



Derivative Rules - Intro

- 1** Find the derivative $f'(x)$ using the sum rule.
if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = 3x^2 + 4x - 2x^3$

A $f'(x) = 6x + 4 - 6x^2$

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

C $f'(x) = 3x + 4 - 2x^2$

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

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

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

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

C $f'(x) = -12x^2 + 6x$

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

if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = -5x^{-3} - 2x^2 + 5$

A $f'(x) = 15x^{-4} - 4x$

B $f'(x) = 15x^{-4} - 4x + 5$

C $f'(x) = 15x^{-3} - 4x^2$

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

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

$$f(x) = 3x^{-1} + 5x$$

A $f'(x) = -3x^{-2} + 5$

B $f'(x) = 3x^{-2} + 5$

C $f'(x) = -3x^{-1} + 5x$

- 5** Find the derivative $f'(x)$ using the sum rule.

if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = -3x^{\frac{2}{3}} + 3x - 3$

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

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

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

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

- 6** Find the derivative $f'(x)$ using the sum rule.

if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = -\frac{2}{x^3} - 5x^2$

A $f'(x) = 6x^{-3} - 10x^2$

B $f'(x) = 6x^{-4} - 10x$

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



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- 7** Find the derivative $f'(x)$ using the sum rule.

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

A

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

B

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

C

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

D

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

- 10** Find the derivative $f'(x)$ using the sum rule.

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

A

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

B

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

C

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

- 11** Find the derivative $f'(x)$ using the sum rule.
if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = 4\sqrt[3]{x^4} + 5$

A

$$f'(x) = \frac{16}{3}x^{\frac{1}{3}} + 5$$

B

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

C

$$f'(x) = \frac{16}{3}x^{\frac{4}{3}}$$

D

$$f'(x) = \frac{16}{3}x^{\frac{1}{3}}$$

- 8** Find the derivative $f'(x)$ using the sum rule.

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

A

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

B

$$f'(x) = -4x^{-3} + 6x$$

C

$$f'(x) = -4x^{-2} + 6x^2$$

- 9** Find the derivative $f'(x)$ using the sum rule.

if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = -5x^{-\frac{4}{3}} - 4 + 3x$

A

$$f'(x) = \frac{20}{3}x^{-\frac{7}{3}} + 3$$

B

$$f'(x) = \frac{20}{3}x^{-\frac{7}{3}} + 3 - 4$$

C

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

D

$$f'(x) = \frac{20}{3}x^{-\frac{4}{3}} + 3x$$

- 12** Find the derivative $f'(x)$ using the sum rule.

if $h(x) = f(x) + g(x)$, $h'(x) = f'(x) + g'(x)$
[12pt] $f(x) = \frac{3}{\sqrt[3]{x}} + 5x$

A

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

B

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

C

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



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13 Find the derivative $f'(x)$ using the sum rule.

$$f(x) = 4\sqrt{x} + 5$$

A

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

B

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

C

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

D

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

14 Find the derivative $f'(x)$ using the sum rule.

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

A

$$f'(x) = -\frac{9}{2}x^{-\frac{5}{2}} - 6x - 4$$

B

$$f'(x) = -\frac{9}{2}x^{-\frac{5}{2}} - 6x$$

C

$$f'(x) = -\frac{9}{2}x^{-\frac{3}{2}} - 6x^2$$

D

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

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

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

$$[12pt] f(x) = (2x^4 + 2)(-3x^2 - 4)$$

A

$$f'(x) = (8x^3)(-3x^2 - 4) - (2x^4 + 2)(-6x)$$

B

$$f'(x) = (8x^3)(-3x^2 - 4) + (2x^4 + 2)(-6x)$$

C

$$f'(x) = (8x^3)(-6x)$$

D

$$f'(x) = (8x^3)(-3x^2 - 4)$$

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

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

$$[12pt] f(x) = (-5x^{-3} + 2)(4x^2)$$

A

$$f'(x) = (15x^{-4})(4x^2)$$

B

$$f'(x) = (15x^{-4})(8x)$$

C

$$f'(x) = (15x^{-4})(4x^2) - (-5x^{-3} + 2)(8x)$$

D

$$f'(x) = (15x^{-4})(4x^2) + (-5x^{-3} + 2)(8x)$$



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

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

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

B $f'(x) = (-6x)(-3x - 4)$

C $f'(x) = (-6x)(-3)$

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

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

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

A $f'(x) = (-15x^{-4})(-2x - 3)$

B $f'(x) = (-15x^{-4})(-2)$

C $f'(x) = (-15x^{-4})(-2x - 3) + (5x^{-3} + 6)(-2)$

D $f'(x) = (-15x^{-4})(-2x - 3) - (5x^{-3} + 6)(-2)$

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

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

$$[12pt] f(x) = (-2x^{\frac{1}{3}} + 6)(-5x)$$

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

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

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

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

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

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

A $f'(x) = (-2x^{-\frac{1}{3}})(-4x - 7)$

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

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

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



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21 Find 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] $f(x) = (\frac{3}{x^2} - 2)(2x - 5)$

A $f'(x) = (-6x^{-3})(2x - 5) - (3x^{-2} - 2)(2)$

B $f'(x) = (-6x^{-3})(2)$

C $f'(x) = (-6x^{-3})(2x - 5)$

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

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

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

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

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

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

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

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

A $f'(x) = (-\frac{9}{2}x^{-\frac{5}{2}})(-5x + 5) + (3x^{-\frac{3}{2}} - 4)(-5)$

B $f'(x) = (-\frac{9}{2}x^{-\frac{5}{2}})(-5x + 5)$

C $f'(x) = (-\frac{9}{2}x^{-\frac{5}{2}})(-5)$

D $f'(x) = (-\frac{9}{2}x^{-\frac{5}{2}})(-5x + 5) - (3x^{-\frac{3}{2}} - 4)(-5)$

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

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

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

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

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

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



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25 Find 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] $f(x) = (4\sqrt{x} - 2)(-2x)$

A

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

B

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

C

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

D

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

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

$$f(x) = (-3\sqrt[3]{x} + 6)(-4x)$$

A

$$f'(x) = (-x^{-\frac{2}{3}})(-4x) + (-3x^{\frac{1}{3}} + 6)(-4)$$

B

$$f'(x) = (-x^{-\frac{2}{3}})(-4x) - (-3x^{\frac{1}{3}} + 6)(-4)$$

C

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

D

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

27 Find 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] $f(x) = (-\frac{5}{\sqrt{x^3}} - 2)(4x - 5)$

A

$$f'(x) = (\frac{15}{2}x^{-\frac{5}{2}})(4x - 5) - (-5x^{-\frac{3}{2}} - 2)(4)$$

B

$$f'(x) = (\frac{15}{2}x^{-\frac{5}{2}})(4)$$

C

$$f'(x) = (\frac{15}{2}x^{-\frac{5}{2}})(4x - 5)$$

D

$$f'(x) = (\frac{15}{2}x^{-\frac{5}{2}})(4x - 5) + (-5x^{-\frac{3}{2}} - 2)(4)$$

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

$$f(x) = (-\frac{5}{\sqrt[3]{x^4}} - 3)(-4x - 2)$$

A

$$f'(x) = (\frac{20}{3}x^{-\frac{7}{3}})(-4x - 2) + (-5x^{-\frac{4}{3}} - 3)(-4)$$

B

$$f'(x) = (\frac{20}{3}x^{-\frac{7}{3}})(-4x - 2)$$

C

$$f'(x) = (\frac{20}{3}x^{-\frac{7}{3}})(-4x - 2) - (-5x^{-\frac{4}{3}} - 3)(-4)$$

D

$$f'(x) = (\frac{20}{3}x^{-\frac{7}{3}})(-4)$$



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29 Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt]f(x) = \frac{-2x^4 - 5}{4x}$$

A
$$f'(x) = \frac{(-2x^4 - 5)(4) - (-8x^3)(4x)}{(4x)^2}$$

B
$$f'(x) = \frac{(-8x^3)(4x) + (-2x^4 - 5)(4)}{(4x)^2}$$

C
$$f'(x) = \frac{(-8x^3)(4x) - (-2x^4 - 5)(4)}{(4x)}$$

D
$$f'(x) = \frac{(-8x^3)(4x) - (-2x^4 - 5)(4)}{(4x)^2}$$

30 Find the derivative $f'(x)$ using the quotient rule.

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

A
$$f'(x) = \frac{(3x^3 + 7)(-3) - (9x^2)(-3x - 4)}{(-3x - 4)^2}$$

B
$$f'(x) = \frac{(9x^2)(-3x - 4) - (3x^3 + 7)(-3)}{(-3x - 4)^2}$$

C
$$f'(x) = \frac{(9x^2)(-3x - 4) + (3x^3 + 7)(-3)}{(-3x - 4)^2}$$

D
$$f'(x) = \frac{(9x^2)(-3x - 4) - (3x^3 + 7)(-3)}{(-3x - 4)}$$

31 Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt]f(x) = \frac{-4x^{-2} + 2}{-2x^2 - 7}$$

A
$$f'(x) = \frac{(8x^{-3})(-2x^2 - 7) - (-4x^{-2} + 2)(-4x)}{(-2x^2 - 7)}$$

B
$$f'(x) = \frac{(8x^{-3})(-2x^2 - 7) + (-4x^{-2} + 2)(-4x)}{(-2x^2 - 7)^2}$$

C
$$f'(x) = \frac{(8x^{-3})(-2x^2 - 7) - (-4x^{-2} + 2)(-4x)}{(-2x^2 - 7)^2}$$

D
$$f'(x) = \frac{(-4x^{-2} + 2)(-4x) - (8x^{-3})(-2x^2 - 7)}{(-2x^2 - 7)^2}$$

32 Find the derivative $f'(x)$ using the quotient rule.

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

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

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

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

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



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33 Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{3x^{\frac{4}{3}} + 4}{-5x^2 - 2}$$

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

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

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

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

34 Find the derivative $f'(x)$ using the quotient rule.

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

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

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

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

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

35 Find the derivative $f'(x)$ using the quotient rule.

$$\text{if } h(x) = \frac{f(x)}{g(x)}, \quad h'(x) = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

$$[12pt] f(x) = \frac{\frac{5}{x^2} - 7}{-4x^2 + 6}$$

A
$$f'(x) = \frac{(-10x^{-3})(-4x^2 + 6) - (5x^{-2} - 7)(-8x)}{(-4x^2 + 6)^2}$$

B
$$f'(x) = \frac{(-10x^{-3})(-4x^2 + 6) + (5x^{-2} - 7)(-8x)}{(-4x^2 + 6)^2}$$

C
$$f'(x) = \frac{(-10x^{-3})(-4x^2 + 6) - (5x^{-2} - 7)(-8x)}{(-4x^2 + 6)}$$

D
$$f'(x) = \frac{(5x^{-2} - 7)(-8x) - (-10x^{-3})(-4x^2 + 6)}{(-4x^2 + 6)^2}$$

36 Find the derivative $f'(x)$ using the quotient rule.

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

A
$$f'(x) = \frac{(-9x^{-4})(3x^2) - (3x^{-3} - 2)(6x)}{(3x^2)^2}$$

B
$$f'(x) = \frac{(-9x^{-4})(3x^2) + (3x^{-3} - 2)(6x)}{(3x^2)^2}$$

C
$$f'(x) = \frac{(-9x^{-4})(3x^2) - (3x^{-3} - 2)(6x)}{(3x^2)}$$

D
$$f'(x) = \frac{(3x^{-3} - 2)(6x) - (-9x^{-4})(3x^2)}{(3x^2)^2}$$