Calculus Name_____ ID: 1

Quotient Rule Extra Practice

Date_____ Period____

Differentiate each function with respect to *x*.

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

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

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

4) $y = \frac{2x^5 + 2x^4}{5x^5 + 3}$

5) $y = \frac{2x^5 + 5x^4 - 5x^3}{3x^5 + 3}$

6) $y = \dfrac{3x^4 - 2x^3 + 4x^2}{x^3 + 2}$

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Differentiate each function with respect to *x*.

1) $y = \dfrac{5}{5x^2 + 2}$

$$\frac{dy}{dx} = -\frac{5 \cdot 10x}{(5x^2 + 2)^2}$$
$$= -\frac{50x}{25x^4 + 20x^2 + 4}$$

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

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

3) $y = \dfrac{x^2 + 2}{2x^4 - 3}$

$$\frac{dy}{dx} = \frac{(2x^4 - 3) \cdot 2x - (x^2 + 2) \cdot 8x^3}{(2x^4 - 3)^2}$$
$$= \frac{-4x^5 - 16x^3 - 6x}{4x^8 - 12x^4 + 9}$$

4) $y = \dfrac{2x^5 + 2x^4}{5x^5 + 3}$

$$\frac{dy}{dx} = \frac{(5x^5 + 3)(10x^4 + 8x^3) - (2x^5 + 2x^4) \cdot 25x^4}{(5x^5 + 3)^2}$$
$$= \frac{-10x^8 + 30x^4 + 24x^3}{25x^{10} + 30x^5 + 9}$$

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

$$\frac{dy}{dx} = \frac{(3x^5 + 3)(10x^4 + 20x^3 - 15x^2) - (2x^5 + 5x^4 - 5x^3) \cdot 15x^4}{(3x^5 + 3)^2}$$
$$= \frac{-5x^8 + 10x^7 + 10x^4 + 20x^3 - 15x^2}{3x^{10} + 6x^5 + 3}$$

6) $y = \dfrac{3x^4 - 2x^3 + 4x^2}{x^3 + 2}$

$$\frac{dy}{dx} = \frac{(x^3 + 2)(12x^3 - 6x^2 + 8x) - (3x^4 - 2x^3 + 4x^2) \cdot 3x^2}{(x^3 + 2)^2}$$

$$= \frac{3x^6 - 4x^4 + 24x^3 - 12x^2 + 16x}{x^6 + 4x^3 + 4}$$