1. Find \( f'(5) \) if \( f(x) = \sqrt[3]{2 + x^2} \).

Solution. According to chain rule, the derivative is

\[
f'(x) = \frac{1}{3}(2 + x^2)^{-2/3} \cdot 2x.
\]

At \( x = 5 \), we find

\[
f'(5) = \frac{1}{3}(2 + 5^2)^{-2/3} \cdot 2 \cdot 5 = \frac{1}{3}(27)^{-2/3} \cdot 10 = \frac{1}{3} \cdot \frac{1}{9} \cdot 10 = \frac{10}{27}.
\]

2. Find an equation of the tangent line to the graph of \( y = x \ln(x) - x \) at the point \((e, 0)\).

Solution. The derivative is given by

\[
y'(x) = \left( \frac{d}{dx}(x) \right) \ln(x) + x \left( \frac{d}{dx} \ln(x) \right) - 1
\]

\[
= \ln(x) + x \cdot \frac{1}{x} - 1 = \ln(x).
\]

At the point \( x = e \), the value of the derivative is \( y'(e) = \ln(e) = 1 \), which is the slope of the tangent line there. Therefore, an equation of the tangent line is

\[
y = x - e.
\]

3. Find \( dy/dx \) by implicit differentiation if \( y \cos(x) = x^2 + y^2 \).

Solution. Applying \( d/dx \) to both sides gives

\[
\frac{dy}{dx} \cos(x) - y \sin(x) = 2x + 2y \frac{dy}{dx}.
\]

Solving for \( dy/dx \) gives

\[
\frac{dy}{dx} = \frac{2x + y \sin(x)}{\cos(x) - 2y}.
\]