

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

SCORE: ____ / 3 PTS



↑ TALL + SKINNY

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

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

$(1\frac{1}{2})$ $(1\frac{1}{2})$

$$54 = 42 + c^2$$

$$c^2 = 12$$

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

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

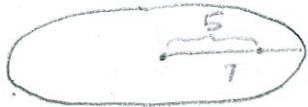
Write the formal definition of an ellipse used in lecture.

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

SCORE: ____ / 3 PTS



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

$$49 = b^2 + 25$$

$$b^2 = 24$$

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

Handwritten red annotations: The denominators 49 and 24 are each circled with a 1 below them. The right-hand side 1 is circled with a 1/2 below it. A red arrow points from the circled 1/2 to the plus sign between the two fractions.

Find the equations of the following parabolas.

SCORE: ____ / 7 PTS

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



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

Red annotations: Brackets under y^2 , -24 , and x are each labeled with a circled 1. A red arrow points from the circled 1 under -24 to the 4 in the equation above.

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

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

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

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

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

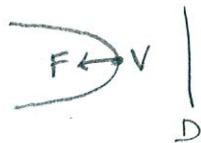
Red annotations: Brackets under $(x-7)^2$, 14 , and $\left(y + \frac{5}{2}\right)$ are each labeled with a circled 1. A red arrow points from the circled 1 under 14 to the 4 in the equation above.



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

$$\begin{aligned} y^2 + 8y &= -24x + 56 \\ \left(\frac{1}{2}\right) y^2 + 8y + 16 &= -24x + 72 \quad (1) \\ (y+4)^2 &= -24(x-3) \quad (1) \\ 4p &= -24 \\ p &= -6 \quad \left(\frac{1}{2}\right) \end{aligned}$$



$$\text{VERTEX } (3, -4) \quad \left(\frac{1}{2}\right)$$

$$\begin{aligned} \text{FOCUS } (3-6, -4) \\ = (-3, -4) \quad \left(\frac{1}{2}\right) \end{aligned}$$

$$\begin{aligned} \text{DIRECTRIX } x &= 3+6 \\ x &= 9 \quad (1) \end{aligned}$$

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