PURE 1 Ex 6F Q5

$$(x - x_1)^2 + (y - y_1)^2 = r^2$$

Have $R(-2,1)$: $(-2-x_1)^2 + (1-y_1)^2 = r^2$

$S(4,3)$: $(4-x_1)^2 + (3-y_1)^2 = r^2$

$T(10,-5)$: $(10-x_1)^2 + (-5-y_1)^2 = r^2$

So

$x_1^2 + 4x_1 + 4 + y_1^2 - 2y_1 + 1 = r^2 \quad \ldots (1)$

$x_1^2 - 8x_1 + 16 + y_1^2 - 6y_1 + 9 = r^2 \quad \ldots (2)$

$x_1^2 - 20x_1 + 100 + y_1^2 + 10y_1 + 25 = r^2 \quad \ldots (3)$

(1) − (2) $12x_1 - 12 + 4y_1 - 8 = 0$

$\therefore \quad 3x_1 + y_1 = 5 \quad \ldots (4)$

(2) − (3) $12x_1 - 84 - 16y_1 - 16 = 0$

$\therefore \quad 3x_1 - 4y_1 = 25 \quad \ldots (5)$

Eliminating x_1 :

(4) - (5) $\quad 5y_1 = -20$

$\therefore y_1 = -4$

Substite in y_1 to find x_1

In (4) $\quad 3x_1 + (-4) = 5$

$\therefore x_1 = 3$

Subsitute to find r

In (2) $\quad (4-3)^2 + (3-(-4))^2 = r^2$

$\therefore r^2 = 50$

So the circle equation is:

$$(x-3)^2 + (y+4)^2 = 50$$