

Start here for

Question Number:

7 a) $\ddot{x} = 4 \cos 2t$.

$$\dot{x} = \cancel{2 \sin 2t} + \frac{1}{a} \cdot \cancel{\cos} \cdot ax = \frac{1}{a} \sin ax$$

$$\therefore \dot{x} = \frac{4}{2} \sin 2t + 1$$

$$\dot{x} = 2 \sin 2t + 1$$

ii) $\cancel{2 \sin 2t} + 1 = 2 \sin 2t + 1$

$$= 2 \sin 0 + 1$$

$$= 1$$

iii) $2 \sin 2t + 1$

$$\ddot{y} = -\frac{1}{a} \cos ax$$

$$= -\frac{2}{2} \cos x$$

$$= -\cos 2x$$

b) ~~$x^2 + 2x + 1$~~ ~~$y = 1$~~ $m = -1$ $m = 2x = -2$

~~$y - 1 = -1(x + 1)$~~ ~~$y - 1 = -2(x + 1)$~~

~~$y - 1 = -x - 1$~~ $y - 1 = -2x - 2$

~~$y - x = 0$~~ $= y + 2x + 1$

ii) $M = \frac{1}{2}, \frac{5}{2}$ ~~$m = 3$~~ gradient of AB = 3

~~$y - y_1 = 3(x - x_1)$~~

~~$y - \frac{1}{2} = 3(x - \frac{5}{2})$~~

~~$y - \frac{1}{2} = 3x - 7\frac{1}{2}$~~ $= 2y - 1 = 6x - 7$ $= 6x - 2y - 6$

~~$3x - y - 3 = 0$~~

$$= 3(0) - y - 3 = 0$$

$$= -y = 3$$

$$= y = -3 \quad \therefore MC \text{ is vertical.}$$

$$\text{iii) } \cdot \quad 1/2, 5/2 \quad m=1.$$

$$y - 5/2 = 1(x - 2)$$

$$y - 5/2 = x - 2.$$

~~$$= x - y + 2 \quad (-1) \quad (1)$$~~

~~$$2x - 2y + 1$$~~

$$= 2y - 5 = 2x - 4$$

$$= 2x - 2y + 1 = 0$$

\therefore BT is tangent to the parabola.

~~$$= 2(-1) - 2(1) + 1 = -3$$~~

Additional writing space on back page.