

$$y = 4x + 2$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = (4)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = 4$$

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = x + \frac{1}{2}$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = (1)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = 1$$

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = 7 - \frac{x}{2}$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = 0 + \frac{-1}{2}x^{1-1}$$

$$\frac{dy}{dx} = \frac{-1}{2}$$

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = 3x^2 - 4x + 2$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = (3)(2)x^{2-1} - (4)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = 6x - 4$$

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = 2x^3 - x + \frac{1}{3}$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = (2)(3)x^{3-1} - (1)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = 6x^2 - 1$$

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = -x^5 - x + \frac{1}{3}$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = (-1)(5)x^{5-1} - (1)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = -5x^4 - 1$$

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = \frac{1}{4}x^4 + \frac{1}{2}x^2 + \frac{1}{3}x$$

Find $\frac{dy}{dx}$.

$$\frac{dy}{dx} = \left(\frac{1}{4}\right)(4)x^{4-1} + \left(\frac{1}{2}\right)(2)x^{2-1} + \left(\frac{1}{3}\right)(1)x^{1-1}$$

$$\frac{dy}{dx} = x^3 + x + \frac{1}{3}$$

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

For any term x except 0 ,
 $x^0=1$

$$y = \frac{1}{x} - \frac{1}{x^2} + \frac{1}{x^3}$$

Find $\frac{dy}{dx}$.

$$y = x^{-1} - x^{-2} + x^{-3}$$

$$\frac{dy}{dx} = (1)(-1)x^{-1-1} - (1)(-2)x^{-2-1} + (1)(-3)x^{-3-1}$$

$$\frac{dy}{dx} = -x^{-2} + 2x^{-3} - 3x^{-4}$$

Rewrite functions as a sums of terms in powers of x before differentiating.

$$f(x) = ax^n$$



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

$$y = x - \frac{2}{x} + \frac{3}{5}$$

Find $\frac{dy}{dx}$.

$$y = x - 2x^{-1} + \frac{3}{5}$$

$$\frac{dy}{dx} = (1)(1)x^{1-1} - (2)(-1)x^{-1-1} + 0$$

$$\frac{dy}{dx} = 1 + 2x^{-2}$$

Rewrite functions as a sums of terms in powers of x before differentiating.


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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = \frac{x}{2} - \frac{3x^3 + 4x}{3x}$$

Find $\frac{dy}{dx}$.



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

$$y = \frac{x}{2} - x^2 - \frac{4}{3}$$

$$\frac{dy}{dx} = \left(\frac{1}{2} \right) (1)x^{1-1} - (1)(2)x^{2-1} - 0$$

$$\frac{dy}{dx} = \frac{1}{2} - 2x$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$\frac{4x^2 - x + 1}{2x}$$

Find $\frac{dy}{dx}$.

$$y = \frac{4x^2}{2x} - \frac{x}{2x} + \frac{1}{2x}$$

$$y = 2x - \frac{1}{2} + \frac{x^{-1}}{2}$$

$$\frac{dy}{dx} = (2)(1)x^{1-1} - 0 + \left(\frac{1}{2}\right)(-1)x^{-1-1}$$

$$\frac{dy}{dx} = 2 - \frac{1}{2}x^{-2}$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = 2\sqrt{x} + x - 1$$

Find $\frac{dy}{dx}$.

$$y = 2x^{\frac{1}{2}} + x - 1$$

$$\frac{dy}{dx} = (2) \left(\frac{1}{2}\right) x^{\frac{1}{2}-1} + (1)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = x^{-\frac{1}{2}} + 1$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = \frac{1}{x} - 3\sqrt{x}$$

Find $\frac{dy}{dx}$.

$$y = x^{-1} - 3x^{\frac{1}{2}}$$

$$\frac{dy}{dx} = (1)(-1)x^{-1-1} - (3)\left(\frac{1}{2}\right)x^{\frac{1}{2}-1}$$

$$\frac{dy}{dx} = -x^{-2} - \frac{3}{2}x^{-\frac{1}{2}}$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = \frac{2x + \sqrt{x}}{3\sqrt{x}}$$

Find $\frac{dy}{dx}$.

$$y = \frac{2x}{3\sqrt{x}} + \frac{\sqrt{x}}{3\sqrt{x}}$$

$$y = \frac{2}{3}x^{1-\frac{1}{2}} + \frac{1}{3}$$

$$y = \frac{2}{3}x^{\frac{1}{2}} + \frac{1}{3}$$

$$\frac{dy}{dx} = \left(\frac{2}{3}\right)\left(\frac{1}{2}\right)x^{\frac{1}{2}-1} + 0$$

$$\frac{dy}{dx} = \frac{1}{3}x^{-\frac{1}{2}}$$


Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

$$y = x(2x + x^2)$$

Find $\frac{dy}{dx}$.


$$y = x(2x + x^2)$$

$$y = (2x^2 + x^3)$$

$$\frac{dy}{dx} = (2)(2)x^{2-1} + (1)(3)x^{3-1}$$

$$\frac{dy}{dx} = 4x + 3x^2$$

Rewrite functions as a sums of terms in powers of x before differentiating.

$$f(x) = ax^n$$



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

$$y = x(2x - 1)(x - 3)$$

Find $\frac{dy}{dx}$.

$$y = x(2x - 1)(x - 3)$$

$$y = (2x^2 - x)(x - 3)$$

$$y = 2x^3 - \underbrace{6x^2 - x^2} + 3x$$

$$y = 2x^3 - 7x^2 + 3x$$

$$\frac{dy}{dx} = (2)(3)x^{3-2} - (7)(2)x^{2-1} + (3)(1)x^{1-1}$$

$$\frac{dy}{dx} = 6x^2 - 14x + 3$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0 = 1$

$$y = 2(x - 3)^2$$

Find $\frac{dy}{dx}$.

$$y = 2(x - 3)^2$$

$$y = 2(x - 3)(x - 3)$$

$$y = (2x - 6)(x - 3)$$

$$y = 2x^2 - 6x - 6x + 18$$

$$y = 2x^2 - 12x + 18$$

$$\frac{dy}{dx} = (2)(2)x^{2-1} - (12)(1)x^{1-1} + 0$$

$$\frac{dy}{dx} = 4x - 12$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0 = 1$

$$y = \sqrt{x} \left(x^2 - \frac{1}{x} \right)$$

Find $\frac{dy}{dx}$.

$$y = \sqrt{x} \left(x^2 - \frac{1}{x} \right)$$

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

$$y = x^{\frac{1}{2}+2} - x^{\frac{1}{2}-1}$$

$$y = x^{\frac{5}{2}} - x^{\frac{-1}{2}}$$

$$\frac{dy}{dx} = (1) \left(\frac{5}{2} \right) x^{\frac{5}{2}-1} - (1) \left(\frac{-1}{2} \right) x^{\frac{-1}{2}-1}$$

$$\frac{dy}{dx} = \frac{5}{2} x^{\frac{3}{2}} + \frac{1}{2} x^{\frac{-3}{2}}$$

Rewrite functions as a sums of terms in powers of x before differentiating.

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

$$f(x) = a \longrightarrow f'(x) = 0$$

For any term x except 0 ,
 $x^0=1$

$$y = 4x^6 - 3x^4 + x^2$$

Find $\frac{d^2y}{dx^2}$.

$$\frac{dy}{dx} = 24x^5 - 12x^3 + 2x$$

$$\frac{d^2y}{dx^2} = (24)(5)x^4 - (12)(3)x^2 + 2$$

$$\frac{d^2y}{dx^2} = 220x^4 - 36x^2 + 2$$

$$y = 3x^5 - 2x^3 + 2x$$

Find $\frac{d^2y}{dx^2}$.

$$\frac{dy}{dx} = 15x^4 - 6x^2 + 2$$

$$\frac{d^2y}{dx^2} = (15)(4)x^3 - (6)(2)x + 0$$

$$\frac{d^2y}{dx^2} = 60x^3 - 12x$$

Question

$$y = 3x^2 - 4x + 1$$

Find $\frac{dy}{dx}$.

$$6x - 4$$

$$y = \frac{1}{5}x^5 - \frac{1}{3}x^3 + x$$

Find $\frac{dy}{dx}$.

$$x^4 - x^2 + 1$$

$$y = x(2x - 3)(x + 1)$$

Find $\frac{dy}{dx}$.

$$6x^2 - 2x - 3$$

$$y = \frac{x^2}{2} - x + \frac{1}{7}$$

Find $\frac{dy}{dx}$.

$$x - 1$$

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

Find $\frac{dy}{dx}$.

$$-x^{-2} + 2x^{-3}$$

$$y = (x + 3)^2$$

Find $\frac{dy}{dx}$.

$$2x + 6$$

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

Find $\frac{dy}{dx}$.

$$3x^2 - 1$$

$$y = \sqrt{x}(2x - 3)$$

Find $\frac{dy}{dx}$.

$$3x^{\frac{1}{2}} - \frac{3}{2}x^{-\frac{1}{2}}$$

$$y = \sqrt{x} - \frac{1}{x}$$

Find $\frac{dy}{dx}$.

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