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

AN ELLIPSE IS THE LOCUS OF POINTS IN A PLANE WHOSE DISTANCES TO 2 FIXED POINTS ADD UP TO A FIXED CONSTANT GRADED BY ME

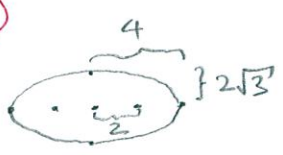
Find the foci and vertices of the ellipse $3x^2 + 4y^2 + 6x - 32y + 19 = 0$. **SCORE: ____ / 4 PTS**

$3(x^2+2x) + 4(y^2-8y) = -19$

$3(x^2+2x+1) + 4(y^2-8y+16) = -19 + 3 + 64$

$\frac{1}{2}$ $3(x+1)^2 + 4(y-4)^2 = 48$ $\frac{1}{2}$

$\frac{(x+1)^2}{16} + \frac{(y-4)^2}{12} = 1$ $\frac{1}{2}$



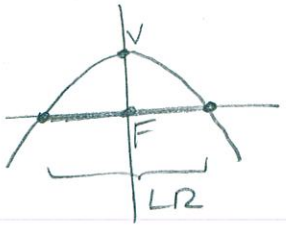
CENTER = $(-1, 4)$ $\frac{1}{2}$

VERTICES = $(-1 \pm \sqrt{16}, 4) = (-1 \pm 4, 4) =$ $(-5, 4)$ AND $(3, 4)$ 1

$c^2 = 16 - 12 = 4 \rightarrow c = 2$ FOCI = $(-1 \pm 2, 4) =$ $(-3, 4)$ AND $(1, 4)$ 1

The focus of a parabola is at the origin, and its vertex is at $(0, 5)$. **SCORE: ____ / 4 PTS**

[a] Find the equation of the parabola.



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

$x^2 = -20(y-5)$ $\frac{1}{2}$ 1 $\frac{1}{2}$

[b] The latus rectum of a parabola is the line segment passing through the focus, perpendicular to the axis of symmetry, with both endpoints on the parabola. Find the co-ordinates of the endpoints of the latus rectum of the parabola in [a].

$x^2 = -20(0-5)$

$x^2 = 100$ 1

$x = \pm 10$ $(\pm 10, 0)$ 1

Fill in the blanks. **NO NEED TO SHOW WORK.** **SCORE: ____ / 2 PTS**

[a] The midpoint of the minor axis of an ellipse is called the CENTER (1) of the ellipse.

[b] The eccentricity of the ellipse $\frac{x^2}{4}+\frac{y^2}{5}=1$ is $\frac{\sqrt{5}}{5}$ (1). $c^2=5-4=1 \rightarrow c=1$, $a=\sqrt{5}$

Find the equation of the ellipse with foci $(7,-5)$ and $(7,1)$, and a minor axis of length 10. **SCORE: ____ / 4 PTS**

CENTER $=(7,-2)$

$a^2=5^2+3^2$

$a^2=34$

$\frac{(x-7)^2}{25}+\frac{(y+2)^2}{34}=1$ ($\frac{1}{2}$, $\frac{1}{2}$, 1, 1, $\frac{1}{2}$)

Find the vertex, focus and equation of the directrix of the parabola $2x^2-12x+y+19=0$. **SCORE: ____ / 4 PTS**

$2x^2-12x=-y-19$

$x^2-6x=-\frac{1}{2}y-\frac{19}{2}$

$x^2-6x+9=-\frac{1}{2}y-\frac{19}{2}+9$

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

VERTEX $(3,-1)$ ($\frac{1}{2}$)

$4p=-\frac{1}{2} \rightarrow p=-\frac{1}{8}$

FOCUS $(3,-1-\frac{1}{8})=(3,-\frac{9}{8})$ (1)

DIRECTRIX $y=-1+\frac{1}{8}$

$y=-\frac{7}{8}$ (1) MUST INCLUDE "$y=$"