

MATH 6 – QUIZ 10
27 APRIL 2012

Name: SOLUTIONS

NO CALCULATORS

1. Find the slope of the line tangent to the graph of the function $f(x) = \cos x \sin x$ at the point $(0,0)$.

$$\begin{aligned} f'(x) &= (\cos x)(\cos x) + (-\sin x)(\sin x) \\ &= \cos^2 x - \sin^2 x \end{aligned}$$

Slope of tangent line to $(0,0) = f'(0)$

$$\begin{aligned} f'(0) &= \cos^2(0) - \sin^2(0) \\ &= 1^2 - 0^2 = \boxed{1} \end{aligned}$$

2. Given that the position of a weight hanging on a spring is described by the function $y = e^{-t} \sin(\pi t)$, what function will tell you the velocity?

$v(t) = y'(t)$. (velocity is the derivative of position).

$$\begin{aligned} y'(t) &= e^{-t} (\cos \pi t)(\pi) + -e^{-t} \sin \pi t \\ &= \boxed{\pi e^{-t} \cos \pi t - e^{-t} \sin \pi t} \end{aligned}$$