TEST 3A

1/ Using $M=\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$
with $(x_1,y_1)=(-1,3)$, $(x_2,y_2)=(5,1)$
we have $M=\left(\frac{-1+5}{2}, \frac{3+1}{2}\right)$
$=(2,2)$

2/ Using $d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
with $(x_1,y_1)=(-1,3)$, $(x_2,y_2)=(5,1)$
we have $d=\sqrt{(5+1)^2+(1-3)^2}$
$=2\sqrt{10}$

3/ $D=\begin{vmatrix} 1 & 1 & 1 \\ -1 & -1 & 1 \\ 2 & 1 & -1 \end{vmatrix}=2$

$D_x=\begin{vmatrix} 6 & 1 & 1 \\ 0 & -1 & 1 \\ 1 & 1 & -1 \end{vmatrix}=2$

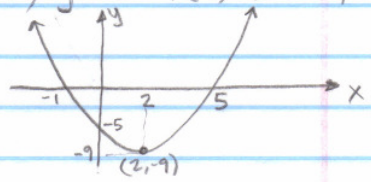
so that $x=\frac{D_x}{D}=\frac{2}{2}=1$

4/ $x+2y=5$ —— ①
$x^2+y^2=25$ —— ②
From ①: $x=5-2y$
Plug this in ② to obtain
$(5-2y)^2+y^2=25$
$\Rightarrow y=0$ or $y=4$
Plug each of these in ① to get
$x=5$ or $x=-3$, respetively.
∴ the solutions are $(5,0)$, $(-3,4)$

5/ $12-3y^2+6x=3x^2-12y$
$\Rightarrow 4=x^2-2x+y^2-4y$
$\Rightarrow (-1)^2+(-2)^2+4=x^2-2x+(-1)^2+y^2-4y+(-2)^2$
$\Rightarrow 9=(x-1)^2+(y-2)^2$
∴ center: $(1,2)$, radius $=3$

6/ center $=(-1,2)$, point $=(1,2)$
plug these in $(x-h)^2+(y-k)^2=r^2$,
$\Rightarrow (1+1)^2+(2-2)^2=r^2$
$\Rightarrow r^2=4$
∴ the equation is: $(x+1)^2+(y-2)^2=4$

7/ $y=x^2-4x-5=(x-5)(x+1)$
For x-int: set $y=0$
$\Rightarrow (x-5)(x+1)=0 \Rightarrow x=5$ or $x=-1$
For y-int: set $x=0$
$\Rightarrow y=-5$
For vertex: $x=\frac{-b}{2a}=\frac{4}{2}=2$ $\Rightarrow (2,-9)$
when $x=2$, $y=2^2-4(2)-5=-9$



8/ $2x^2+6x+3=0$
Using the quadratic formula,
$x=\frac{-6\pm\sqrt{(-6)^2-4(2)(3)}}{2(2)}=\frac{-3\pm\sqrt{3}}{2}$

9/ By problem 1/, the center $=M=(2,2)$
By problem 2/, the radius $=\frac{1}{2}d=\sqrt{10}$
∴ the equation is: $(x-2)^2+(y-2)^2=10$

10/ $y=3x-x^2=x(3-x)$
$\Rightarrow$ x-int: $x=0, x=3$; y-int: $y=0$
vertex: $x=\frac{-3}{-2}=\frac{3}{2} \Rightarrow y=\frac{9}{4} \Rightarrow \left(\frac{3}{2},\frac{9}{4}\right)$