Using complete sentences, write the distance based definition of "ellipse". **SCORE: ____ / 2 PTS**

AN ELLIPSE IS THE LOCUS OF POINTS IN THE PLANE WHOSE DISTANCES TO TWO FIXED POINTS (CALLED THE FOCI) ADD UP TO A FIXED CONSTANT

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Find the vertex, focus and equation of the directrix of the parabola $x^2+8x+2y+2=0$. **SCORE: ____ / 4 PTS**

$x^2+8x=-2y-2$

$x^2+8x+16=-2y+14$

$(x+4)^2=-2(y-7)$ (½) (1)

VERTEX $=(-4,7)$ (½)

$4p=-2 \rightarrow p=-\frac{1}{2}$ (½)

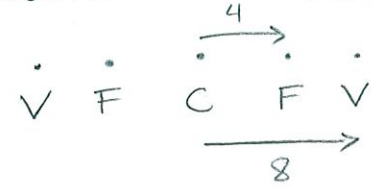
FOCUS $=(-4,7-\frac{1}{2})=(-4,\frac{13}{2})$ (½)

DIRECTRIX $y=7+\frac{1}{2}$ (½)

$y=\frac{15}{2}$ (½)

Find the equation of the ellipse with foci $(7,-5)$ and $(-1,-5)$, and a major axis of length 16. **SCORE: ____ / 4 PTS**

CENTER $=\left(\frac{7+-1}{2},-5\right)=(3,-5)$ (½)



$8^2=4^2+b^2$

$b^2=64-16=48$ (½)

(½) $\frac{(x-3)^2}{64}$ (½) $+$ $\frac{(y+5)^2}{48}$ (½) $=1$ (½)

(½)

Fill in the blanks. **SCORE: ____ / 2 PTS**

[a] The line segment joining the vertices of an ellipse is called the MAJOR AXIS] (1)

[b] The line passing through the focus and vertex of a parabola is called the AXIS OF SYMMETRY] (1)

Find the center, foci, vertices and eccentricity of the ellipse $3x^2+2y^2+18x-8y+11=0$. **SCORE: ____ / 5 PTS**

$3x^2+18x+2y^2-8y=-11$

$3(x^2+6x)+2(y^2-4y)=-11$

$3(x^2+6x+9)+2(y^2-4y+4)=-11+27+8$

(1) $3(x+3)^2+2(y-2)^2=24$ (1)

$\frac{(x+3)^2}{8}+\frac{(y-2)^2}{12}=1$ (½)

CENTER $=(-3,2)$ (½)

VERTICES $=(-3,2\pm\sqrt{12})=(-3,2\pm2\sqrt{3})$ (½)

$c^2=12-8=4$

$c=2$ (½)

FOCI $=(-3,2\pm2)=(-3,4),(-3,0)$ (½)

$e=\frac{2}{\sqrt{12}}=\frac{2}{2\sqrt{3}}=\frac{1}{\sqrt{3}}=\frac{\sqrt{3}}{3}$ (½)

Find the equation of the parabola with focus $(-8, 4)$ and directrix $x=2$. **SCORE: ____ / 3 PTS**

VERTEX $=\left(\frac{-8+2}{2},4\right)=(-3,4)$ (½)

$p=-5$ (½)

$(y-4)^2=4(-5)(x+3)$

$(y-4)^2=-20(x+3)$

(½) (1) (½)