

For each of the following functions, find the derivative and simplify.

1) $f(x) = \sqrt{1 + (x - 3)^2}$

2) $f(x) = (x^2 + 3)^4 (4x - 5)^3$

3) $g(x) = \frac{2x}{\sqrt[3]{x^2 + 4}}$

4) $g(x) = \left(\frac{1 + x^2}{1 - x^2} \right)^{10}$

$$5) \quad f(t) = \left(\frac{\sqrt[3]{5+3t}}{1-t^2} \right)^2$$

$$6) \quad f(x) = \frac{(x^2+3)^3(x^3-1)^2}{x^4}$$