

1. Use the product rule to find each derivative.

(a) $f(x) = (3x-1)(2x+5)$	(c) $f(x) = (x^3 + 5)(3x^2 - 7)$
(b) $f(x) = x^3 e^x$	(d) $f(x) = (2\sqrt{x} - 3)(x^3 - 5e^x)$ Note: Just use the product rule; do not simplify your answer.

2. If f is a differentiable function of x and $g(x) = \sqrt[3]{x} f(x)$,

(a) Find an expression for the derivative of $g(x)$ in terms of $f(x)$ and $f'(x)$.

(b) If it is known that $f(8) = 12$ and $f'(8) = 5$, find $g'(8)$.

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3. Differentiate each quotient and simplify your results.

(a) $f(x) = \frac{3x+1}{3x-1}$	(c) $f(x) = \frac{x^2+8x+7}{\sqrt{x}}$
(b) $f(x) = \frac{x}{x^2+1}$	(d) $f(x) = \frac{x^2+x-2}{x^2+5}$

4. Find the equation of the tangent line to the function $f(x) = \frac{x^2+1}{x-1}$ when $x = 3$ on the curve.

Answers

<p>1. (a) $(3x-1)2 + (2x+5)3 = 12x+13$ (b) $x^3e^x + e^x3x^2 = x^2e^x(x+3)$ (c) $(x^3+5)(6x) + (3x^2-7)(3x^2)$ $= 15x^4 - 21x^2 + 30x = 3x(5x^3 - 7x + 10)$ (d) $(2\sqrt{x}-3)(3x^2-5e^x) + \frac{x^3-5e^x}{\sqrt{x}}$</p>	<p>2. (a) $x^{1/3}f'(x) + \frac{f(x)}{3x^{2/3}}$ (b) 11 3. (a) $-\frac{6}{(3x-1)^2}$ (b) $\frac{1-x^2}{(x^2+1)^2}$</p>	<p>3. (c) $\frac{3}{2}x^{1/2} + \frac{4}{x^{1/2}} - \frac{7}{2x^{3/2}}$ (d) $\frac{-x^2+14x+5}{(x^2+5)^2}$ 4. $y = \frac{1}{2}x + \frac{7}{2}$</p>
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