**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

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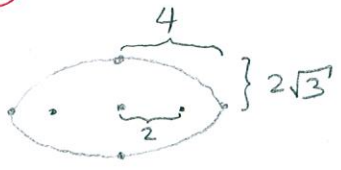
Find the foci and vertices of the ellipse $3x^2 + 4y^2 + 6x - 24y - 9 = 0$. **SCORE: ____ / 4 PTS**

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

$3(x^2+2x+1) + 4(y^2-6y+9) = 9+3+36$

(½) $3(x+1)^2 + 4(y-3)^2 = 48$ (½)

$\frac{(x+1)^2}{16} + \frac{(y-3)^2}{12} = 1$ (½)




CENTER = $(-1, 3)$ (½)

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

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

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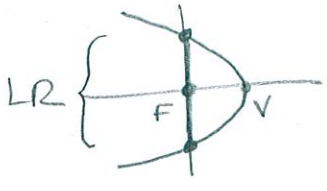
The focus of a parabola is at the origin, and its vertex is at $(3, 0)$. **SCORE: ____ / 4 PTS**

[a] Find the equation of the parabola.




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

$y^2 = -12(x-3)$

(½) (1) (½)

[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].

$y^2 = -12(0-3)$

$y^2 = 36$ (1)

$y = \pm 6$ $(0, \pm 6)$ (1)

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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 $\frac{x^2}{6}+\frac{y^2}{10}=1$ is $\frac{\sqrt{10}}{5}$ (1). $c^2=10-6=4 \rightarrow c=2$, $a=\sqrt{10}$

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


CENTER $=(7,-2)$

$5^2=b^2+3^2$

$b^2=16$ (½)

$\frac{(x-7)^2}{16}$ (½) $+$ (½) $\frac{(y+2)^2}{25}=1$ (½)

(1) (1)

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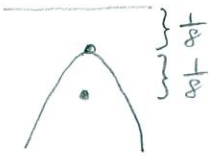
Find the vertex, focus and equation of the directrix of the parabola $2x^2-24x+y+73=0$. **SCORE: ____ / 4 PTS**

$2x^2-24x=-y-73$

$x^2-12x=-\frac{1}{2}y-\frac{73}{2}$

$x^2-12x+36=-\frac{1}{2}y-\frac{73}{2}+36$

(½) $(x-6)^2=-\frac{1}{2}y-\frac{1}{2}=-\frac{1}{2}(y+1)$ (½) (½)




VERTEX $(6,-1)$ (½)

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

FOCUS $(6,-1-\frac{1}{8})=(6,-\frac{9}{8})$ (1)

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

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