

5) a) Find inverse of  $M^{-1}$

(2)


$$(M^{-1})^{-1} = M = \frac{1}{10} \begin{pmatrix} 2 & 0 \\ -1 & 5 \end{pmatrix}$$

$$b) MX = B \Rightarrow X = M^{-1}B = \begin{pmatrix} 5 & 0 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} 1 \\ 7 \end{pmatrix} = \begin{pmatrix} 5 \times 1 + 0 \times 7 \\ 1 \times 1 + 2 \times 7 \end{pmatrix}$$
$$= \begin{pmatrix} 5 \\ 15 \end{pmatrix} \text{ so } x=5, y=15$$

$$6) a) f'' = 3(x-3)^2$$

$$b) f'(3) = (3-3)^2 = 0, f''(3) = 3(3-3)^2 = 0$$

c) Integrate  $f'$  to give  $f(x) = \frac{1}{4}(x-3)^4 + C$

Graph of  $f$  is  and 3 is

a minimum not a point of inflexion

$$7) f(x) = 0 \Rightarrow 0 = \sqrt{3} \sin x + \cos x e^{2x}$$

Now  $e^{2x}$  is never 0 so  $\sqrt{3} \sin x + \cos x$  must be 0.

$$\sqrt{3} \sin x + \cos x = 0$$

$$\sqrt{3} \sin x = -\cos x \text{ so } \tan x = \frac{-1}{\sqrt{3}}$$

So  ~~$x = -\pi/6, 5\pi/6, 11\pi/6$~~  But since

$$0 \leq x \leq \pi, x = 5\pi/6$$