

SATPREP

Assignment- Differentiation

Differentiate each function with respect to x .

1) $y = \sin^{-1} 3x^4$

2) $y = \tan^{-1} -4x^4$

3) $y = \cos^{-1} 5x^5$

4) $y = (2x^2 + 1)\sin 5x^3$

5) $y = (2x^5 - 3)\sin 2x^2$

6) $y = \frac{-3x^4 - 2}{\tan 2x^2}$

7) $y = e^{4x^5}(3x^2 + 1)$

8) $y = (2x^3 + 5) \cdot e^{3x^5}$

9) $y = (2x^2 + 1)\ln 4x^4$

10) $y = (x^3 + 2)\log_3 2x^5$



Answers to Assignment- Differentiation

$$1) \frac{dy}{dx} = \frac{1}{\sqrt{1 - (3x^4)^2}} \cdot 12x^3$$

$$= \frac{12x^3}{\sqrt{1 - 9x^8}}$$

$$2) \frac{dy}{dx} = \frac{1}{(-4x^4)^2 + 1} \cdot -16x^3$$

$$= -\frac{16x^3}{16x^8 + 1}$$

$$3) \frac{dy}{dx} = -\frac{1}{\sqrt{1 - (5x^5)^2}} \cdot 25x^4$$

$$= -\frac{25x^4}{\sqrt{1 - 25x^{10}}}$$

$$4) \frac{dy}{dx} = (2x^2 + 1) \cdot \cos 5x^3 \cdot 15x^2 + \sin 5x^3 \cdot 4x$$

$$= x(30x^3 \cos 5x^3 + 15x \cos 5x^3 + 4 \sin 5x^3)$$

$$5) \frac{dy}{dx} = (2x^5 - 3) \cdot \cos 2x^2 \cdot 4x + \sin 2x^2 \cdot 10x^4$$

$$= 2x(4x^5 \cos 2x^2 - 6 \cos 2x^2 + 5x^3 \sin 2x^2)$$

$$6) \frac{dy}{dx} = \frac{\tan 2x^2 \cdot -12x^3 - (-3x^4 - 2) \cdot \sec^2 2x^2 \cdot 4x}{\tan^2 2x^2}$$

$$= \frac{4x(-3x^2 \tan 2x^2 + 3x^4 \sec^2 2x^2 + 2 \sec^2 2x^2)}{\tan^2 2x^2}$$

$$7) \frac{dy}{dx} = e^{4x^5} \cdot 6x + (3x^2 + 1) \cdot e^{4x^5} \cdot 20x^4$$

$$= 2xe^{4x^5}(3 + 30x^5 + 10x^3)$$

$$8) \frac{dy}{dx} = (2x^3 + 5) \cdot e^{3x^5} \cdot 15x^4 + e^{3x^5} \cdot 6x^2$$

$$= 3x^2 e^{3x^5}(10x^5 + 25x^2 + 2)$$

$$9) \frac{dy}{dx} = (2x^2 + 1) \cdot \frac{1}{4x^4} \cdot 16x^3 + \ln 4x^4 \cdot 4x$$

$$= \frac{4(x^2 \ln 4x^4 + 2x^2 + 1)}{x}$$

$$10) \frac{dy}{dx} = (x^3 + 2) \cdot \frac{1}{2x^5 \ln 3} \cdot 10x^4 + \log_3 2x^5 \cdot 3x^2$$

$$= \frac{3x^3 \log_3 2x^5 \cdot \ln 3 + 5x^3 + 10}{x \ln 3}$$

