

Conditions

using chain rule find dx/dy of $y = u/5 + 7$ and $u = 5x - 35$?

Solution

In calculus, the chain rule is a formula for computing the derivative of the composition of two or more functions. That is, if f is a function and g is a function, then the chain rule expresses the derivative of the composite function $f \circ g$ in terms of the derivatives of f and g . For example, the chain rule for $f \circ g (x) \equiv f [g (x)]$ is

$$\frac{df}{dx} = \frac{df}{dg} \frac{dg}{dx}.$$

$$y[u(x)] = \frac{u(x)}{5} + 7$$

$$u(x) = 5x - 35$$

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

$$\frac{dy}{du} = \left(\frac{u}{5} + 7\right)'_u = \frac{1}{5}$$

$$\frac{du}{dx} = (5x - 35)'_x = 5$$

$$\frac{dy}{du} \frac{du}{dx} = \frac{1}{5} \cdot 5 = 1$$

Answer: 1