

Exercise 26

Differentiate.

$$f(x) = \frac{ax + b}{cx + d}$$

Solution

Use the quotient rule to differentiate $f(x)$.

$$\begin{aligned} f'(x) &= \frac{d}{dx} \left(\frac{ax + b}{cx + d} \right) \\ &= \frac{\left[\frac{d}{dx}(ax + b) \right] (cx + d) - \left[\frac{d}{dx}(cx + d) \right] (ax + b)}{(cx + d)^2} \\ &= \frac{(a)(cx + d) - (c)(ax + b)}{(cx + d)^2} \\ &= \frac{ad - bc}{(cx + d)^2} \end{aligned}$$