

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

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

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

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

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



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

$$36 = b^2 + 9$$

$$b^2 = 27$$

$$\boxed{\frac{x^2}{36}} + \boxed{\frac{y^2}{27}} = 1$$

Handwritten equation of the ellipse. The terms $\frac{x^2}{36}$ and $\frac{y^2}{27}$ are each enclosed in a red box. Below the first box is a circled '1'. Below the second box is a circled '1'. Below the equals sign is a circled $\frac{1}{2}$. A red arrow points from the circled $\frac{1}{2}$ to the plus sign between the two boxes.

Find the equations of the following parabolas.

SCORE: ____ / 7 PTS

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



$$y^2 = 4(-12)x$$
$$y^2 = -48x$$

(Handwritten red annotations: a bracket under -48 with a circled 1, an arrow pointing from the circled 1 to the coefficient -12, and a circled 1 under -12.)

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

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

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

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

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

(Handwritten red annotations: a bracket under (x-6) with a circled 1, a bracket under 14 with a circled 1 and a circled 1/2, and a bracket under (y + 3/2) with a circled 1.)



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

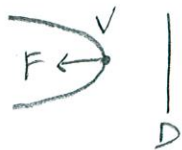
$$y^2 + 12y = -16x + 44$$

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

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

$$4p = -16$$

$$\underline{p = -4} \textcircled{\frac{1}{2}}$$



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

$$\text{FOCUS } (5-4, -6) \\ = \underline{(1, -6)} \textcircled{\frac{1}{2}}$$

$$\text{DIRECTRIX } x = 5+4$$

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



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