SOLUTIONS CHAPTER 12.2

MATH 132 WI01

2.

Proof. $f(x)$ is a constant! it does not contain any x in its formula, hence

$$f'(x) = 0$$

□

8.

Proof.

$$y' = (4 \cdot x^4)' = 4(x^4)' = 4 \cdot 4x^3 = 16x^3$$

□

28.

Proof.

$$f(x) = \frac{5(x^4 - 3)}{2} = \frac{5}{2}(x^4 - 3)$$

and so

$$f'(x) = (\frac{5}{2}(x^4 - 3))' = \frac{5}{2}(x^4 - 3)' = \frac{5}{2}(4x^3) = 10x^3$$

□

48.

Proof.

$$y = \frac{1}{4x^5} = \frac{1}{4} \cdot \frac{1}{x^5} = \frac{1}{4}x^{-5}$$

and so

$$y' = (\frac{1}{4}x^{-5})' = \frac{1}{4}(x^{-5})' = \frac{1}{4}(-5)x^{-5-1} = -\frac{5}{4}x^{-6}$$

□

74.

Proof.

$$f(x) = \frac{7x^3 + x}{2\sqrt{x}} = \frac{7x^3}{2\sqrt{x}} + \frac{x}{2\sqrt{x}} =$$
$$= \frac{7}{2} \cdot \frac{x^3}{x^{\frac{1}{2}}} + \frac{1}{2} \cdot \frac{1}{x^{\frac{1}{2}}} =$$
$$= \frac{7}{2}x^{3-\frac{1}{2}} + \frac{1}{2}x^{1-\frac{1}{2}} = \frac{7}{2}x^{\frac{5}{2}} + \frac{1}{2}x^{\frac{1}{2}}$$

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and so

$$\begin{aligned} y' &= (\frac{7}{2}x^{\frac{5}{2}} + \frac{1}{2}x^{\frac{1}{2}})' = \\ &= (\frac{7}{2}x^{\frac{5}{2}})' + (\frac{1}{2}x^{\frac{1}{2}})' = \\ &= \frac{7}{2} \cdot (x^{\frac{5}{2}})' + \frac{1}{2} \cdot (x^{\frac{1}{2}})' = \\ &= \frac{7}{2} \cdot \frac{5}{2}x^{\frac{5}{2}-1} + \frac{1}{2} \cdot \frac{1}{2}x^{\frac{1}{2}-1} = \\ &= \frac{35}{4}x^{\frac{3}{2}} + \frac{1}{4}x^{-\frac{1}{2}} \end{aligned}$$

□