a) $P = 1000$

$r = 3.5\%$

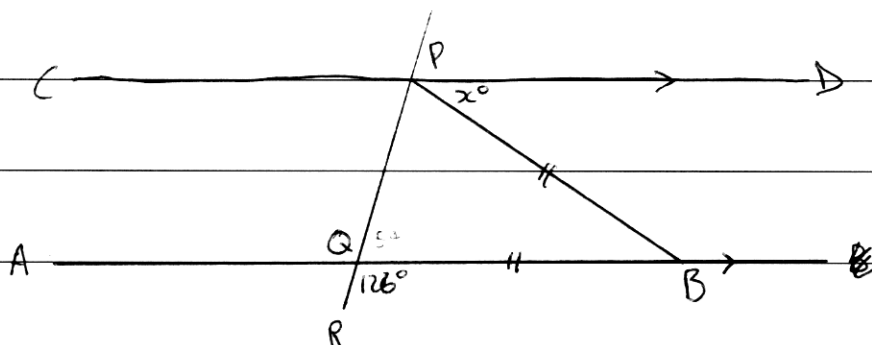$n = 20$

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

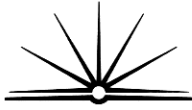$\quad = 1000\left(1.035\right)^{20}$

$\quad = \$1989.79$

b)

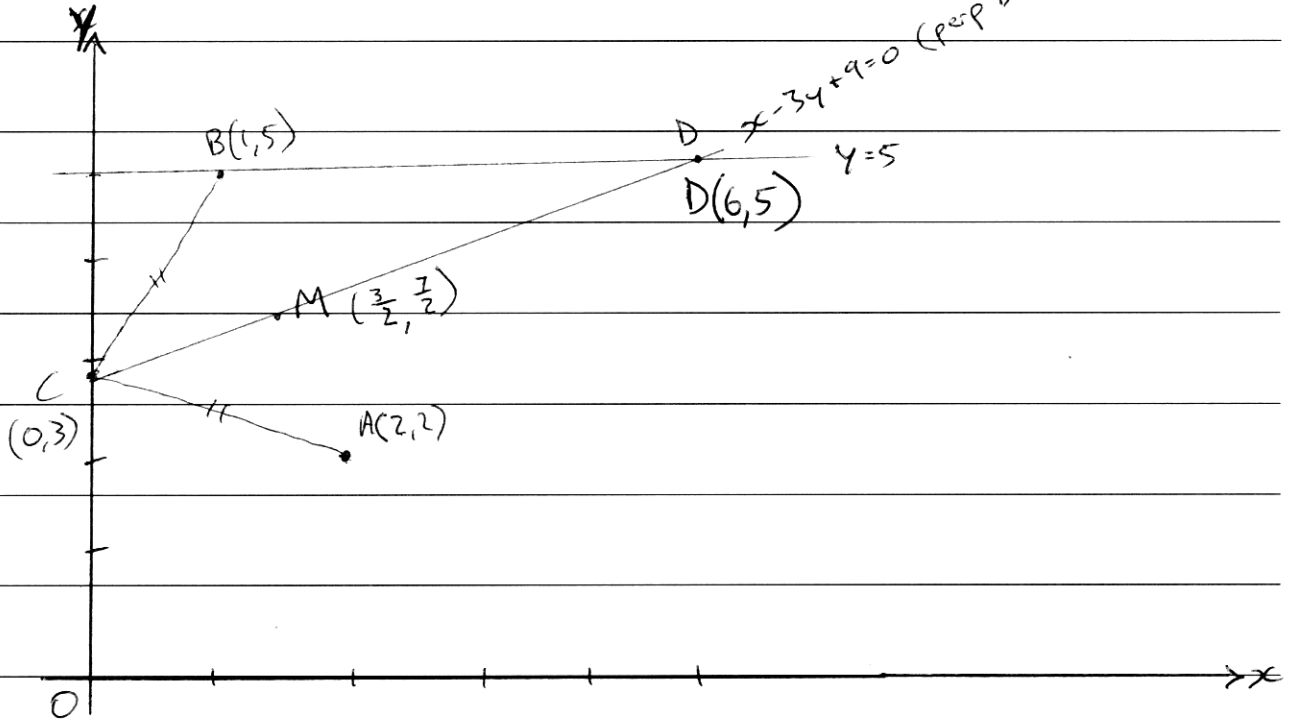$\angle BQP = 180 - 126 \qquad (\text{supplementary} \angle\text{'s})$

$\qquad = 54$

$\angle DPQ = 126° \qquad (\text{corresponding})$

$\angle QPB = \angle PQB = 54° \qquad (\text{Base angles in isoceles } \angle\text{'s are equal}$
$\qquad\qquad\qquad\qquad\qquad PB = QB \text{ data})$

$\therefore x° = 126 - 54° = 72°$

c)

Graph showing points: $B(1,5)$, D, $x - 3y + 9 = 0$ (perp Bisector), $y = 5$, $D(6,5)$, $M\left(\frac{3}{2}, \frac{7}{2}\right)$, $C(0,3)$, $A(2,2)$, with axes y, x, O.

i) $M = \dfrac{1+2}{2}, \dfrac{2+5}{2}$

$M\left(\dfrac{3}{2}, \dfrac{7}{2}\right)$

ii) $M_{aB} = $ ~~illegible~~

$M_{aB} = \dfrac{5-2}{1-2} = \dfrac{3}{-1}$

$= -3$

$M_{P.Bisector} = \dfrac{1}{3}$ \qquad as $M_1 M_2 = -1$

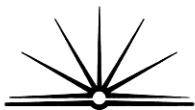~~$y - \frac{1}{3}(x-\frac{3}{2})$~~ \qquad\qquad $-3 \times m_2 = -1$

~~$3y - 6 = x - 2$~~ \qquad\qquad $m_2 = \dfrac{-1}{-3} = \dfrac{1}{3}$

~~$x - 3y + 4$~~

See next page

eqn of perp bisector is

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

$$3y - \frac{21}{2} = x - \frac{3}{2}$$

~~or~~ $x - 3y + 9 = 0$ shown

iii) C will lie on $x - 3y + 9 = 0$ where $x = 0$

$$0 - 3y + 9 = 0$$

$$3y = 9$$

$$y = 3$$

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

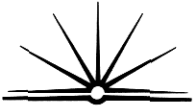iv) $x - 3y + 9 = 0$

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

$$x - 6 = 0$$

$$x = 6$$

$$D(6, 5)$$

v) $\ell_{AB} = \sqrt{(5-2)^2 + (1-2)^2}$

$\quad = \sqrt{3^2 + (-1)^2}$

$\quad = \sqrt{10} \text{ units}$

~~Perp D_{AB} $\ell_{MD} = \frac{|x-3y+4|}{\sqrt{1+(-3)^2}}$~~

~~$\frac{(6-3(5)+4)}{\sqrt{9+4}}$~~

$D(6,5) \quad M\left(\frac{3}{2}, \frac{7}{2}\right)$

$\ell_{AB} = y-2 = -3(x-2)$

$\quad y-2 = -3x+6$

$\quad 3x+y-8=0$

$\ell_{MD} = \sqrt{\left(5-\frac{7}{2}\right)^2 + \left(6-\frac{3}{2}\right)^2}$

$\quad = \sqrt{\left(\frac{3}{2}\right)^2 + \left(\frac{9}{2}\right)^2}$

$\quad = \sqrt{\frac{9}{4} + \frac{81}{4}}$

$\quad = \frac{\sqrt{17}}{2}$

$\quad = \frac{3\sqrt{3}}{2}$

$Pd = \frac{|3x+y-8|}{\sqrt{3^2+1^2}}$

$\quad = \frac{|3(6)+5-8|}{\sqrt{10}}$

$\quad = \frac{15}{\sqrt{10}} \text{ units}$

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

$\quad = \frac{1}{2} \times \frac{15}{\sqrt{10}} \times \sqrt{10}$

$\quad = \frac{15}{2}$

$\quad = 7\frac{1}{2} \text{ units}^2$