

10. The equation $kx^2 + 4kx + 3 = 0$, where k is a constant, has no real roots.

Prove that

$$0 \leq k < \frac{3}{4}$$

(4)

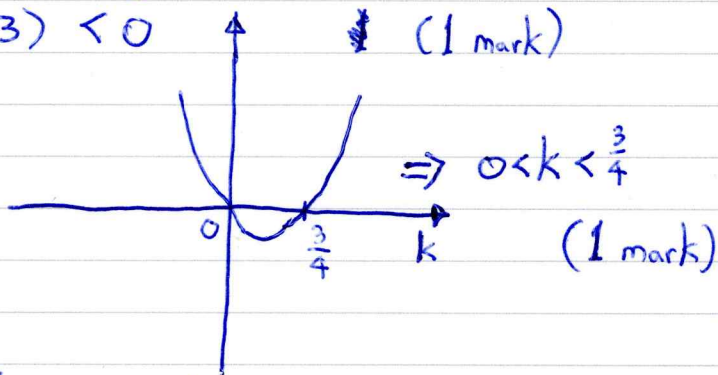
discriminant is -ve for no real roots

$$\Rightarrow (4k)^2 - 4(k)(3) < 0$$

$$16k^2 - 12k < 0$$

$$4k^2 - 3k < 0$$

$$k(4k - 3) < 0$$



but $k=0$ also has no real roots
because

$$(0)x^2 + 4(0)x + 3 = 3 \neq 0$$

(1 mark)

so, combining conditions,

$$0 \leq k < \frac{3}{4} \text{ for no real roots}$$

(1 mark)