1. (2 points) Find the $x$-value for each point on the graph of $f(x) = x^3 + 150$ where the line tangent to the curve is perpendicular to the line $y = -12x + 7$.

2. (2 points) What is the slope of the curve $y = 5\tan x + 3\cos x$ at its $y$-intercept?
3. (2 points each) Using Leibniz notation (i.e., \( \frac{dy}{dx} \), \( \frac{dP}{dt} \), etc.), find derivatives for each of the following functions. For part (a) simplify your answer.

(a) \( q = \left( \frac{x \sqrt{x}}{\sqrt[3]{x}} \right)^{12} \)

(b) \( p = 10y^3 \sin y + \ln \left( \frac{5}{e^2} \right) \)

(c) \( w = \frac{4}{t^8 + 5e^t} \)