

PROBLEM SET 3

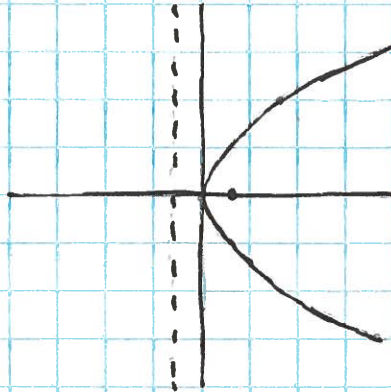
1. $x = \frac{2}{5}y^2$ AND $x = ay^2$ so $a = \frac{2}{5}$

$$a = \frac{1}{4d} \quad \text{so} \quad d = \frac{5}{8}$$

DIRECTRIX: $x = -\frac{5}{8}$

VERTEX = $(0, 0)$

Focus = $(\frac{5}{8}, 0)$



2. $x^2 + 9y^2 = 9$

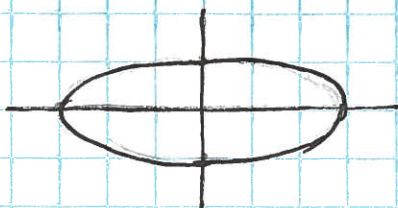
$$\frac{x^2}{3^2} + \frac{y^2}{1^2} = 1$$

$$a = 3$$
$$b = 1$$

$$b^2 = a^2 - c^2$$
$$c = 2\sqrt{2}$$

VERTICES: $(3, 0)$ AND $(-3, 0)$

FOCI: $(2\sqrt{2}, 0)$ AND $(-2\sqrt{2}, 0)$



3. $x^2 - y^2 = 100$

$$\frac{x^2}{10^2} - \frac{y^2}{10^2} = 1$$

$$a = 10$$

$$b = 10$$

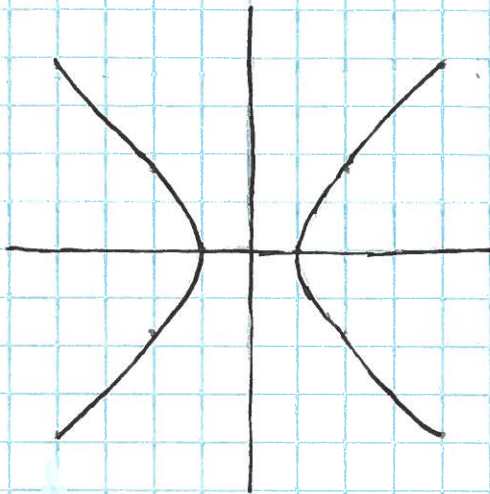
$$b^2 = c^2 - a^2$$

$$c = \pm 10\sqrt{2}$$

VERTICES: $(\pm 10, 0)$

FOCI: $(\pm 10\sqrt{2}, 0)$

ASYMPTOTES: $\pm \frac{b}{a} = \pm 1$ so $y = \pm x$



4. $x^2 = 4y - 2y^2$

$$x^2 + 2(y^2 - 2y + 1) = 2$$

$$x^2 + 2(y-1)^2 = 2$$

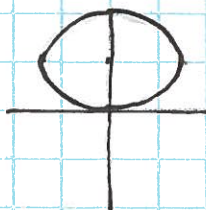
$$\frac{x^2}{\sqrt{2}^2} + \frac{(y-1)^2}{1^2} = 1$$

VERTICES: $(\pm \sqrt{2}, 1)$

$$b^2 = a^2 - c^2$$

$$1^2 = 2^2 - c^2$$

$c = \pm 1$ so foci: $(\pm 1, 1)$



5. $d = 4$ AND $a = \frac{1}{4d}$ so $a = \frac{1}{16}$

CURVE IS $y = \frac{x^2}{16}$ BUT SHIFTED $(3, 2)$

so $y - 2 = \frac{(x - 3)^2}{16}$

6. CENTER IS AT $(0, 4)$, so $c = \pm 2$
 $a = \pm 4$

$b^2 = a^2 - c^2 = (4\sqrt{3})^2$

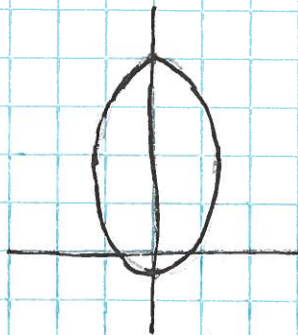
$\frac{x^2}{(4\sqrt{3})^2} + \frac{(y - 4)^2}{4^2} = 1$

7. $R = \frac{e \cdot d}{1 \pm e \cdot \cos \theta}$ $R = \frac{9}{1 - 3 \cos \theta}$

8. $R = \frac{e \cdot d}{1 \pm e \cdot \sin \theta}$ $R = \frac{0.8}{1 - 0.8 \sin \theta}$ $e = 0.8$
 $d = 1$

- a. $e = 0.8$
b. ELLIPSE
c. $y = -1$

d.



AT $\frac{\pi}{2}$ $R = 4$

AT $\frac{3\pi}{2}$ $R = \frac{4}{9}$

$a^2 = \frac{e^2 d^2}{1 - e^2}$ so $a = 1.3$

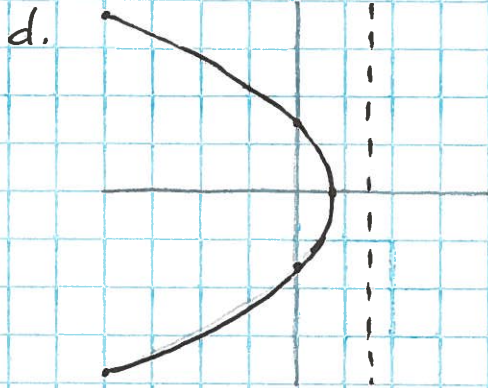
9.
$$r = \frac{3}{2 + 2\cos\theta}$$

$$r = \frac{1.5}{1 + \cos\theta}$$

a. $e = 1$

b. PARABOLA

c. $d = 1.5$ so $x = 1.5$



10.

$$r = \frac{1.56 \times 10^6 (1 - 0.093^2)}{1 + 0.093 \cos\theta}$$