

# Derivative – Trigonometric functions - Answers

For questions 1 – 10 find the derivative of the following functions.

1.  $f(x) = x^2 - \sin(x)$   $f'(x) = 2x \sin x + x^2 \cos x$

2.  $f(x) = x^2 (\tan(x))$   $f'(x) = 2x \tan x + \frac{x^2}{\cos^2 x}$

3.  $g(z) = \frac{\sin z}{z^3}$   $g'(z) = \frac{z \cos z - 3 \sin z}{z^4}$

4.  $f(x) = (x + \cos x)(1 - \sin x)$   $f'(x) = (1 - \sin x)^2 - \cos x(x + \cos x)$

5.  $h(y) = 2y \sin(y) + y^2 \cos(y)$   $h'(y) = 4y \cos(y) + 2 \sin y - y^2 \sin(y)$

6.  $f(x) = \cos(4x)$   $f'(x) = -4 \sin(4x)$

7.  $f(x) = \sin(x) \cos(x)$   $f'(x) = \cos^2(x) - \sin^2(x)$

8.  $s(t) = t^3 - t^2 \sin(t)$   $s'(t) = 3t^2 - t^2 \cos(t) - 2t \sin(t)$

9.  $y = 5 \cos^3(\pi x)$   $y' = -15 \cos^2(\pi x) \sin(\pi x)$

10.  $v(t) = \frac{1}{2 \sin(t) - 4 \cos(t)}$   $v'(t) = -\frac{2 \cos(t) + 4 \sin(t)}{(2 \sin(t) - 4 \cos(t))^2}$

Solve the following problems

11. Find the equation of the tangent line to  $f(x) = \tan(x) + 9 \cos(x)$  at  $x = \pi$

$$y = x - \pi - 9$$

12. Find the equation of the tangent line to  $f(x) = 1 + \cos(x)$  at  $x = \frac{3\pi}{2}$

$$y = x + \frac{2-3\pi}{2}$$