

Write the formal definition of a parabola used in lecture.

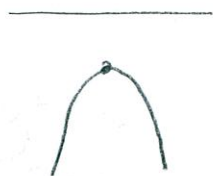
SCORE: ____ / 2 PTS

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

Find the equations of the following parabolas.

SCORE: ____ / 7 PTS

- [a] vertex at the origin, directrix $y = 8$



$$x^2 = 4(-8)y$$
$$\underbrace{x^2}_{(1)} = \underbrace{-32y}_{(1)}$$

(1)

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



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

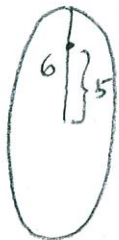
$$p = 7 - \frac{1}{2} = \frac{13}{2}$$

$$(y-1)^2 = 4\left(\frac{13}{2}\right)\left(x - \frac{1}{2}\right)$$

$$\underbrace{(y-1)^2}_{(1)} = \underbrace{26}_{(1\frac{1}{2})} \underbrace{\left(x - \frac{1}{2}\right)}_{(1)}$$

Find the equation of the ellipse with vertices $(0, \pm 6)$ and foci $(0, \pm 5)$.

SCORE: ____ / 3 PTS



$$6^2 = b^2 + 5^2$$

$$36 = b^2 + 25$$

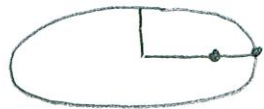
$$b^2 = 11$$

$$\frac{x^2}{11} + \frac{y^2}{36} = 1$$

Handwritten red annotations: A circled '1' under the first denominator, a circled '1' under the second denominator, a circled ' $\frac{1}{2}$ ' under the right-hand side, and a red arrow pointing from the circled ' $\frac{1}{2}$ ' to the '+' sign between the two fractions.

Find the co-ordinates of the vertices and foci of the ellipse $\frac{x^2}{50} + \frac{y^2}{32} = 1$.

SCORE: ____ / 3 PTS



$$50 = 32 + c^2$$

$$c^2 = 18$$

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

↑ SHORT + FAT

$$\text{VERTICES } (\pm \sqrt{50}, 0) = (\pm 5\sqrt{2}, 0)$$

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

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

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

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

EACH ANSWER YOU FORGOT $\pm$

Find the co-ordinates of the focus and vertex, and the equation of the directrix, of the parabola $x^2 + 10x + 20y - 55 = 0$.

SCORE: ____ / 5 PTS

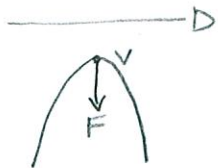
$$x^2 + 10x = -20y + 55$$

$$\textcircled{\frac{1}{2}} \quad \underline{x^2 + 10x + 25 = -20y + 80} \quad \textcircled{1}$$

$$\underline{(x+5)^2 = -20(y-4)} \quad \textcircled{1}$$

$$4p = -20$$

$$\underline{p = -5} \quad \textcircled{\frac{1}{2}}$$



$$\text{VERTEX } \underline{(-5, 4)} \quad \textcircled{\frac{1}{2}}$$

$$\text{FOCUS } (-5, 4-5)$$

$$= \underline{(-5, -1)} \quad \textcircled{\frac{1}{2}}$$

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

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

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