

Using complete sentences, write the distance based definition of "parabola".

SCORE: ____ / 2 PTS

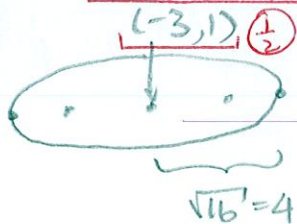
A PARABOLA IS THE LOCUS OF POINTS IN A PLANE
WHICH ARE EQUIDISTANT
FROM A FIXED LINE AND A FIXED POINT NOT ON THE LINE.

GRADED BY ME

Find the foci and vertices of the ellipse $3x^2 + 4y^2 + 18x - 8y - 17 = 0$.

SCORE: ____ / 5 PTS

$$\begin{aligned} 3x^2 + 18x + 4y^2 - 8y &= 17 \\ 3(x^2 + 6x) + 4(y^2 - 2y) &= 17 \\ \textcircled{\frac{1}{2}} \quad 3(x^2 + 6x + 9) + 4(y^2 - 2y + 1) &= 17 + 3(9) + 4(1) \quad \textcircled{\frac{1}{2}} \\ 3(x+3)^2 + 4(y-1)^2 &= 48 \quad \textcircled{\frac{1}{2}} \\ \frac{(x+3)^2}{16} + \frac{(y-1)^2}{12} &= 1 \quad \textcircled{\frac{1}{2}} \end{aligned}$$



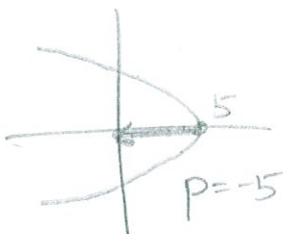
$$\begin{aligned} c^2 &= 16 - 12 = 4 \\ c &= 2 \end{aligned}$$

$$\begin{aligned} \text{VERTICES} &= (-3 \pm 4, 1) \\ &= (1, 1), (-7, 1) \quad \textcircled{1} \\ \text{FOCI} &= (-3 \pm 2, 1) \\ &= (-1, 1), (-5, 1) \quad \textcircled{1} \end{aligned}$$

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

SCORE: ____ / 2 PTS

Find the equation of the parabola.



$$\begin{aligned} y^2 &= 4(-5)(x-5) \\ y^2 &= -20(x-5) \\ \textcircled{\frac{1}{2}} \quad \textcircled{1} \quad \textcircled{\frac{1}{2}} \end{aligned}$$

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 $\frac{x^2}{4} + \frac{y^2}{5} = 1$ is $\frac{\sqrt{5}}{5}$. $c^2 = 5 - 4 = 1 \rightarrow c = 1$
 $e = \frac{c}{a} = \frac{1}{\sqrt{5}}$

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

SCORE: ____ / 4 PTS

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

$\frac{1}{2}(10) = 5$

$F(7, 1)$
 $C(7, -2)$
 $F(7, -5)$

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

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

$a^2 = 34$

Find the vertex, focus and equation of the directrix of the parabola $2x^2 - 12x + y + 19 = 0$.

SCORE: ____ / 4 PTS

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

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

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

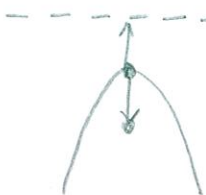
$(x-3)^2 = -\frac{1}{2}y - \frac{1}{2}$

$(x-3)^2 = -\frac{1}{2}(y+1)$ $\rightarrow 4p = -\frac{1}{2} \rightarrow p = -\frac{1}{8}$

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

--- VERTEX = $(3, -1)$

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



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

MUST HAVE
"y = "