

## Quiz 11 Solutions

①  $f(x) = \tan x + \frac{2}{3}e^{3x} + \tan^{-1} x + C$

②  $xy = 100$

Maximize  $M = x + y$

$$M = x + y = x + \frac{100}{x}$$

$$M' = 1 - \frac{100}{x^2} = 0$$

$$x^2 = 100$$

$$x = \pm 10, \quad y = \pm 10$$

So  $x + y = 20$  is max

$$\left( M'' = \frac{200}{x^3} \text{ and at } x = 10, M'' > 0 \text{ so} \right.$$

we get a minimum)

③ We want slope of tangent line =  $-1$ , so we want  $x^3 = -1$ , so the tangent must be at  $(-1, +1)$

so now  $f(x) = \frac{1}{4}x^4 + C$ . To make this pass through  $(-1, 1)$  we need  $C = \frac{3}{4}$ .  $\therefore f(x) = \frac{1}{4}x^4 + \frac{3}{4}$