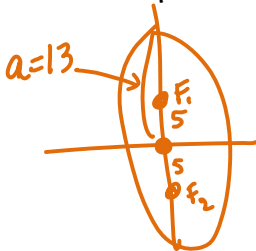


CONIC SECTIONS: DAY 3

ELLIPSES (DAY 2)

1. Write equation of ellipse with foci at $(0, \pm 5)$ and major axis length = 26.



$$c = 5$$

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

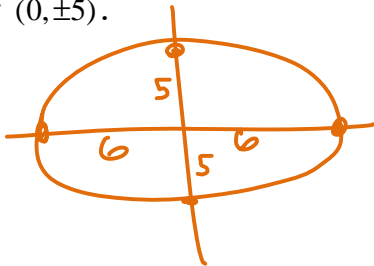
$$25 = 169 - b^2$$

$$b^2 = 144$$

$$b = 12$$

$$\frac{x^2}{144} + \frac{y^2}{169} = 1$$

2. Write equation of ellipse with endpoints of the major axis at $(\pm 6, 0)$ and endpoints of the minor axis at $(0, \pm 5)$.



$$\frac{x^2}{36} + \frac{y^2}{25} = 1$$

3. Eliminate the parameter. $X = -3 + 5 \cos T$
 $Y = 3 + 2 \sin T$

$$\left(\frac{x+3}{5}\right)^2 + \left(\frac{y-3}{2}\right)^2 = 1$$

Completing the Square for an Ellipse

$$\textcircled{4} \quad 3x^2 + 5y^2 - 12x + 30y + 42 = 0$$

$$3x^2 - 12x + 5y^2 + 30y = -42$$

$$3(x^2 - 4x + \underline{4}) + 5(y^2 + 6y + \underline{9}) = -42 + \underline{12} + \underline{45}$$

$$\frac{3(x-2)^2}{15} + \frac{5(y+3)^2}{15} = \frac{15}{15}$$

$$\frac{(x-2)^2}{5} + \frac{(y+3)^2}{3} = 1$$

$$\textcircled{5} \quad 4x^2 + y^2 - 32x + 16y + 124 = 0$$

$$4x^2 - 32x + y^2 + 16y = -124$$

$$4(x^2 - 8x + \underline{16}) + y^2 + 16y + \underline{64} = -124 + \underline{64} + \underline{64}$$

$$\frac{4(x-4)^2}{4} + \frac{(y+8)^2}{4} = \frac{4}{4}$$

$$\frac{(x-4)^2}{1} + \frac{(y+8)^2}{4} = 1$$