

Find the co-ordinates of the vertices and foci of the ellipse $\frac{x^2}{42} + \frac{y^2}{54} = 1$.

SCORE: _____ / 3 PTS



$$54 = 42 + c^2$$

$$c^2 = 12$$

$$c = 2\sqrt{3}$$

TALL + SKINNY

VERTICES

FOCI

$$(0, \pm \sqrt{54}) = (0, \pm 3\sqrt{6}),$$

$$(0, \pm 2\sqrt{3})$$

(1½)

(1½)

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

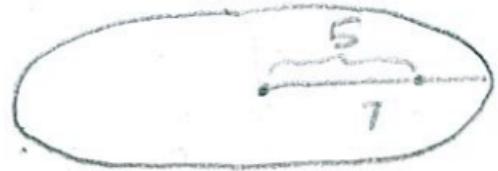
Write the formal definition of an ellipse used in lecture.

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 $(\pm 7, 0)$ and foci $(\pm 5, 0)$.

SCORE: _____ / 3 PTS



$$7^2 = b^2 + 5^2$$

$$49 = b^2 + 25$$

$$b^2 = 24$$

$$\left| \frac{x^2}{49} \right| + \left| \frac{y^2}{24} \right| = 1$$

The diagram shows the standard form of the ellipse equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. The term $\frac{x^2}{49}$ is circled with a red circle containing the number 1. The term $\frac{y^2}{24}$ is circled with a red circle containing the number 1. The right side of the equation, 1, is circled with a red circle containing the fraction $\frac{1}{2}$. A red arrow points from the fraction $\frac{1}{2}$ down to the circled 1 under the y^2 term.

Find the equations of the following parabolas.

SCORE: ____ / 7 PTS

- [a] vertex at the origin, directrix $x = 6$

A hand-drawn diagram of a parabola opening to the left. The vertex is at the origin (0,0), marked with a small circle. A vertical dashed line extends upwards from the vertex, labeled 'D' at the bottom. A horizontal dashed line extends to the right, labeled 'x' at the top. The distance from the vertex to the directrix is 6 units, indicated by a red bracket below the x-axis. The focus is located 6 units to the left of the vertex, at (-6, 0), also marked with a small circle. A red bracket above the y-axis indicates the distance from the vertex to the focus is 6 units.

$$y^2 = 4(-6)x$$
$$y^2 = -24x$$

- [b] focus $(7, 1)$, directrix $y = -6$

$$\text{VERTEX} = \left(7, \frac{1-6}{2}\right) = \left(7, -\frac{5}{2}\right)$$

$$P = 1 - -\frac{5}{2} = \frac{7}{2}$$

$$(x-7)^2 = 4\left(\frac{7}{2}\right)(y + \frac{5}{2})$$

$$(x-7)^2 = 14(y + \frac{5}{2})$$



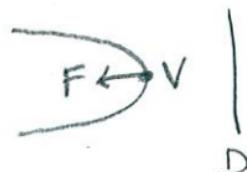
Find the co-ordinates of the focus and vertex, and the equation of the directrix, of the parabola $y^2 + 24x + 8y - 56 = 0$.

SCORE: _____ / 5 PTS

$$\begin{aligned} y^2 + 8y &= -24x + 56 \\ \textcircled{1} \\ \underline{y^2 + 8y + 16} &= \underline{-24x + 72} \quad \textcircled{2} \\ (y+4)^2 &= -24(x-3) \quad \textcircled{1} \end{aligned}$$

$$4p = -24$$

$$P = -6 \quad \textcircled{2}$$



VERTEX $\boxed{(3, -4)}$ $\frac{1}{2}$
FOCUS $(3-6, -4)$
 $= (-3, -4)$ $\frac{1}{2}$

DIRECTRIX $x = 3 + 6$
 $x = 9$ $\frac{1}{2}$

SUBTRACT $\frac{1}{2}$ POINT
IF YOU FORGOT $x =$
OR WROTE $y =$
INSTEAD