WARMUP

Recall $b^{m/n} = \sqrt[n]{b^m}$

$b^{-n} = \frac{1}{b^n}$

Rewrite each expression in radical form.

1) $x^{3/2} = \sqrt{x^3}$

2) $3x^{7/3} = 3\sqrt[3]{x^7}$

3) $5x^{-2/3} = \frac{5}{x^{2/3}} = \frac{5}{\sqrt[3]{x^2}}$

Rewrite each expression rational form

4) $\sqrt[3]{x^4} = x^{4/3}$

5) $\frac{4}{\sqrt{x^5}} = \frac{4}{x^{5/2}} = 4x^{-5/2}$

Section 3.1 Derivative Rules

$\frac{d}{dx}[c] = 0$

$\frac{d}{dx}[x] = 1 \quad \frac{d}{dx}[cx] = c$

$\frac{d}{dx}[cf(x)] = cf'(x)$

$\frac{d}{dx}[x^n] = nx^{n-1}$

$\frac{d}{dx}[f(x) \pm g(x)] = f'(x) \pm g'(x)$

TRY: Find $f'(x)$ if $f(x) = 3x^4 + 7x^3 - 6x + 2$

$$f'(x) = 12x^3 + 21x^2 - 6$$

$$\frac{d}{dx}\left[3^x\right] =$$

x is in the exponent so we can't use the rules we just learned.

$$= 3^x \cdot \ln 3$$

$$\frac{d}{dx}\left[x^{3.2}\right] = 3.2x^{2.2}$$

$$\frac{d}{dx}\left[9x^{1.1}\right] = 9.9x^{0.1}$$

$y = \sqrt{x}$ find y'

$y = x^{\frac{1}{2}}$

$y' = \frac{1}{2}x^{-\frac{1}{2}}$

$\frac{1}{2} - 1 = \frac{1}{2} - \frac{2}{2} = -\frac{1}{2}$

no negative exponent in answer unless it's an e^{-x}

$y' = \frac{1}{2} \cdot \frac{1}{x^{1/2}}$

$y' = \frac{1}{2\sqrt{x}}$

$$y = \sqrt[3]{x^5} = x^{5/3}$$

$$y' = \frac{5}{3}x^{2/3} = \frac{5}{3}\sqrt[3]{x^2}$$

Find $h'(\theta)$ if $h(\theta) = \frac{1}{\sqrt[3]{\theta^1}} = \frac{1}{\theta^{1/3}} = \theta^{-1/3}$

$$h'(\theta) = -\frac{1}{3}\theta^{-4/3} = -\frac{1}{3\theta^{4/3}}$$

$$= -\frac{1}{3\sqrt[3]{\theta^4}}$$

Assignment: p111 3-11 odd, 13-16, 18, 20, 24