

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: ____ / 5 PTS

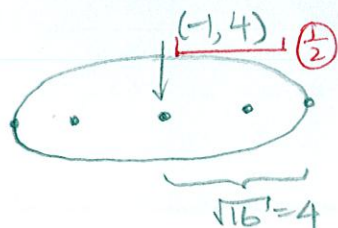
$$3x^2 + 6x + 4y^2 - 32y = -19$$

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

$$\textcircled{\frac{1}{2}} \quad 3(x^2 + 2x + 1) + 4(y^2 - 8y + 16) = -19 + 3(1) + 4(16) \quad \textcircled{\frac{1}{2}}$$

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

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



$$c^2 = 16 - 12 = 4$$
$$c = 2$$

$$\text{VERTICES} = (-1 \pm 4, 4)$$

$$= (3, 4), (-5, 4) \quad \textcircled{1}$$

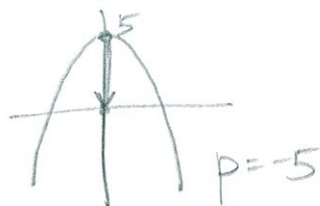
$$\text{FOCI} = (-1 \pm 2, 4)$$

$$= (1, 4), (-3, 4) \quad \textcircled{1}$$

The focus of a parabola is at the origin, and its vertex is at $(0, 5)$.

SCORE: ____ / 2 PTS

Find the equation of the parabola.



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

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

$\textcircled{\frac{1}{2}}$

$\textcircled{1}$

$\textcircled{\frac{1}{2}}$

Fill in the blanks. **NO NEED TO SHOW WORK.**

SCORE: ____ / 3 PTS

[a] The latera recta of an ellipse are perpendicular to THE MAJOR AXIS and pass through THE FOCI.

[b] The eccentricity of the ellipse $\frac{x^2}{6} + \frac{y^2}{10} = 1$ is $\frac{\sqrt{10}}{5}$. $c^2 = 10 - 6 = 4 \rightarrow c = 2$
 $e = \frac{c}{a} = \frac{2}{\sqrt{10}}$

Find the equation of the ellipse with foci $(7, -5)$ and $(7, 1)$, and a major axis of length 10.

SCORE: ____ / 4 PTS

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

$\frac{1}{2}(10) = 5$
 $\begin{array}{c} \bullet V \\ \bullet F(7, 1) \\ \bullet C(7, -2) \\ \bullet F(7, -5) \\ \bullet V \end{array}$

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

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

$b^2 = 16$

Find the vertex, focus and equation of the directrix of the parabola $2x^2 - 24x + y + 73 = 0$.

SCORE: ____ / 4 PTS

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

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

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

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

$(x-6)^2 = -\frac{1}{2}(y+1) \rightarrow 4p = -\frac{1}{2} \rightarrow p = -\frac{1}{8}$

$\frac{1}{2}$ FOR EACH UNDERLINED ITEM

DIRECTRIX $y = -1 + \frac{1}{8} \rightarrow y = -\frac{7}{8}$

VERTEX $(6, -1)$

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

MUST HAVE "y ="

