



Basic Derivatives - Practice

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

if $f(x) = ax^n$, $f'(x) = anx^{n-1}$

[12pt] $f(x) = 3x^6$

A

$$f'(x) = 18x^7$$

B

$$f'(x) = 18x^5$$

C

$$f'(x) = 3x^5$$

D

$$f'(x) = 18x^6$$

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

if $f(x) = ax^n$, $f'(x) = anx^{n-1}$

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

A

$$f'(x) = 12x^{-5}$$

B

$$f'(x) = 12x^{-3}$$

C

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

D

$$f'(x) = 12x^{-4}$$

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

$$f(x) = 4x^5$$

A

$$f'(x) = 20x^5$$

B

$$f'(x) = 20x^6$$

C

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

D

$$f'(x) = 20x^4$$

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

$$f(x) = -7x^{-1}$$

A

$$f'(x) = 7x^{-2}$$

B

$$f'(x) = 7$$

C

$$f'(x) = 7x^{-1}$$

D

$$f'(x) = -7x^{-2}$$



Basic Derivatives - Practice

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

if $f(x) = ax^n$, $f'(x) = anx^{n-1}$

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

A

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

B

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

C

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

D

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

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

if $f(x) = ax^n$, $f'(x) = anx^{n-1}$

[12pt] $f(x) = -9x^{-\frac{4}{3}}$

A

$$f'(x) = 12x^{-\frac{1}{3}}$$

B

$$f'(x) = 12x^{-\frac{7}{3}}$$

C

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

D

$$f'(x) = 12x^{-\frac{4}{3}}$$

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

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

A

$$f'(x) = \frac{45}{2}x^{\frac{5}{2}}$$

B

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

C

$$f'(x) = \frac{45}{2}x^{\frac{3}{2}}$$

D

$$f'(x) = \frac{45}{2}x^{\frac{7}{2}}$$

- 9** Rewrite the function as a single power of x .

$$\frac{1}{x^n} = x^{-n}$$

[12pt] $f(x) = \frac{1}{x^1}$

A

$$-x^{-1}$$

B

$$x^{-1}$$

C

$$\frac{1}{x}$$

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

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

A

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

B

$$f'(x) = \frac{27}{2}x^{-\frac{5}{2}}$$

C

$$f'(x) = \frac{27}{2}x^{-\frac{3}{2}}$$

D

$$f'(x) = \frac{27}{2}x^{-\frac{1}{2}}$$



Basic Derivatives - Practice

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

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

$$[12pt] f(x) = \frac{1}{x^5}$$

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

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

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

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

13 Rewrite the function as a single power of x .

$$\frac{1}{x^n} = x^{-n}$$
$$[12pt] f(x) = \frac{3}{x^4}$$

A $3x^{-4}$

B $3x^4$

C $3x^{-\frac{1}{4}}$

D $-3x^{-4}$

14 Rewrite the function as a single power of x .

$$f(x) = \frac{7}{x^1}$$

A $7x$

B $7x^{-1}$

C $-7x^{-1}$

11 Rewrite the function as a single power of x .

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

A x^{-4}

B $-x^{-4}$

C x^4

D $x^{-\frac{1}{4}}$

12 Find the derivative $f'(x)$ using the power rule.

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

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

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

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

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

15 Rewrite the function as a single power of x .

$$\sqrt[n]{x^m} = x^{\frac{m}{n}}$$
$$[12pt] f(x) = \sqrt{x^3}$$

A x^2

B $x^{\frac{3}{2}}$

C $x^{-\frac{3}{2}}$

D $x^{\frac{2}{3}}$

**Basic Derivatives - Practice**

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

if $f(x) = ax^n$, $f'(x) = anx^{n-1}$

[12pt] $f(x) = \frac{3}{x^1}$

A

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

B

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

C

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

D

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

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

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

A

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

B

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

C

$$f'(x) = 6x^{-1}$$

D

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

18 Rewrite the function as a single power of x .

$\sqrt[5]{x^m} = x^{\frac{m}{5}}$
[12pt] $f(x) = \frac{1}{\sqrt{x}}$

A

$$x^{-2}$$

B

$$x^{-\frac{1}{2}}$$

C

$$x^{\frac{1}{2}}$$

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

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

[12pt] $f(x) = \sqrt{x^5}$

A

$$f'(x) = \frac{5}{2}x^{\frac{7}{2}}$$

B

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

C

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

D

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

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

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

[12pt] $f(x) = \frac{1}{\sqrt{x}}$

A

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

B

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

C

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

D

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

21 Rewrite the function as a single power of x .

$$f(x) = \sqrt{x^3}$$

A

$$x^2$$

B

$$x^{\frac{2}{3}}$$

C

$$x^{\frac{3}{2}}$$

D

$$x^{-\frac{3}{2}}$$



Basic Derivatives - Practice

22 Rewrite the function as a single power of x .

$$f(x) = \frac{1}{\sqrt{x}}$$

- | | |
|---------------------|----------------------|
| A $x^{\frac{1}{2}}$ | B $x^{-\frac{1}{2}}$ |
| C x^{-2} | |

23 Find the derivative $f'(x)$ using the power rule.

$$f(x) = \sqrt[3]{x^5}$$

- | | |
|--|--|
| A $f'(x) = x^{\frac{2}{3}}$ | B $f'(x) = \frac{5}{3}x^{\frac{2}{3}}$ |
| C $f'(x) = \frac{5}{3}x^{\frac{5}{3}}$ | D $f'(x) = \frac{5}{3}x^{\frac{8}{3}}$ |

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

$$f(x) = \frac{1}{\sqrt{x}}$$

- | | |
|--|--|
| A $f'(x) = -\frac{1}{2}x^{-\frac{3}{2}}$ | B $f'(x) = x^{-\frac{3}{2}}$ |
| C $f'(x) = -\frac{1}{2}x^{\frac{1}{2}}$ | D $f'(x) = -\frac{1}{2}x^{-\frac{1}{2}}$ |

25 Rewrite the function as a single power of x .

$$\sqrt[n]{x^m} = x^{\frac{m}{n}}$$

$$[12pt]f(x) = -6\sqrt{x^5}$$

- | | |
|------------------------|-----------------------|
| A $-6x^{\frac{2}{5}}$ | B $-6x^{\frac{5}{2}}$ |
| C $-6x^{-\frac{5}{2}}$ | D $-6x^2$ |

26 Rewrite the function as a single power of x .

$$\sqrt[n]{x^m} = x^{\frac{m}{n}}$$

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

- | | |
|-----------------------|------------------------|
| A $-4x^{-2}$ | B $-4x^{-\frac{2}{3}}$ |
| C $-4x^{\frac{3}{2}}$ | D $-4x^{-\frac{3}{2}}$ |

28 Rewrite the function as a single power of x .

$$f(x) = 5\sqrt{x^3}$$

- | | |
|----------------------|-----------------------|
| A $5x^{\frac{3}{2}}$ | B $5x^2$ |
| C $5x^{\frac{2}{3}}$ | D $5x^{-\frac{3}{2}}$ |

27 Find the derivative $f'(x)$ using the power rule.

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

$$[12pt]f(x) = -5\sqrt[3]{x}$$

- | |
|--|
| A $f'(x) = -\frac{5}{3}x^{\frac{4}{3}}$ |
| B $f'(x) = -\frac{5}{3}x^{-\frac{2}{3}}$ |
| C $f'(x) = -5x^{-\frac{2}{3}}$ |
| D $f'(x) = -\frac{5}{3}x^{\frac{1}{3}}$ |

**Basic Derivatives - Practice**

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

if $f(x) = ax^n$, $f'(x) = anx^{n-1}$

[12pt] $f(x) = -\frac{9}{\sqrt[3]{x}}$

A

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

B

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

C

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

D

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

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

$$f(x) = \frac{9}{\sqrt{x}}$$

A

$$f'(x) = -\frac{9}{2}x^{-\frac{1}{2}}$$

B

$$f'(x) = -\frac{9}{2}x^{\frac{1}{2}}$$

C

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

D

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

30 Rewrite the function as a single power of x .

$$f(x) = -\frac{6}{\sqrt{x}}$$

A

$$-6x^{-\frac{1}{2}}$$

B

$$-6x^{-2}$$

C

$$-6x^{\frac{1}{2}}$$

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

$$f(x) = 9\sqrt[3]{x^2}$$

A

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

B

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

C

$$f'(x) = 9x^{-\frac{1}{3}}$$

D

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

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

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

A

$$f'(x) = 4x + 2x^2$$

B

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

C

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

**Basic Derivatives - Practice**

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

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

[12pt] $f(x) = 5x^2 + 3x + 5$

A

$$f'(x) = 10x + 3 + 5$$

B

$$f'(x) = 5x + 3$$

C

$$f'(x) = 10x + 3$$

D

$$f'(x) = 10x^2 + 3x$$

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

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

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

A

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

B

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

C

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

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

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

A

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

B

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

C

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

37 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

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

B

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

C

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

D

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

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

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

A

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

B

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

C

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



Basic Derivatives - Practice

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

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

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

A

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

B

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

C

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

D

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

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

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

A

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

B

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

C

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

D

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

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

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

A

$$f'(x) = -10x^{-3} + 9x^2$$

B

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

C

$$f'(x) = -10x^{-2} + 9x^3$$

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

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

[12pt] $f(x) = -4x^{-\frac{1}{3}} - 4$

A

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

B

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

C

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

D

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

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

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

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

A

$$f'(x) = -x^{-\frac{1}{2}} + 8x$$

B

$$f'(x) = -x^{\frac{1}{2}} + 8x^2$$

C

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

**Basic Derivatives - Practice**

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

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

A

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

B

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

C

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

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

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

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

A

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

B

$$f'(x) = \frac{4}{3}x^{-\frac{1}{3}} + 4x - 9x^3$$

C

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

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

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

A

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

B

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

C

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

D

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

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

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

$$[12pt]f(x) = (3x^2 - 6)(-2x^2)$$

A

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

B

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

C

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

D

$$f'(x) = (6x)(-2x^2)$$

**Basic Derivatives - Practice****48** Find the derivative $f'(x)$ using the product rule.

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

- A $f'(x) = (-10x)(-10x)$
- B $f'(x) = (-10x)(-5x^2 + 2) + (-5x^2 + 6)(-10x)$
- C $f'(x) = (-10x)(-5x^2 + 2)$
- D $f'(x) = (-10x)(-5x^2 + 2) - (-5x^2 + 6)(-10x)$

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

- A $f'(x) = (5x^{-2})(3x) - (-5x^{-1} - 5)(3)$
- B $f'(x) = (5x^{-2})(3x)$
- C $f'(x) = (5x^{-2})(3)$
- D $f'(x) = (5x^{-2})(3x) + (-5x^{-1} - 5)(3)$

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

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

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

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

- A $f'(x) = (4x^{-2})(2)$
- B $f'(x) = (4x^{-2})(2x + 2) - (-4x^{-1} - 4)(2)$
- C $f'(x) = (4x^{-2})(2x + 2) + (-4x^{-1} - 4)(2)$
- D $f'(x) = (4x^{-2})(2x + 2)$



Basic Derivatives - Practice

52 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

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

D

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

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

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

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

A

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

B

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

C

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

D

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

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

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

A

$$f'(x) = (4x^{-3})(-5x^2) - (-2x^{-2} + 6)(-10x)$$

B

$$f'(x) = (4x^{-3})(-10x)$$

C

$$f'(x) = (4x^{-3})(-5x^2) + (-2x^{-2} + 6)(-10x)$$

D

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