

Precalc 10.3

Determine and use standard and general forms for the equations of ellipses

Graph ellipses

Locate and use foci on ellipses

Quiz 10.1-10.2 Fri.

focus (sing)--foci (pl)

ellipse

vertex--vertices

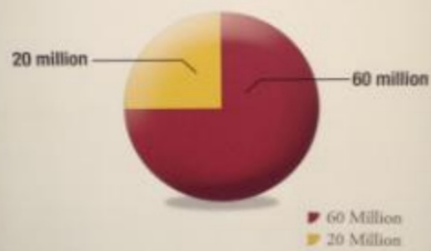
major axis

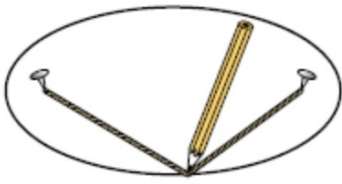
minor axis

eccentricity

activity: parking lot

1/3 of our operating
budget
goes towards
financial aid.





Parking lot

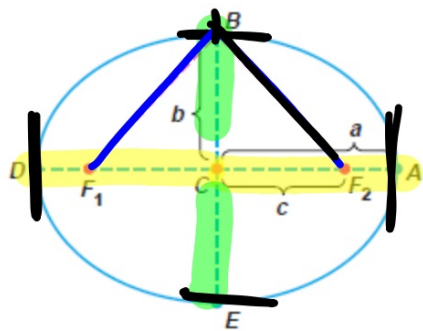
Parking lot:

major axis

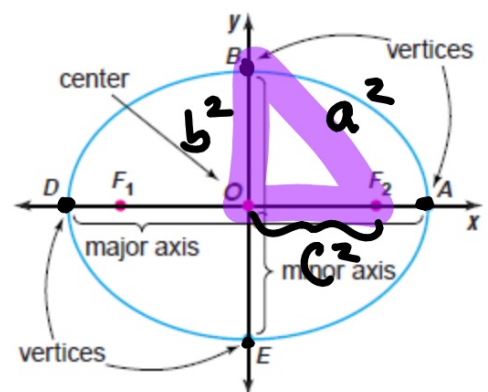
minor axis

semi-major axis

semi-minor axis



$$\text{!} \quad \text{---} \quad \cancel{a^2 + b^2 = c^2}$$



$$b^2 + c^2 = a^2$$

$$\frac{(x-2)^2}{36} + \frac{(y+4)^2}{9} = 1$$

What do I need to know?

$$b = 3$$

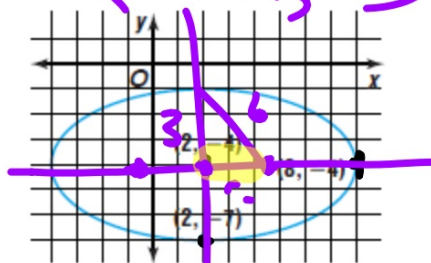
$$(2+3\sqrt{3}, -4)$$

$$(2-3\sqrt{3}, -4)$$

2 Consider the ellipse graphed at the right.

a. Write the equation of the ellipse in standard form.

b. Find the coordinates of the foci.



$$3^2 + c^2 = 6^2$$

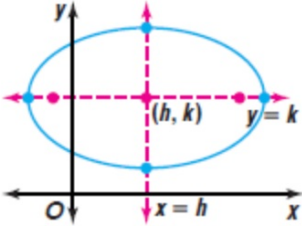
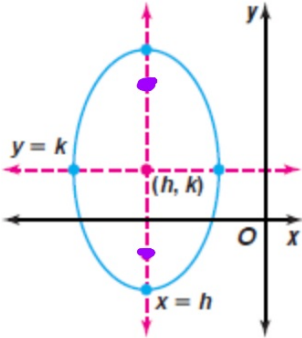
$$9 + c^2 = 36$$

$$c^2 = 27$$

$$c = \sqrt{27}$$

$$c = \pm \sqrt{27}$$

e634

Standard Form of the Equation of an Ellipse	Orientation	Description
$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1,$ where $c^2 = a^2 - b^2$		Center: (h, k) Foci: $(h \pm c, k)$ Major axis: $y = k$ Major axis vertices: $(h \pm a, k)$ Minor axis: $x = h$ Minor axis vertices: $(h, k \pm b)$
↓ $\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1,$ where $c^2 = a^2 - b^2$		Center: (h, k) Foci: $(h, k \pm c)$ Major axis: $x = h$ Major axis vertices: $(h, k \pm a)$ Minor axis: $y = k$ Minor axis vertices: $(h \pm b, k)$

major axis...2a
whichever is
longer
minor axis...2b
whichever is
shorter

**Note change
order:
long way (major
axis)
is first**

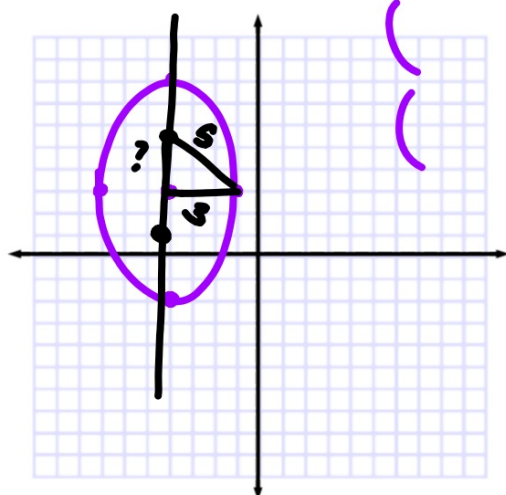
3 For the equation $\frac{(y-3)^2}{25} + \frac{(x+4)^2}{9} = 1$, find the coordinates of the center, foci, and vertices of the ellipse. Then graph the equation.

$C(-4, 3)$

$V(\quad)$

$F(-4, 7)$

$(-4, -1)$



CTS complications:

$$2x^2 + 3y^2 + 8x + 6y - 7 = 0$$

$$\left(\frac{\quad}{a}\right)^2 + \left(\frac{\quad}{b}\right)^2 = 1$$

$$2(x^2 + 4x + 4) + 3(y^2 + 2y + 1) = 7 + 8 + 3$$

$$\frac{2(x+2)^2}{18} + \frac{3(y+1)^2}{18} = \frac{18}{18}$$

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

$$e = \frac{c}{a}$$

10.3

17-45 odd