

① Differentiate $\sqrt{x}(x+2)$ with respect to x

② Differentiate $\cos^2 x$ with respect to x .

③ The equation of a curve is $y = e^{-x^2}$.

(i) Find $\frac{dy}{dx}$.

④ Find the slope of the tangent to the curve $x^2 + y^3 = x - 2$ at the point $(3, -2)$.

⑤ Differentiate with respect to x :

(i) $(4x^2 - 1)^3$.

(ii) $\sin^{-1}\left(\frac{2x}{3}\right)$.

$$y = \sin^{-1}\left(\frac{x}{a}\right)$$

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

⑥ A curve is defined by the equation $x^2 - 2xy + 3y^2 + 4y = 22$.

(i) Find $\frac{dy}{dx}$ in terms of x and y .

⑦ $x = e^t \cos t$ and $y = e^t \sin t$. Show that $\frac{dy}{dx} = \frac{x+y}{x-y}$.

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A curve is defined by the parametric equations

$$x = \frac{t-1}{t+1} \text{ and } y = \frac{-4t}{(t+1)^2}, \text{ where } t \neq -1.$$

(i) Find $\frac{dx}{dt}$ and $\frac{dy}{dt}$.

(ii) Hence find $\frac{dy}{dx}$, and express your answer in terms of x .