

Sample Problem Sheet

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1. Find the gradient of the unit circle ($x^2 + y^2 = 1$).

Solution: Differentiating with respect to x gives:

$$\begin{aligned}2x + 2y \frac{dy}{dx} &= 0 \\ \frac{dy}{dx} &= \frac{-2x}{2y} \\ &= \frac{-x}{\sqrt{1-x^2}}.\end{aligned}$$

2. Differentiate the following functions:

(a) $f(x) = 4x^2 - 3x + 10$

Solution: $f'(x) = 8x - 3$

(b) $f'(x) = -4 \cos(-4x)$