Pure 1 Ex 6F Q8 (SBD)

$\angle DEF = 90°$ $\therefore$ ΔDEF is a right-angled triangle

So $DE^2 + EF^2 = DF^2$

But $DE^2 = 4^2 + (b-1)^2$

$EF^2 = 4^2 + (b-7)^2$

$DF^2 = 8^2 + 6^2$

$\therefore$ $4^2 + (b-1)^2 + 4^2 + (b-7)^2 = 100$

$16 + b^2 - 2b + 1 + 16 + b^2 - 14b + 49 = 100$

so, collecting terms

$2b^2 - 16b - 18 = 0$

$b^2 - 8b - 9 = 0$

$(b-9)(b+1) = 0$

But $b > 0$, so $\underline{\underline{b = 9}}$

b) As $\angle DEF = 90° \Rightarrow$ DF is a diameter of the circle

$\therefore$ Centre of the circle is their midpoint : $(-3, 4)$

and radius is $\frac{1}{2} DF = \frac{1}{2}\sqrt{100} = 5$

$\therefore$ C's equation is $\underline{\underline{(x+3)^2 + (y-4)^2 = 25}}$