Pure 1 Mixed Ex 6 Q7 (SBD)

Line: $4x - y - 7 = 0$

$\Rightarrow \quad y = 4x - 7$

Circle: $x^2 + px + y^2 + 3y = 10$

$\Rightarrow \quad x^2 + px + y(y+3) = 10$

These intersect when:

$$x^2 + px + (4x-7)(4x-7+3) = 10$$

$$x^2 + px + (4x-7)(4x-4) = 10$$

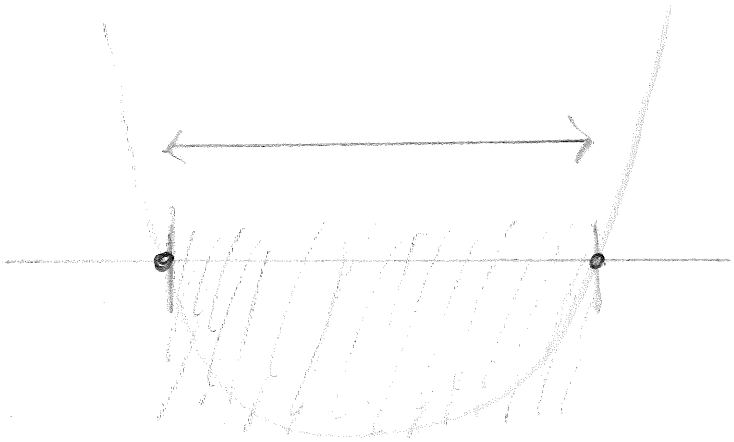
$$x^2 + px + 16x^2 - 16x - 28x + 28 = 10$$

ie $$\underline{17x^2 + (p-44)x + 18 = 0}$$

We want no solutions for this (no intersection), so the discriminant must be less than zero.

ie $$b^2 - 4ac < 0$$

$\Rightarrow \quad (p-44)^2 - 4 \times 17 \times 18 < 0$



Roots: $(p-44)^2 = 1224$

$$p = 44 \pm \sqrt{1224}$$

$$= 44 \pm 6\sqrt{34}$$

So there is no intersection when:

$$\underline{\underline{44 - 6\sqrt{34} < p < 44 + 6\sqrt{34}}}$$