Answers to Worksheet 5 - Derivatives II

1) $\dfrac{dy}{dx} = -4x$

2) $\dfrac{dy}{dx} = 6x$

3) $\dfrac{dy}{dx} = \dfrac{8}{3}x^3 - \dfrac{10}{3}x^{\frac{2}{3}} + \dfrac{2}{15}x^{-\frac{3}{5}}$

$$= \dfrac{8x^3}{3} - \dfrac{10x^{\frac{2}{3}}}{3} + \dfrac{2}{15x^{\frac{3}{5}}}$$

4) $f'(x) = \dfrac{25}{3}x^{\frac{2}{3}} - 8x^{-5} + \dfrac{5}{4}x^{-6}$

$$= \dfrac{25x^{\frac{2}{3}}}{3} - \dfrac{8}{x^5} + \dfrac{5}{4x^6}$$

5) $f'(x) = \dfrac{20}{3}x^4 - x^{-2} + \dfrac{5}{2}x^{-6}$

$$= \dfrac{20x^4}{3} - \dfrac{1}{x^2} + \dfrac{5}{2x^6}$$

6) $\dfrac{dy}{dx} = \dfrac{5}{3}x^4 - 16x^3 + x^2$

$$= \dfrac{5x^4}{3} - 16x^3 + x^2$$

7) $f'(x) = \dfrac{16}{3}x^{\frac{1}{3}} - \dfrac{5}{12}x^{-\frac{2}{3}} + 10x^{-3}$

$$= \dfrac{16x^{\frac{1}{3}}}{3} - \dfrac{5}{12x^{\frac{2}{3}}} + \dfrac{10}{x^3}$$

8) $f'(x) = -\dfrac{4}{3}x^{\frac{2}{3}} - \dfrac{1}{2}x^{-\frac{1}{2}} - 4x^{-5}$

$$= -\dfrac{4x^{\frac{2}{3}}}{3} - \dfrac{1}{2x^{\frac{1}{2}}} - \dfrac{4}{x^5}$$

9) $f'(x) = 12x^3 - \dfrac{5}{16}x^{-\frac{3}{4}} + \dfrac{2}{5}x^{-\frac{4}{5}}$

$$= 12x^3 - \dfrac{5}{16x^{\frac{3}{4}}} + \dfrac{2}{5x^{\frac{4}{5}}}$$

10) $f'(x) = -8x^3 + 3 + \dfrac{1}{5}x^{-2}$

$$= -8x^3 + 3 + \dfrac{1}{5x^2}$$

11) $f'(x) = 2x - 5x^{-2} + 2x^{-6}$

$$= 2x - \dfrac{5}{x^2} + \dfrac{2}{x^6}$$

12) $f'(x) = -\dfrac{6}{5}x^2 - \dfrac{5}{4}x^{-\frac{1}{2}} + \dfrac{2}{25}x^{-\frac{3}{5}}$

$$= -\dfrac{6x^2}{5} - \dfrac{5}{4x^{\frac{1}{2}}} + \dfrac{2}{25x^{\frac{3}{5}}}$$

13) $f'(x) = 4x + \cos x + \sin x$

14) $g'(x) = \dfrac{1}{x} - 2\sin x + \dfrac{2}{x^2}$

15) $g'(x) = 3\sin x + \dfrac{5}{x} - 5e^x - \dfrac{4}{x^3}$

 M a d e   w i t h   I n f i n i t e   C a l c u l u s .