

Day 2

Eccentricity of an ellipse is the measure of the "ovalness" of the ellipse.

$e=c/a$, where $0 < e < 1$. If the eccentricity is close to 0, then the ellipse is close to being circular. If the eccentricity is close to 1, then the ellipse is more flat.

Example: Find the center, foci, vertices and eccentricity of $25x^2 + 9y^2 - 200x + 36y + 211 = 0$ and sketch the graph. Complete the square

regroup $25x^2 - 200x + 9y^2 + 36y = -211$

factor out
coef. of x^2, y^2

$$25(x^2 - 8x + \underline{16}) + 9(y^2 + 4y + \underline{4}) = -211$$

$(x-4)(x-4)$

$+25(16)$
 $+9(4)$

$$25(x-4)^2 + 9(y+2)^2 = 225$$

$$\frac{225}{225} \quad \frac{225}{225} \quad \frac{225}{225}$$

$$\frac{(x-4)^2}{9} + \frac{(y+2)^2}{25} = 1$$

center $(4, -2)$

$$a^2 = 25, a = \pm 5$$

$$b^2 = 9, b = \pm 3$$

vertices $(4, 3)$ $(4, -7)$

$$\text{Foci: } c^2 = a^2 - b^2$$

$$c^2 = 25 - 9$$

$$c^2 = 16$$

$$c = \pm 4$$

foci $(4, 2)$ $(4, -6)$

$$\text{eccentricity: } e = \frac{c}{a}$$

$$e = \frac{4}{5}$$

