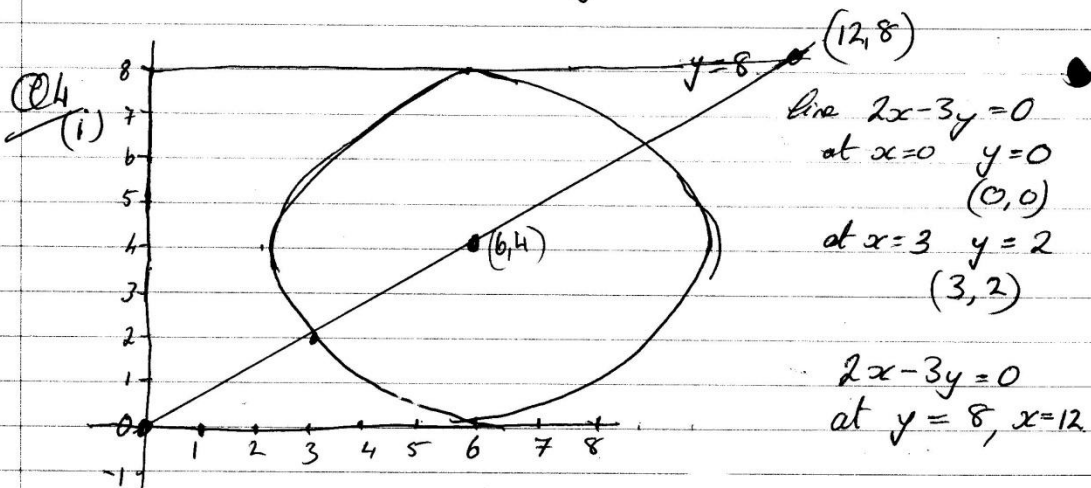
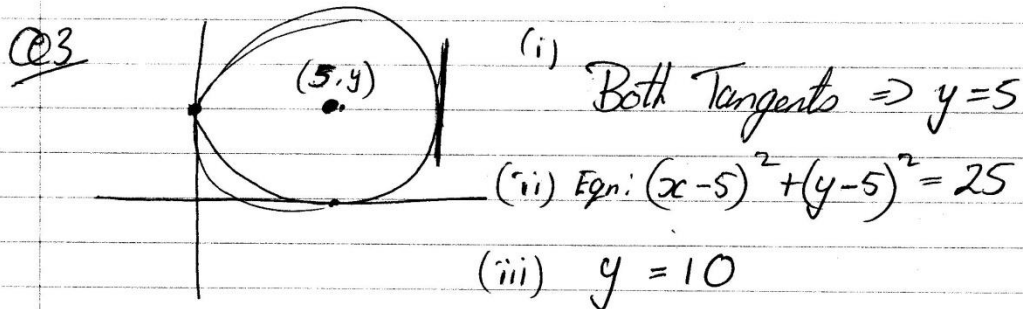
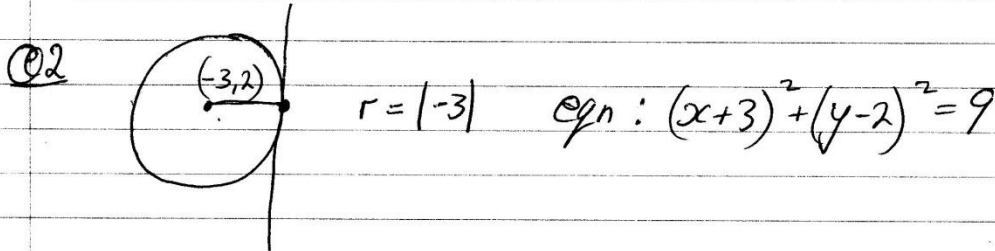
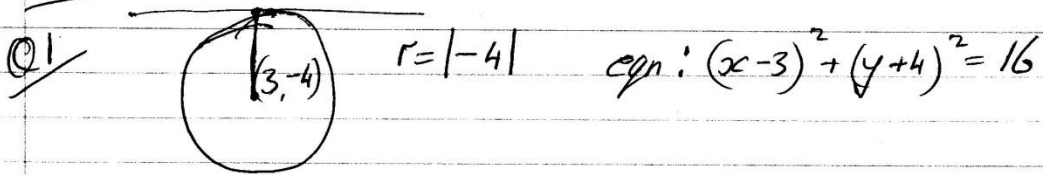
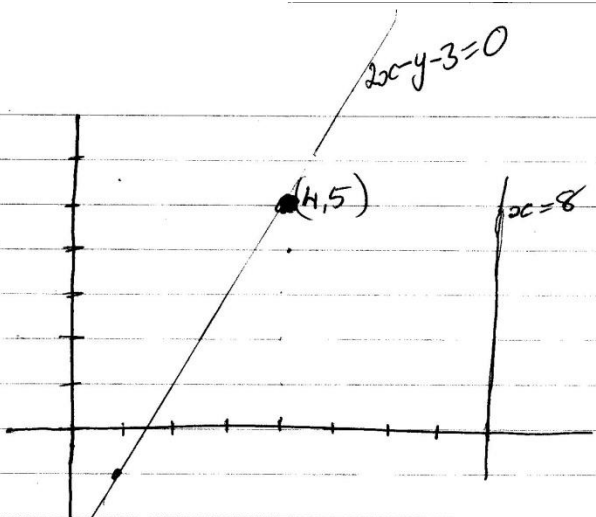


EX A.7



- (ii) $y = 8$ and x -axis tangents \Rightarrow Diameter = 8 $\Rightarrow r = 4$.
 (iii) Mid pt of $(0, 0)$ and $(12, 8) = (6, 4) =$ centre *OR $y=4$ on line $2x-3y=0$.
 (iv) Eqn: $(x-6)^2 + (y-4)^2 = 16$

Q5



(i) y axis and $x=8$ are Tangents \Rightarrow Diameter = 8 \Rightarrow Radius = 4

(ii) Centre: $\left[\begin{array}{l} \text{on line } 2x - y - 3 = 0 \\ \text{at } x=0 \quad y = -3 \quad (0, -3) \\ \text{at } x=1 \quad y = -1 \quad (1, -1) \end{array} \right]$

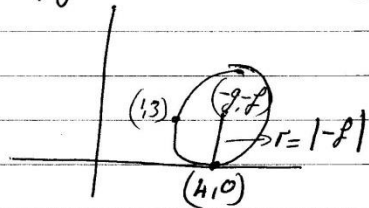
radius = 4 \Rightarrow $x=4$ on $2x - y - 3 = 0$
 $8 - y - 3 = 0$
 $y = 5$

centre (4, 5)

(iii) Eqn: $(x-4)^2 + (y-5)^2 = 16$

Q6 x axis tangent to $x^2 + y^2 + 2gx + 2fy + c = 0$

centre $(-g, -f)$



$$r = \sqrt{g^2 + f^2 - c}$$
$$|-f| = \sqrt{g^2 + f^2 - c}$$
$$f^2 = g^2 + f^2 - c$$
$$c = g^2 \quad \text{Q.F.D.}$$

(4, 0) on $x^2 + y^2 + 2gx + 2fy + c = 0$

$$\Rightarrow 16 + 0 + 8g + c = 0$$
$$8g + c = -16 \quad (1)$$

(1, 3) on $x^2 + y^2 + 2gx + 2fy + c = 0$

$$\Rightarrow 1 + 9 + 2g + 6f + c = 0$$
$$2g + 6f + c = -10 \quad (2)$$

(1) $8g + c = -16$ but $c = g^2$

$$\Rightarrow 8g + g^2 = -16$$
$$g^2 + 8g + 16 = 0$$
$$(g + 4)(g + 4) = 0$$
$$g = -4$$

Into (1) $g = -4 \Rightarrow 8(-4) + c = -16$

$$-32 + c = -16$$
$$c = 16$$

Into (2) $g = -4$ and $c = 16 \Rightarrow 2(-4) + 6f + 16 = -10$

$$-8 + 6f + 16 = -10$$
$$6f = -18$$

$$\Rightarrow \text{Eqn b } x^2 + y^2 + 2(-4)x + 2(-3)y + 16 = 0$$
$$x^2 + y^2 - 8x - 6y + 16 = 0$$
$$f = -3$$

• Q7 y axis tangent to $x^2 + y^2 + 2gx + 2fy + c = 0$

$r = |-g|$
 $\sqrt{g^2 + f^2} = |-g|$
 $g^2 + f^2 - c = g^2$
 $f^2 = c$ C.F.D.

$(0, -3) \Rightarrow 0 + 9 - 6f + c = 0$
 $-6f + c = -9$ ①

• $(4, 1) \Rightarrow 16 + 1 + 8g + 2f + c = 0$
 $8g + 2f + c = -17$ ②

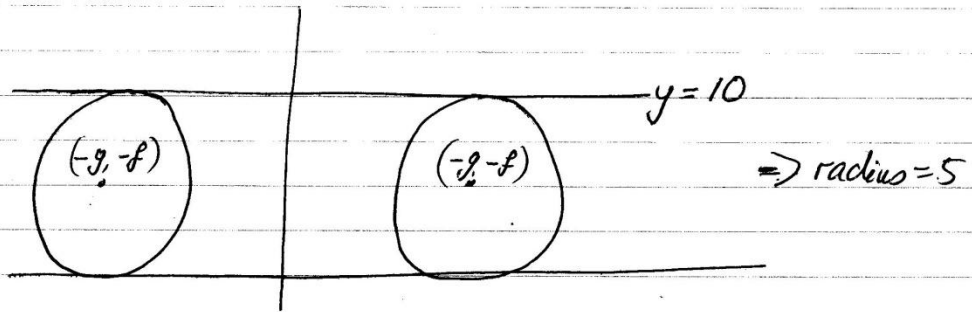
$f^2 = c$ into ① $\Rightarrow -6f + f^2 = -9$
 $f^2 - 6f + 9 = 0$
 $(f - 3)(f - 3) = 0$
 $f = 3$

$f = 3$ into ① $\Rightarrow -6(3) + c = -9$
 $c = 9$

• $f = 3$, and $c = 9$ into ② $\Rightarrow 8g + 2(3) + 9 = -17$
 $8g = -32$
 $g = -4$

\Rightarrow Eqn of circle is: $x^2 + y^2 + 2(-4)x + 2(3)y + (9) = 0$
 $x^2 + y^2 - 8x + 6y + 9 = 0$

Q8



$$\Rightarrow \begin{cases} -f = 5 \\ f = -5 \end{cases}$$

Eqn of circle: $x^2 + y^2 + 2gx + 2fy + c = 0$

$$(1, 5) \Rightarrow \begin{aligned} 1 + 25 + 2g + 10f + c &= 0 \\ 2g + 10f + c &= -26 \end{aligned}$$

But $f = -5$

$$\Rightarrow \begin{aligned} 2g - 50 + c &= -26 \\ 2g + c &= 24 \end{aligned}$$

Tangent to
Touches x axis $\Rightarrow c = g^2$

$$\begin{aligned} \Rightarrow 2g + g^2 &= 24 \\ g^2 + 2g - 24 &= 0 \\ (g - 4)(g + 6) &= 0 \\ g = 4 \quad g = -6 \end{aligned}$$

\therefore Circle 1: centre $(+6, 5)$ $r = 5$
 $(x-6)^2 + (y-5)^2 = 25$

and Circle 2: centre $(-4, 5)$ $r = 5$
 $(x+4)^2 + (y-5)^2 = 25$