

Find the equations of the following parabolas.

SCORE: ____ / 7 PTS

- [a] vertex at the origin, directrix $y = 10$



$$x^2 = 4(-10)y$$
$$x^2 = -40y$$

The equation $x^2 = -40y$ is annotated with red markings: a bracket under x^2 with a circled 1 below it, a bracket under -40 with a circled 1 below it, and a circled 1 below the y .

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



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

$$p = 6 - \frac{1}{2} = \frac{11}{2}$$

$$(y-2)^2 = 4\left(\frac{11}{2}\right)\left(x - \frac{1}{2}\right)$$

$$(y-2)^2 = 22\left(x - \frac{1}{2}\right)$$

The equation $(y-2)^2 = 22(x - \frac{1}{2})$ is annotated with red markings: a bracket under $(y-2)^2$ with a circled 1 below it, a bracket under 22 with a circled $\frac{1}{2}$ below it, and a bracket under $(x - \frac{1}{2})$ with a circled 1 below it.

Write the formal definition of a parabola used in lecture.

SCORE: ____ / 2 PTS

A PARABOLA IS THE LOCUS OF POINTS IN THE PLANE
WHOSE DISTANCES TO A FIXED POINT AND A FIXED LINE
ARE EQUAL

Find the co-ordinates of the focus and vertex, and the equation of the directrix, of the parabola $x^2 + 14x + 12y - 23 = 0$.

SCORE: ____ / 5 PTS

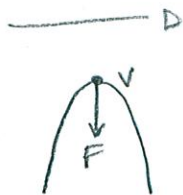
$$x^2 + 14x = -12y + 23$$

$$\textcircled{\frac{1}{2}} \quad \underline{x^2 + 14x + 49 = -12y + 72} \quad \textcircled{1}$$

$$\underline{(x+7)^2 = -12(y-6)} \quad \textcircled{1}$$

$$4p = -12$$

$$\underline{p = -3} \quad \textcircled{\frac{1}{2}}$$



$$\text{VERTEX } \underline{(-7, 6)} \quad \textcircled{\frac{1}{2}}$$

$$\text{FOCUS } (-7, 6-3) \\ = \underline{(-7, 3)} \quad \textcircled{\frac{1}{2}}$$

$$\text{DIRECTRIX } y = 6 + 3$$

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

↑

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

Find the co-ordinates of the vertices and foci of the ellipse $\frac{x^2}{40} + \frac{y^2}{12} = 1$.

SCORE: ____ / 3 PTS



↑ SHORT & FAT

$$40 = 12 + c^2$$

$$c^2 = 28$$

$$c = 2\sqrt{7}$$

$$\text{VERTEX } (\pm \sqrt{40}, 0) = (\pm 2\sqrt{10}, 0)$$

$$\text{FOCI } (\pm 2\sqrt{7}, 0)$$

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

EACH ANSWER YOU FORGOT $\pm$

Find the equation of the ellipse with vertices $(0, \pm 7)$ and foci $(0, \pm 6)$.

SCORE: ____ / 3 PTS



$$7^2 = b^2 + 6^2$$

$$49 = b^2 + 36$$

$$b^2 = 13$$

$$\frac{x^2}{13} + \frac{y^2}{49} = 1$$

Handwritten equation of the ellipse. The terms $\frac{x^2}{13}$ and $\frac{y^2}{49}$ are each enclosed in a red box, with a circled 1 below each. A red arrow points from a circled $\frac{1}{2}$ below the plus sign to the plus sign itself. The right side of the equation is 1, with a circled $\frac{1}{2}$ below it.