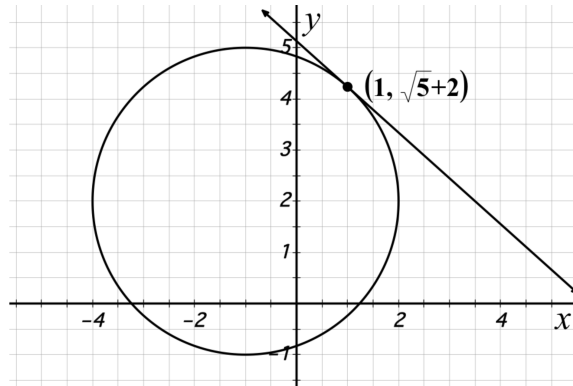# Implicit Differentiation

1. The figure below, which shows the line tangent to the graph of the circle $(x+1)^2+(y-2)^2 = 9$ at the point $\left(1, \sqrt{5}+2\right)$. Which formula that gives the slope of the tangent line to the graph of this circle at any point (x, y) on the circle?

(a) $\dfrac{dy}{dx} = -\dfrac{y}{x}$

(b) $\dfrac{dy}{dx} = \left(\dfrac{y}{x}\right)^2$

(c) $\dfrac{dy}{dx} = \dfrac{y - y_1}{x - x_1}$

(d) $\dfrac{dy}{dx} = \dfrac{y - 2}{x - 1}$

(e) $\dfrac{dy}{dx} = \dfrac{x + 1}{2 - y}$

2. The figure below, which shows the line tangent to the graph of the circle $(x+1)^2+(y-2)^2 = 9$ at the point $\left(1, \sqrt{5}+2\right)$. Which formula that gives the slope of the tangent line to the graph of this circle at any point (x, y) on the circle?
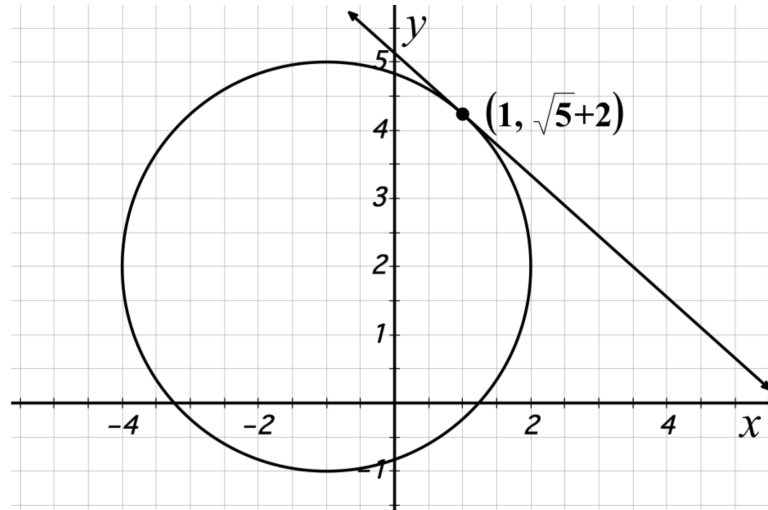
(a) $m \approx -0.89$

(b) $m \approx 1.13$

(c) $m \approx -2.25$

(d) $m \approx 1.00$

(e) $m \approx -1.13$

3. Find $\dfrac{dy}{dx}$ for the curve $x + \sin(y) = xy$. (You must solve for $\dfrac{dy}{dx}$ in terms of x and y).

4. Find $\dfrac{dt}{dz}$ for the curve $\ln(z + 2t) - \cos(t)\sin(z) = 12zt^3$

5. Find the slope of the line tangent to the curve $xe^y = 3x + 3y$ at the point $(3, 5)$