

1. Find the derivative $f'(x)$ of each given function:

a. $f(x) = 4x^2 - 5$

e. $f(x) = 3 \sin x - 4 \cos x$

b. $f(x) = (4x^2 - 5)(3x^4 + x^3 - 7x + 1)$

f. $f(x) = x^4 \sin x$

c. $f(x) = \sqrt[3]{x} + 5\sqrt{x}$

g. $f(x) = \frac{\sin x + 1}{\cos x}$

d. $f(x) = \frac{x^2 + 4x}{x^3 - 5x + 1}$

h. $f(x) = \cos(x + \sqrt{x})$

i. $f(x) = \sin(\sin(\sin x))$

2. Find the derivative of $f(x) = \sin^2 x + \cos^2 x$, but do it twice. The first time, forget *all* trig identities and find the derivative using differentiation rules. The second time, use the-trig-identity-that-everyone-must-simply-know to rewrite $f(x)$, and then use the simplest of all differentiation rules.

3. Let $f(x) = (x^2 - 1)^6$. Find all points where the tangent line to $f(x)$ is horizontal. (Give both the x -coordinate and the y -coordinate of each point.)