

- **The chain rule is:**

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

where y is a function of u and u is another function of x .

Given that $y = (3x^4 + x)^5$, find $\frac{dy}{dx}$ using the chain rule.

■ The chain rule enables you to differentiate a function of a function. In general,

• if $y = (f(x))^n$ then $\frac{dy}{dx} = n(f(x))^{n-1} f'(x)$

• if $y = f(g(x))$ then $\frac{dy}{dx} = f'(g(x))g'(x)$

Given that $y = \sqrt{5x^2 + 1}$, find $\frac{dy}{dx}$ at (4, 9).