

Mixed Derivatives Practice

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Differentiate each function with respect to x .

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

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

3) $f(x) = (x^3 + 5)^5$

4) $y = \cos 5x^2$

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

6) $y = \frac{\csc x^2}{2x^3 - 5}$

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

8) $y = \sec 2x^5 \cdot (-x^3 - 2)$

Answers to Mixed Derivatives Practice

$$1) \frac{dy}{dx} = 3(-2x^5 + 3)^2 \cdot -10x^4 = -30x^4(-2x^5 + 3)^2$$

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

$$3) f'(x) = 5(x^3 + 5)^4 \cdot 3x^2 = 15x^2(x^3 + 5)^4$$

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

$$5) f'(x) = (5x^2 - 4) \cdot -5(-3x - 2)^{-6} \cdot -3 + (-3x - 2)^{-5} \cdot 10x = \frac{5(9x^2 - 12 - 4x)}{(-3x - 2)^6}$$

$$6) \frac{dy}{dx} = \frac{(2x^3 - 5) \cdot -\csc x^2 \cot x^2 \cdot 2x - \csc x^2 \cdot 6x^2}{(2x^3 - 5)^2} = \frac{2x \csc x^2 \cdot (-2x^3 \cot x^2 + 5 \cot x^2 - 3x)}{(2x^3 - 5)^2}$$

$$7) f'(x) = \frac{(-3x^4 + 2)^2 \cdot 15x^4 - (3x^5 + 2) \cdot 2(-3x^4 + 2) \cdot -12x^3}{((-3x^4 + 2)^2)^2} = \frac{3x^3(9x^5 + 10x + 16)}{(-3x^4 + 2)^3}$$

$$8) \frac{dy}{dx} = \sec 2x^5 \cdot -3x^2 + (-x^3 - 2) \cdot \sec 2x^5 \cdot \tan 2x^5 \cdot 10x^4 = x^2 \sec 2x^5 \cdot (-3 - 10x^5 \tan 2x^5 - 20x^2 \tan 2x^5)$$