

Assignment

Date _____ Period _____

Differentiate each function with respect to x .

1) $y = \cos x^5$

2) $y = \sin 3x^3$

3) $y = \tan 4x^5$

4) $y = \tan 4x^4 \cdot (x^5 + 3)$

5) $y = \tan 4x^4$

6) $y = \cos x^3$

$$7) y = \frac{x^5 - 4}{\cos x^4}$$

$$8) y = \frac{-x^4 + 3}{\sin x^3}$$

$$9) y = \frac{\cos 4x^3}{3x^2 + 2}$$

$$10) y = \sin^{-1} 2x^3$$

$$11) y = \sin^{-1} 2x^5$$

$$12) y = \sin^{-1} 5x^5$$

$$13) y = (\cos^{-1} 2x^4)^2$$

$$14) y = (\tan^{-1} 4x^4)^3$$

$$15) y = (\sin^{-1} -5x^5)^2$$

Answers to Assignment (ID: 1)

$$1) \frac{dy}{dx} = -\sin x^5 \cdot 5x^4 \quad 2) \frac{dy}{dx} = \cos 3x^3 \cdot 9x^2 \quad 3) \frac{dy}{dx} = \sec^2 4x^5 \cdot 20x^4$$

$$= -5x^4 \sin x^5 \quad = 9x^2 \cos 3x^3 \quad = 20x^4 \sec^2 4x^5$$

$$4) \frac{dy}{dx} = \tan 4x^4 \cdot 5x^4 + (x^5 + 3) \cdot \sec^2 4x^4 \cdot 16x^3$$

$$= x^3(5x \tan 4x^4 + 16x^5 \sec^2 4x^4 + 48 \sec^2 4x^4)$$

$$5) \frac{dy}{dx} = \sec^2 4x^4 \cdot 16x^3 \quad 6) \frac{dy}{dx} = -\sin x^3 \cdot 3x^2$$

$$= 16x^3 \sec^2 4x^4 \quad = -3x^2 \sin x^3$$

$$7) \frac{dy}{dx} = \frac{\cos x^4 \cdot 5x^4 - (x^5 - 4) \cdot -\sin x^4 \cdot 4x^3}{\cos^2 x^4} \quad 8) \frac{dy}{dx} = \frac{\sin x^3 \cdot -4x^3 - (-x^4 + 3) \cdot \cos x^3 \cdot 3x^2}{\sin^2 x^3}$$

$$= \frac{x^3(5x \cos x^4 + 4x^5 \sin x^4 - 16 \sin x^4)}{\cos^2 x^4} \quad = \frac{x^2(-4x \sin x^3 + 3x^4 \cos x^3 - 9 \cos x^3)}{\sin^2 x^3}$$

$$9) \frac{dy}{dx} = \frac{(3x^2 + 2) \cdot -\sin 4x^3 \cdot 12x^2 - \cos 4x^3 \cdot 6x}{(3x^2 + 2)^2} \quad 10) \frac{dy}{dx} = \frac{1}{\sqrt{1 - (2x^3)^2}} \cdot 6x^2$$

$$= \frac{6x(-6x^3 \sin 4x^3 - 4x \sin 4x^3 - \cos 4x^3)}{(3x^2 + 2)^2} \quad = \frac{6x^2}{\sqrt{1 - 4x^6}}$$

$$11) \frac{dy}{dx} = \frac{1}{\sqrt{1 - (2x^5)^2}} \cdot 10x^4 \quad 12) \frac{dy}{dx} = \frac{1}{\sqrt{1 - (5x^5)^2}} \cdot 25x^4$$

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

$$13) \frac{dy}{dx} = 2 \cos^{-1} 2x^4 \cdot -\frac{1}{\sqrt{1 - (2x^4)^2}} \cdot 8x^3 \quad 14) \frac{dy}{dx} = 3(\tan^{-1} 4x^4)^2 \cdot \frac{1}{(4x^4)^2 + 1} \cdot 16x^3$$

$$= -\frac{16x^3 \cos^{-1} 2x^4}{\sqrt{1 - 4x^8}} \quad = \frac{48x^3 (\tan^{-1} 4x^4)^2}{16x^8 + 1}$$

$$15) \frac{dy}{dx} = 2 \sin^{-1} -5x^5 \cdot \frac{1}{\sqrt{1 - (-5x^5)^2}} \cdot -25x^4$$

$$= -\frac{50x^4 \sin^{-1} -5x^5}{\sqrt{1 - 25x^{10}}}$$