

Topic 8: Quotient Rule

Find the derivative of each function.

$$1. f(x) = \frac{3x-2}{5x+1}$$

$$2. f(x) = \frac{x-2}{x^2+x+1}$$

$$3. f(x) = \frac{3x-6\sqrt{x}}{5x^2-2}$$

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

$$5. f(x) = (x^2-1)\frac{x^3+3x^2}{x^2+2}$$

Answers

$$1) f'(x) = \frac{3(5x+1) - (3x-2)5}{(5x+1)^2} = \frac{13}{(5x+1)^2}$$

$$2) f'(x) = \frac{1(x^2+x+1) - (x-2)(2x+1)}{(x^2+x+1)^2} = \frac{-x^2+4x+3}{(x^2+x+1)^2}$$

$$3) f'(x) = \frac{(3-3x^{-1/2})(5x^2-2) - (3x-6\sqrt{x})(10x)}{(5x^2-2)^2}$$

$$4) f'(x) = \frac{(2x-1)(x^2-5x+1) - (x^2-x-2)(2x-5)}{(x^2-5x+1)^2} = \frac{-4x^2+6x-11}{(x^2-5x+1)^2}$$

$$5) f'(x) = (2x)\left(\frac{x^3+3x^2}{x^2+2}\right) + (x^2-1)\frac{(3x^2+6x)(x^2+2) - (x^3+3x^2)(2x)}{(x^2+2)^2}$$