

Write the formal definition of an ellipse used in lecture.

SCORE: _____ / 2 PTS

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

Find the equation of the ellipse with vertices $(\pm 6, 0)$ and foci $(\pm 3, 0)$.

SCORE: _____ / 3 PTS



$$6^2 = b^2 + 3^2$$

$$36 = b^2 + 9$$

$$b^2 = 27$$

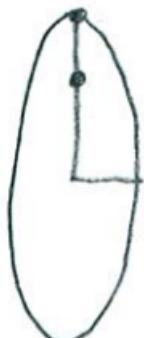
$$\left| \frac{x^2}{36} \right| + \left| \frac{y^2}{27} \right| = 1$$

Annotations for the ellipse equation:

- Red circles with the number 1 are placed under the terms $\frac{x^2}{36}$ and $\frac{y^2}{27}$.
- A red circle with the fraction $\frac{1}{2}$ is placed to the right of the equation.
- A red arrow points from the center of the fraction $\frac{1}{2}$ down to the center of the fraction $\frac{y^2}{27}$.

Find the co-ordinates of the vertices and foci of the ellipse $\frac{x^2}{68} + \frac{y^2}{88} = 1$.

SCORE: _____ / 3 PTS



$$88 = 68 + c^2$$

$$c^2 = 20$$

$$c = 2\sqrt{5}$$

↑ TALL + SKINNY

VERTICES $(0, \pm \sqrt{88}) = (0, \pm 2\sqrt{22})$

FOCI $(0, \pm 2\sqrt{5})$

1½

1½

SUBTRACT $\frac{1}{2}$ POINT
EACH ANSWER YOU FORGOT ±

Find the co-ordinates of the focus and vertex, and the equation of the directrix, of the parabola $y^2 + 16x + 12y - 44 = 0$.

SCORE: _____ / 5 PTS

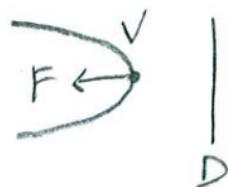
$$y^2 + 12y = -16x + 44$$

$$\textcircled{1}, \quad y^2 + 12y + 36 = -16x^2 + 80 \quad \textcircled{1}$$

$$(y+6)^2 = -16(x-5) \quad \textcircled{1}$$

$$4p = -16$$

$$P = -4 \quad \textcircled{1}$$



VERTEX $(5, -6)$ $\textcircled{\frac{1}{2}}$

FOCUS $(5-4, -6)$

$= (1, -6)$ $\textcircled{\frac{1}{2}}$

DIRECTRIX $x = 5+4$

$$\underline{x = 9} \quad \textcircled{1}$$

An arrow points upwards from the directrix equation to the value 9.

SUBTRACT $\frac{1}{2}$ POINT

IF YOU FORGOT $x =$

OR WROTE $y =$
INSTEAD

Find the equations of the following parabolas.

SCORE: _____ / 7 PTS

- [a] vertex at the origin, directrix $x = 12$

A hand-drawn diagram of a parabola opening to the left. The vertex is at the origin (0,0), indicated by a small circle with a dot. A vertical line segment extends downwards from the vertex, labeled 'v' at the top. To the right of the vertex, a horizontal line segment extends to the right, labeled 'D' at the end. The equation $y^2 = 4(-12)x$ is written above the vertex. Below it, another equation $y^2 = -48x$ is shown with red annotations: a bracket under the first term y^2 is labeled '1', a bracket under the entire term $-48x$ is labeled '1', and a bracket under the entire equation is labeled '1'.

- [b] focus $(6, 2)$, directrix $y = -5$

$$\text{VERTEX} = (6, \frac{2-5}{2}) = (6, -\frac{3}{2})$$

$$P = 2 - \frac{-3}{2} = \frac{7}{2}$$

$$(x-6)^2 = 4(\frac{7}{2})(y + \frac{3}{2})$$

$$(x-6)^2 = 14(y + \frac{3}{2})$$

