

Quiz 4 Review

Date _____ Period _____

Differentiate each function with respect to x .

1) $y = \sqrt{3x^4 + 1}$

2) $y = \sqrt{2x^4 + 1}$

3) $y = \sqrt[5]{-x^3 - 4}$

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

5) $y = (5x^2 - 4)^{\frac{1}{5}} \cdot (5x^5 + 2)^2$

6) $y = (4x^2 + 1)^{\frac{1}{3}} \cdot (5x + 2)^{\frac{1}{5}}$

7) $y = \frac{3x^5 + 2x^4}{2\sqrt[4]{x} + 4}$

8) $y = \frac{5x^4 + 2x^2}{4x^{\frac{4}{5}} + 2}$

9) $y = \frac{2x^5 + 5x^4}{5\sqrt[3]{x} + 2}$

10) $y = \sin 5x^2 \sin 5x^4$

11) $y = \sin 3x^4 \sin 5x^2$

12) $y = \cos 5x^5 \cos 4x^3$

Answers to Quiz 4 Review

$$1) \frac{dy}{dx} = \frac{1}{2}(3x^4 + 1)^{-\frac{1}{2}} \cdot 12x^3 = \frac{6x^3}{(3x^4 + 1)^{\frac{1}{2}}}$$

$$2) \frac{dy}{dx} = \frac{1}{2}(2x^4 + 1)^{-\frac{1}{2}} \cdot 8x^3 = \frac{4x^3}{(2x^4 + 1)^{\frac{1}{2}}}$$

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

$$4) \frac{dy}{dx} = (-2x^4 + 5)^5 \cdot 2(3x^5 + 1) \cdot 15x^4 + (3x^5 + 1)^2 \cdot 5(-2x^4 + 5)^4 \cdot -8x^3 = 10x^3(-2x^4 + 5)^4(3x^5 + 1)(-18x^5 + 15x - 4)$$

$$5) \frac{dy}{dx} = (5x^2 - 4)^{\frac{1}{5}} \cdot 2(5x^5 + 2) \cdot 25x^4 + (5x^5 + 2)^2 \cdot \frac{1}{5}(5x^2 - 4)^{-\frac{4}{5}} \cdot 10x = \frac{4x(5x^5 + 2)(65x^5 - 50x^3 + 1)}{(5x^2 - 4)^{\frac{4}{5}}}$$

$$6) \frac{dy}{dx} = (4x^2 + 1)^{\frac{1}{3}} \cdot \frac{1}{5}(5x + 2)^{-\frac{4}{5}} \cdot 5 + (5x + 2)^{\frac{1}{5}} \cdot \frac{1}{3}(4x^2 + 1)^{-\frac{2}{3}} \cdot 8x = \frac{52x^2 + 3 + 16x}{3(5x + 2)^{\frac{4}{5}} \cdot (4x^2 + 1)^{\frac{2}{3}}}$$

$$7) \frac{dy}{dx} = \frac{\left(2x^4 + 4\right)(15x^4 + 8x^3) - (3x^5 + 2x^4) \cdot \frac{1}{2}x^{-\frac{3}{4}}}{\left(2x^4 + 4\right)^2} = \frac{57x^{\frac{17}{4}} + 120x^4 + 30x^{\frac{13}{4}} + 64x^3}{8x^{\frac{1}{2}} + 32x^{\frac{1}{4}} + 32}$$

$$8) \frac{dy}{dx} = \frac{\left(4x^{\frac{4}{5}} + 2\right)(20x^3 + 4x) - (5x^4 + 2x^2) \cdot \frac{16}{5}x^{-\frac{1}{5}}}{\left(4x^{\frac{4}{5}} + 2\right)^2} = \frac{80x^{\frac{19}{5}} + 50x^3 + 12x^{\frac{9}{5}} + 10x}{20x^{\frac{8}{5}} + 20x^{\frac{4}{5}} + 5}$$

$$9) \frac{dy}{dx} = \frac{\left(5x^{\frac{1}{3}} + 2\right)(10x^4 + 20x^3) - (2x^5 + 5x^4) \cdot \frac{5}{3}x^{-\frac{2}{3}}}{\left(5x^{\frac{1}{3}} + 2\right)^2} = \frac{140x^{\frac{13}{3}} + 60x^4 + 275x^{\frac{10}{3}} + 120x^3}{75x^{\frac{2}{3}} + 60x^{\frac{1}{3}} + 12}$$

$$10) \frac{dy}{dx} = \sin 5x^2 \cdot \cos 5x^4 \cdot 20x^3 + \sin 5x^4 \cdot \cos 5x^2 \cdot 10x$$

$$= 10x(2x^2 \sin 5x^2 \cos 5x^4 + \sin 5x^4 \cos 5x^2)$$

$$11) \frac{dy}{dx} = \sin 3x^4 \cdot \cos 5x^2 \cdot 10x + \sin 5x^2 \cdot \cos 3x^4 \cdot 12x^3$$

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

$$12) \frac{dy}{dx} = \cos 5x^5 \cdot -\sin 4x^3 \cdot 12x^2 + \cos 4x^3 \cdot -\sin 5x^5 \cdot 25x^4$$

$$= x^2(-12 \cos 5x^5 \sin 4x^3 - 25x^2 \cos 4x^3 \sin 5x^5)$$