

Precalc 10.3

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

Graph ellipses

Locate and use foci on ellipses

focus (sing)--foci (pl)

ellipse

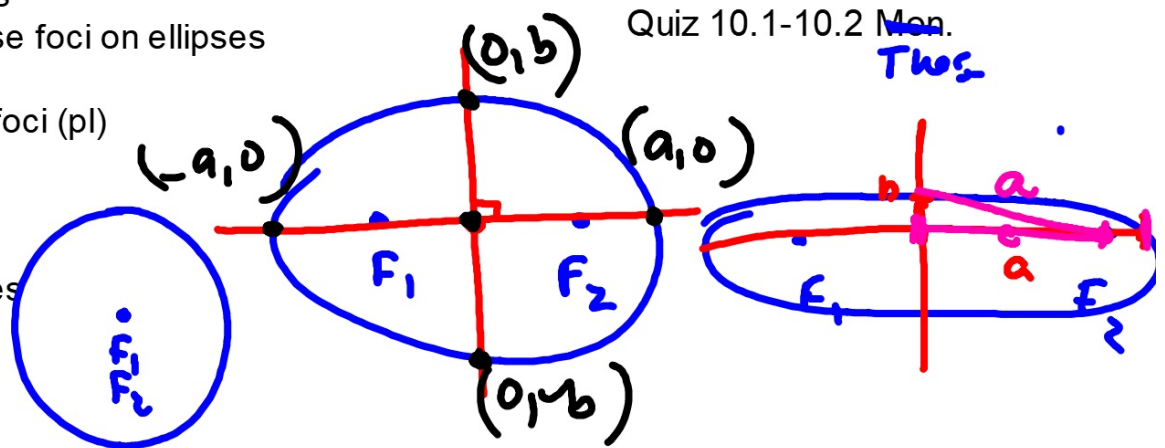
vertex--vertices

major axis

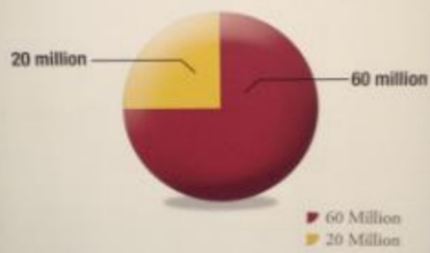
minor axis

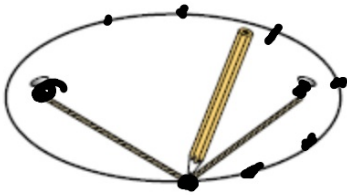
eccentricity

activity: parking lot



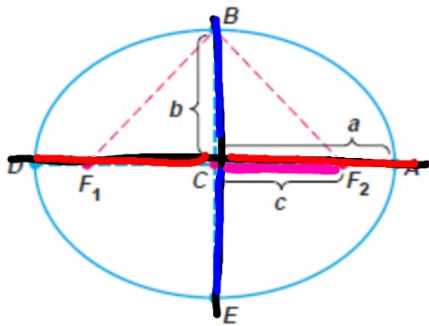
**1/3** of our operating budget goes towards financial aid.





Parking lot

Parking lot:

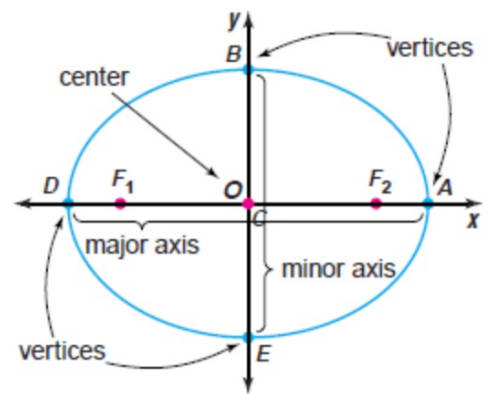


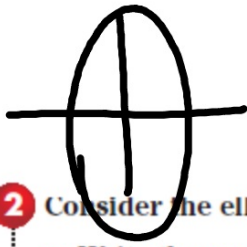
major axis

minor axis

semi-major axis

semi-minor axis





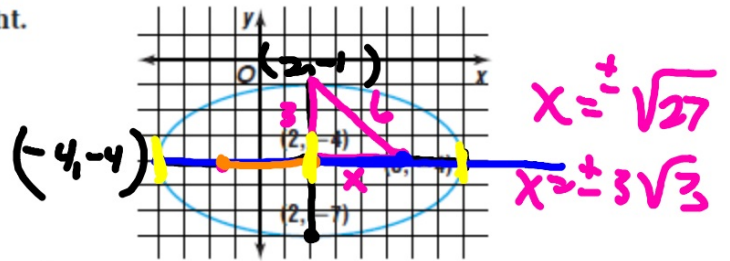
What do I need to know?

2 Consider the ellipse graphed at the right.

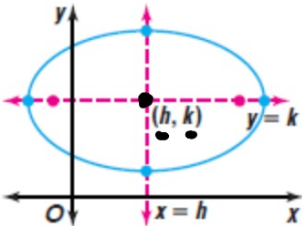
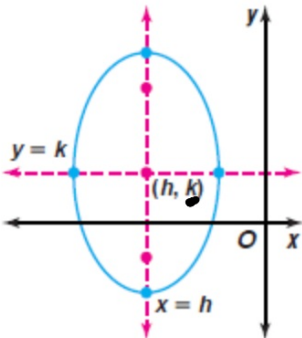
- a. Write the equation of the ellipse in standard form.  $(2 \pm 3\sqrt{3}, -4)$   
 b. Find the coordinates of the foci.

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

$a^2$                        $b^2$



$$\begin{aligned} 3^2 + x^2 &= 6^2 \\ 9 + x^2 &= 36 \\ x^2 &= 27 \end{aligned}$$

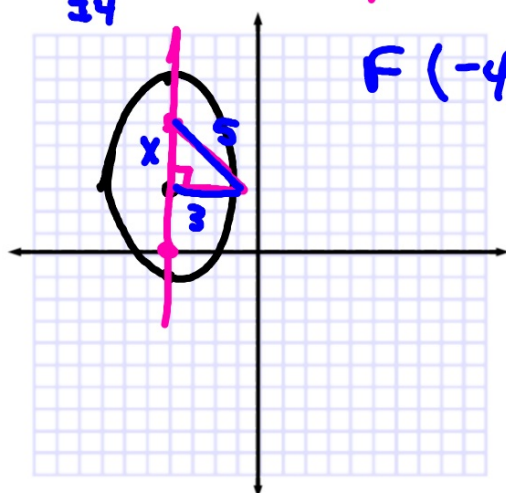
Standard Form of the Equation of an Ellipse	Orientation	Description
<div style="border: 2px solid black; padding: 5px; display: inline-block;"> <math display="block">\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1,</math> <p>where <math>c^2 = a^2 - b^2</math></p> </div>		<p>Center: <math>(h, k)</math>  Foci: <math>(h \pm c, k)</math>  Major axis: <math>y = k</math>  Major axis vertices: <math>(h \pm a, k)</math>  Minor axis: <math>x = h</math>  Minor axis vertices: <math>(h, k \pm b)</math></p>
$\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1,$ <p>where <math>c^2 = a^2 - b^2</math></p>		<p>Center: <math>(h, k)</math>  Foci: <math>(h, k \pm c)</math>  Major axis: <math>x = h</math>  Major axis vertices: <math>(h, k \pm a)</math>  Minor axis: <math>y = k</math>  Minor axis vertices: <math>(h \pm b, k)</math></p>

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

Note change in 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  $(-4, 3)$   $\pm 4$  v  $(-1, 3)$   $(-7, 3)$   $(-4, 8)$   $(-4, -2)$



F  $(-4, 7)$   $(-4, 1)$

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