\frac{d}{dx}\left(u \pm v\right) = \frac{du}{dx} \pm \frac{dv}{dx}\Big)$

5. $\frac{d}{dx}\left[e^x\right] = e^x$

**1. If $f(x) = x^{3/2}$, then $f'(4) =$

For 2 - 3, differentiate each function.

2. $\frac{1}{2\sqrt[3]{x^2}} = f(x)$

3. $a(t) = \frac{-\left(t^4\right)}{2} + 3t^3 - 2t$

**4. $\frac{d}{dx}\left(\frac{1}{x^3} - \frac{1}{x} + x^2\right)$ at $x = -1$ is

5. Find $f'(x)$ for $f(x) = 5e^x + 7x^{\pi} - 3$

Notes for Simple Derivatives - Day 1

1) Find g' if $g(x) = \frac{-3x^3}{5} - 4x^2 + 7x - 6.$

2) Find $\frac{dP}{dt}$ if $P = \frac{t^{-4}}{3} - \frac{t^{-3}}{9} + t^2 - 5.$

3) $\frac{d}{dx}\left(\frac{6x^4 - 3x + 14}{x^2}\right)$

4) Find $v'(t)$ if $v(t) = \frac{10}{3\sqrt[4]{t^5}} - t^{2/3}.$

5) Find $\frac{dy}{dx}$ for $y = \frac{-3}{\sqrt[5]{x^2}} + \frac{\sqrt{x}}{4} - 7$

6) State the a) horizontal and b) vertical asymptotes for

$f(x) = \frac{2x^2 + 9x + 4}{2x^3 + 2x^2 - 24x}$.

7) For $y = (2x - 3)^2$, find $y'(-3)$.

Review Notes - Day 2

1) For $y(t) = 16t^2 - 3t + 4$, find $y'(3)$ and verify with your calculator.

2) Find the derivative for $f(x) = \frac{6}{5x^2} + 4x^{2/3} - \sqrt{17}$, and then find the slope at $x = -1$. Verify with your calculator.

3) If $H(x) = \frac{3x^2 - 5x + 2}{\sqrt[3]{x}}$, find $H(-8)$.

4)Determine the second derivative of $f(x) = \frac{-5}{\sqrt[5]{x^2}}$.

5) Find $\frac{d^2y}{(d(x))^2}$ for $y = \frac{5x^4}{6} - 2x^{-3} + \pi x - 9$.