



Differentiate products using the product rule

- 1** Find the derivative $f'(x)$ using the power rule.

$$\text{if } f(x) = x^n, f'(x) = n x^{n-1}$$

$$[12pt] f(x) = x^3$$

A

$$f'(x) = 3x^4$$

B

$$f'(x) = 3x^2$$

C

$$f'(x) = 3x^3$$

D

$$f'(x) = x^2$$

- 2** Find the derivative $f'(x)$ using the product rule.

$$\text{if } h(x) = f(x)g(x), h'(x) = f'(x)g(x) + f(x)g'(x)$$

$$[12pt] f(x) = \left(\frac{3}{x^3} - 4\right)(2x^2 - 3)$$

A

$$f'(x) = (-9x^{-4})(2x^2 - 3)$$

B

$$f'(x) = (-9x^{-4})(2x^2 - 3) - (3x^{-3} - 4)(4x)$$

C

$$f'(x) = (-9x^{-4})(4x)$$

D

$$f'(x) = (-9x^{-4})(2x^2 - 3) + (3x^{-3} - 4)(4x)$$

- 3** Find the derivative $f'(x)$ using the product rule.

$$f(x) = (-4x^{\frac{1}{2}} + 3)(5x^2)$$

A

$$f'(x) = (-2x^{-\frac{1}{2}})(5x^2) - (-4x^{\frac{1}{2}} + 3)(10x)$$

B

$$f'(x) = (-2x^{-\frac{1}{2}})(5x^2) + (-4x^{\frac{1}{2}} + 3)(10x)$$

C

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

D

$$f'(x) = (-2x^{-\frac{1}{2}})(10x)$$

- 4** Find the derivative $f'(x)$ using the product rule.

$$f(x) = (2x^{-\frac{3}{2}} - 4)(3x + 6)$$

A

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

B

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

C

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

D

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



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5Find the derivative $f'(x)$ using the product rule.

$$f(x) = (4x^3 + 5)(3x^2)$$

A $f'(x) = (12x^2)(3x^2) + (4x^3 + 5)(6x)$

B $f'(x) = (12x^2)(3x^2) - (4x^3 + 5)(6x)$

C $f'(x) = (12x^2)(3x^2)$

D $f'(x) = (12x^2)(6x)$

6Find the derivative $f'(x)$ using the product rule.

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

A $f'(x) = (8x^{-3})(3x) - (-4x^{-2} + 3)(3)$

B $f'(x) = (8x^{-3})(3x)$

C $f'(x) = (8x^{-3})(3)$

D $f'(x) = (8x^{-3})(3x) + (-4x^{-2} + 3)(3)$

7Find the derivative $f'(x)$ using the product, natural exponential, and trigonometric rules.

$$f(x) = (2e^x)(\sin(x))$$

A $f'(x) = (2e^x)(\sin(x)) - (2e^x)(\cos(x))$

B $f'(x) = (2e^x)(\sin(x)) + (2e^x)(\cos(x))$

C $f'(x) = (2e^x)(\cos(x))$

D $f'(x) = (2e^x)(\sin(x))$

8Find the derivative $f'(x)$ using the product, natural exponential, and general exponential rules.

$$f(x) = (2e^x)(3 \cdot 7^x)$$

A $f'(x) = (2e^x)(3 \cdot 7^x \ln 7)$

B $f'(x) = (2e^x)(3 \cdot 7^x) + (2e^x)(3 \cdot 7^x \ln 7)$

C $f'(x) = (2e^x)(3 \cdot 7^x)$

D $f'(x) = (2e^x)(3 \cdot 7^x) - (2e^x)(3 \cdot 7^x \ln 7)$



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9Find the derivative $f'(x)$ using the product, general exponential, and trigonometric rules.

$$f(x) = (2 \cdot 3^x)(5 \sin(x))$$

- A $f'(x) = (2 \cdot 3^x \ln 3)(5 \sin(x)) + (2 \cdot 3^x)(5 \cos(x))$
- B $f'(x) = (2 \cdot 3^x \ln 3)(5 \sin(x))$
- C $f'(x) = (2 \cdot 3^x \ln 3)(5 \cos(x))$
- D $f'(x) = (2 \cdot 3^x)(5 \cos(x))$

10Find the derivative $f'(x)$ using the product rule.

if $h(x) = f(x)g(x)$, $h'(x) = f'(x)g(x) + f(x)g'(x)$

$$[12pt]f(x) = \left(-\frac{2}{x^2} - 6\right)(2x^2)$$

- A $f'(x) = (4x^{-3})(2x^2) + (-2x^{-2} - 6)(4x)$
- B $f'(x) = (4x^{-3})(2x^2)$
- C $f'(x) = (4x^{-3})(2x^2) - (-2x^{-2} - 6)(4x)$
- D $f'(x) = (4x^{-3})(4x)$

11Find the derivative $f'(x)$ using the product rule.

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

- A $f'(x) = \left(-\frac{4}{3}x^{-\frac{1}{3}}\right)(2x + 4)$
- B $f'(x) = \left(-\frac{4}{3}x^{-\frac{1}{3}}\right)(2)$
- C $f'(x) = \left(-\frac{4}{3}x^{-\frac{1}{3}}\right)(2x + 4) - (-2x^{\frac{2}{3}} - 7)(2)$
- D $f'(x) = \left(-\frac{4}{3}x^{-\frac{1}{3}}\right)(2x + 4) + (-2x^{\frac{2}{3}} - 7)(2)$