

1. Differentiate  $f(x) = (x + 3)(2x - 5)$

2. Differentiate  $y = \frac{x^2+1}{1-x^2}$

3. Find an equation for the tangent line to  $y = \frac{x}{2x+1}$  at the point where  $x = -2$ . (Hint: Find  $y'$ , then find  $y'(-2)$  to find the slope of the tangent line at  $x = -2$ , then use point-slope form.)

4. Find all points on the graph of  $f(x) = (x - 1)(x^2 - 3x + 2)$  where the tangent line is horizontal. (Hint: Find  $f'(x)$ , then find all  $x$  where  $f'(x) = 0$ .)

5. Find the second derivative of  $y = x^2(3x + 2)$ .

6. Find the fifth derivative of  $y = \frac{1}{x}$  (Hint: Rewrite  $\frac{1}{x}$  as  $x^{-1}$ , then use Power Rule to take derivatives.)

Q: I can run but not walk. Wherever I go, thought follows close behind. What am I?