Q3 Note: $A = P\left(1+\frac{r}{100}\right)^n$.

a) $P = 1000$

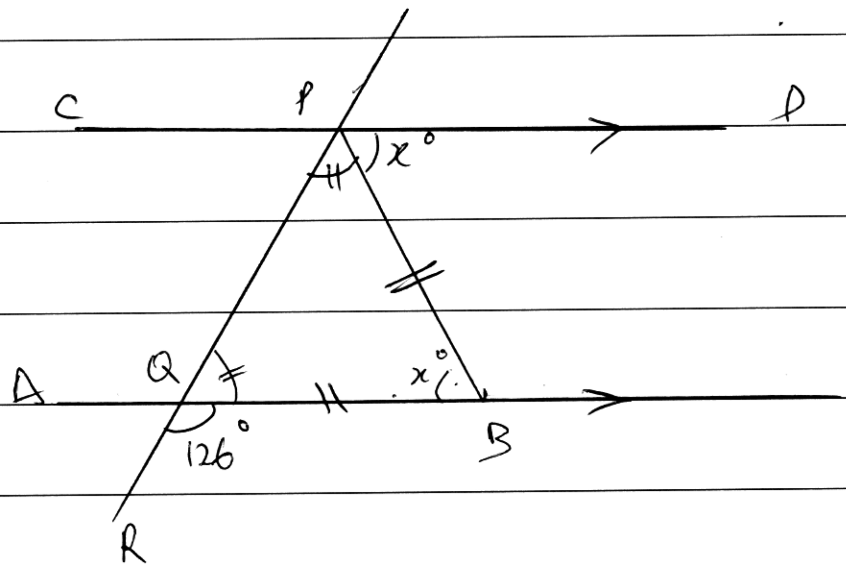
$r = \frac{3.5}{100}$

$n = 20$.

$A = 1000\,(1+0.035)^{20}$

$= \$1,989.79$ (2dp)

b)



$\angle DPB = \angle QBP$ (alt $\angle$'s are equal, $PD \parallel AB$)

$\triangle PQB$ is isosceles. ($PB = RB$ given)

$\therefore \angle PQB = \angle QPB$ (base $\angle$'s of isos $\triangle$)

$= \cancel{180 - \ldots}$

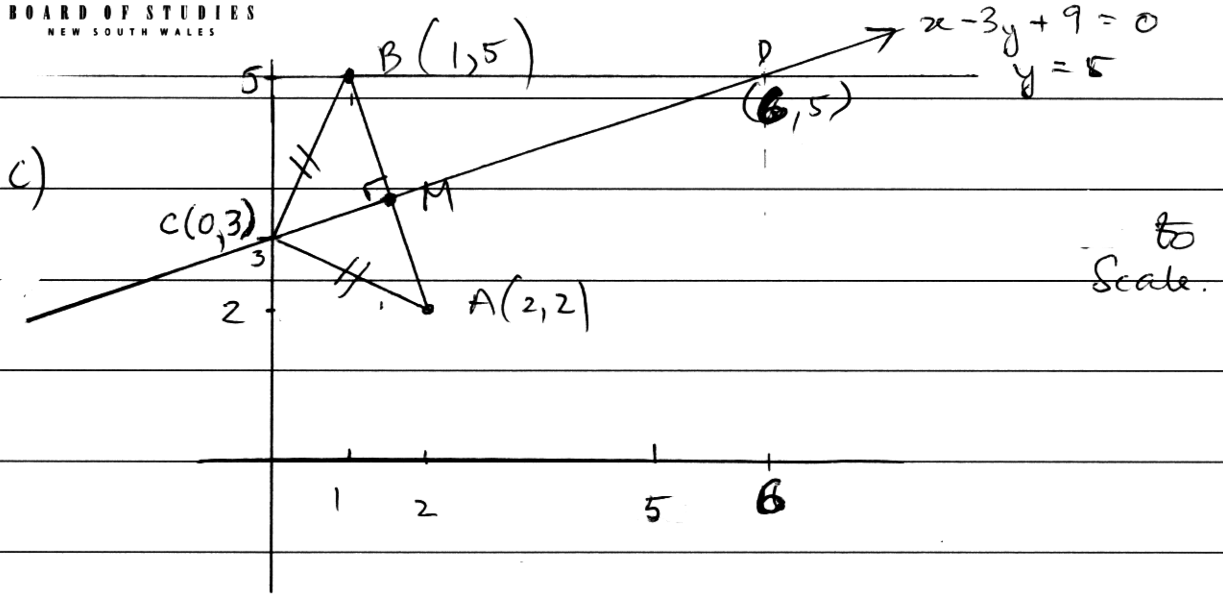
~~∠QPB~~ We have $\angle PQB$:

$\cancel{x}\ \cancel{180} = 180 - 126 = 54$. ($\angle$ sum of straight line)

$\therefore x = 180 - 54 \times 2$ ($\angle$ sum of $\triangle$)

$\therefore x = 72°$.

c)



$$x_m = \frac{x_1+x_2}{2} \qquad y_m = \frac{y_1+y_2}{2}$$

(i) $x_m = \frac{2+1}{2} = \frac{3}{2} = 1.5 \qquad = \frac{5+2}{2} = \frac{7}{2} = 3.5$

$\therefore M(1.5, 3.5)$

(ii) gradient of AB $= \frac{y_2-y_1}{x_2-x_1} = \frac{5-2}{1-2} = \frac{3}{-1} = -3$

Let the gradient of the $\perp$ of AB ~~be~~ m_2

then $m_2 \times m_{AB} = -1$

$m_2 \times -3 = -1$

$m_2 = \frac{1}{3}$.

$\therefore$ The equation of the perpendicular bisector is :

$y - 3.5 = \frac{1}{3}(x - 1.5)$

$y - \frac{7}{2} = \frac{1}{3}\left(x - \frac{3}{2}\right)$

$y = \frac{x}{3} - \frac{1}{2} + \frac{7}{2}$ ~~y~~

~~$3y = x$~~

$y = \frac{x}{3} + 3$

$3y = x + 9$

$\therefore \quad 0 = x - 3y + 9$ #

Since Point C lies on the y axis, $x = 0$.

(iii) $\therefore$ C$(0, y)$ A$(2,2)$ and B$(1,5)$

$AC = CB$ (given)

$AC^2 = CB^2$.

$(2-0)^2 + (\cancel{2}-y)^2 = (1-0)^2 + (5-y)^2$.

$4 + 4 + \cancel{y^2} - 4y = 1 + 25 + \cancel{y^2} - 10y$.

$6y = 18$

$y = 3$.

$\therefore$ C$(0, 3)$

iv) $x - 3y + 9 = 0$ (1)

$y = 5$ (2)

Substitute $y = 5$ into (1)

ie $x - 3(5) + 9 = 0$.

$x = 6$.

$\therefore$ D$(6, 5)$

$AB = \sqrt{(2-1)^2 + (2-5)^2} = \sqrt{1+9} = \sqrt{10}$

(v) $x_M = \frac{3}{2}$ $\quad x_D = \cancel{3}6$

$\cancel{d}\ DM \quad 6 - \frac{3}{2} = 4\frac{1}{2}\ u.$

Area $\triangle ABD = \frac{1}{2} \times h \times b$

$= \frac{1}{2} \times DM \times AB$

$= \frac{1}{2} \times \frac{9}{2} \times \sqrt{10}$

$= \frac{9\sqrt{10}}{4}\ u^2$