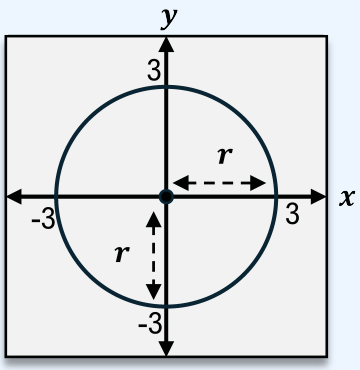
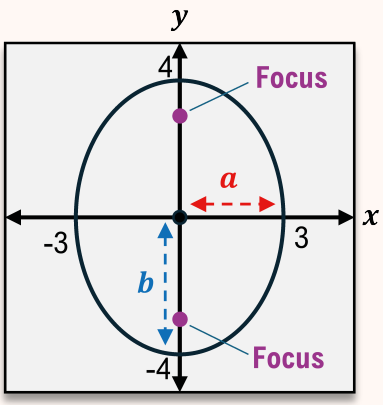
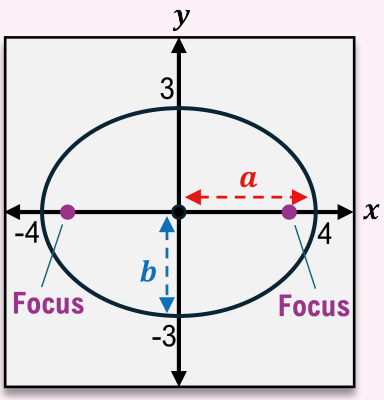
TOPIC: ELLIPSES

Ellipses at the Origin

◆ Recall: The graph of a circle is the set of all points that are the same distance r from ___ point, the center.

► An ellipse is an oval shape made up of points whose distances to ___ points (**foci**) *add* to the same value.

Circle at Origin	Vertical Ellipse	Horizontal Ellipse
		
$x^2 + y^2 = r^2$	$a =$ ___ $b =$ ___	$a =$ ___ $b =$ ___
$x^2 + y^2 = 3^2$ $x^2 + y^2 = 9$	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	

◆ To sketch, plot points a units right & left and b units up & down from (__ , __) and connect with a smooth curve.

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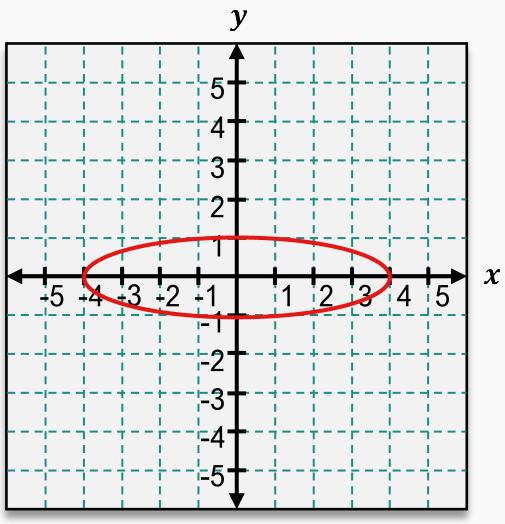
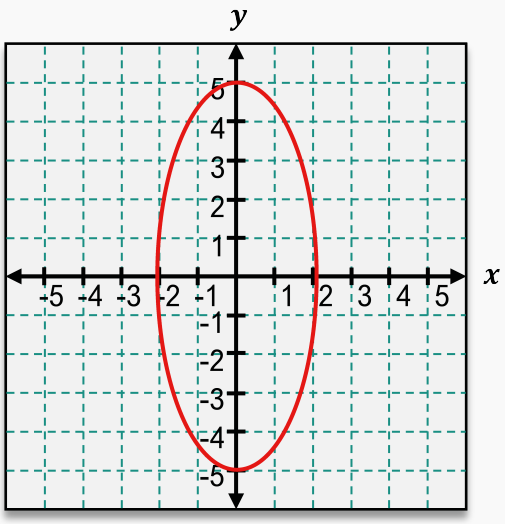
PRACTICE Write the standard form equation of each ellipse centered at the origin.

(*A*)

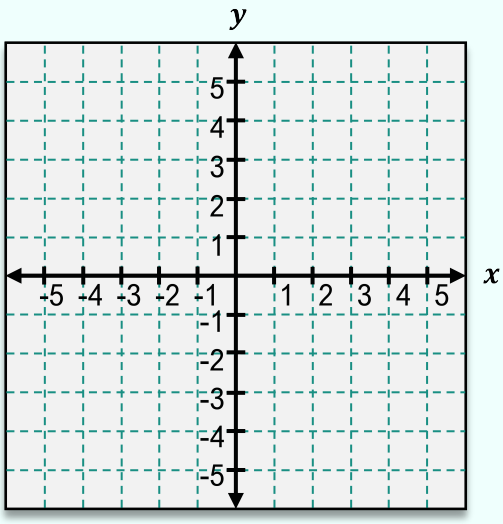


(*B*)



EXAMPLE Find the x- and y-intercepts and graph the ellipse.

$$\frac{x^2}{16} = 1 - \frac{y^2}{25}$$



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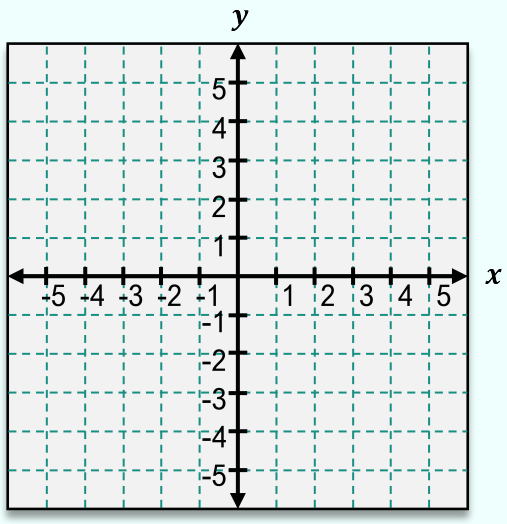
EXAMPLE Graph the ellipse.

$$4x^2 + 9y^2 = 36$$



TOPIC: ELLIPSES

Ellipses Not at the Origin

◆ Recall: To sketch, plot pts a units right & left and b units up & down from $(0, 0)$ & connect w/ a smooth curve.

► To sketch, plot pts a units right & left and b units up & down from center (__, __) & connect w/ a smooth curve.

Recall — Ellipse at Origin

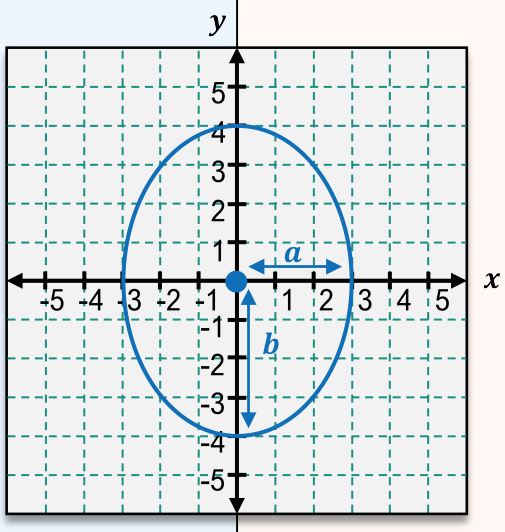
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$\frac{x^2}{9} + \frac{y^2}{16} = 1$$

Center: $(0, 0)$

$a = 3$

$b = 4$



New — Ellipse NOT at Origin

$$\frac{(x - \quad)^2}{a^2} + \frac{(y - \quad)^2}{b^2} = 1$$

$$\frac{(x-2)^2}{9} + \frac{(y+1)^2}{16} = 1$$

Center: (,)

$a =$

$b =$

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EXAMPLE Match the graph of each ellipse with the correct equation:

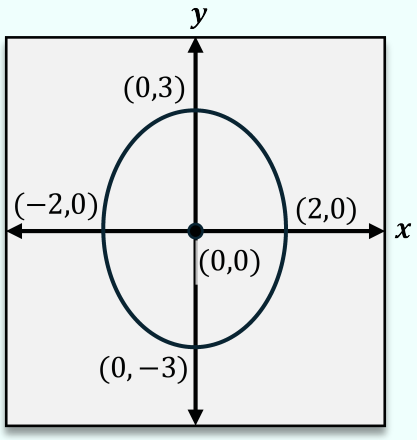
A) $\frac{x^2}{4}+\frac{y^2}{9}=1$

B) $\frac{(x-1)^2}{36}+\frac{(y-3)^2}{16}=1$

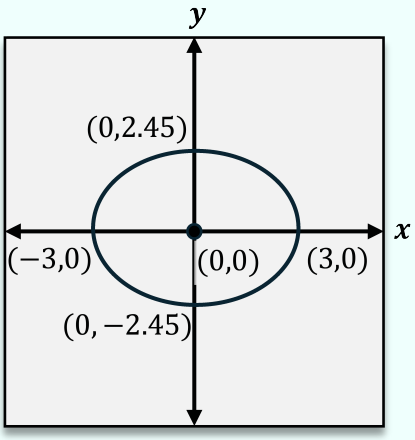
C) $(x+4)^2+\frac{y^2}{9}=1$

D) $\frac{x^2}{9}+\frac{y^2}{6}=1$

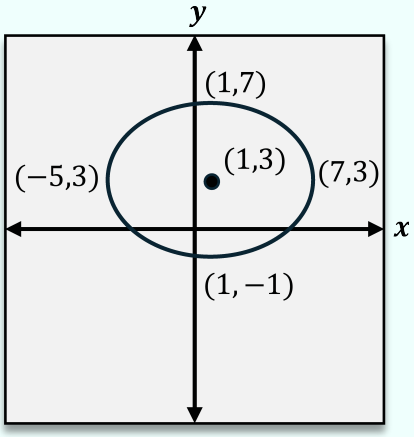
1)



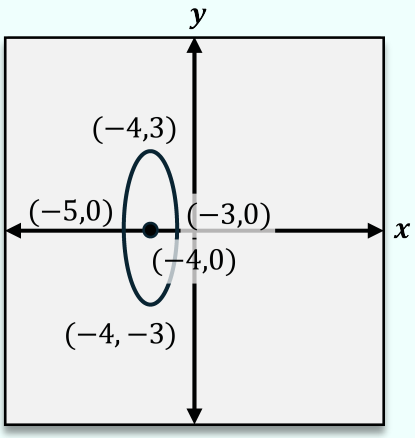
2)



3)



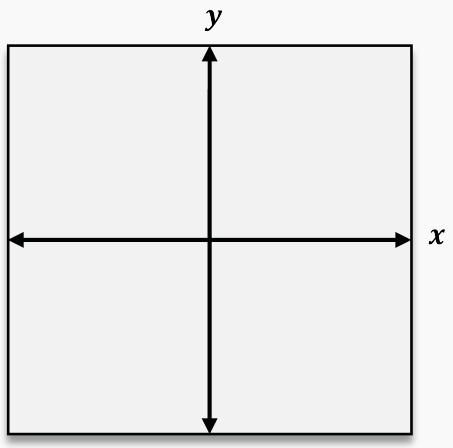
4)



TOPIC: ELLIPSES

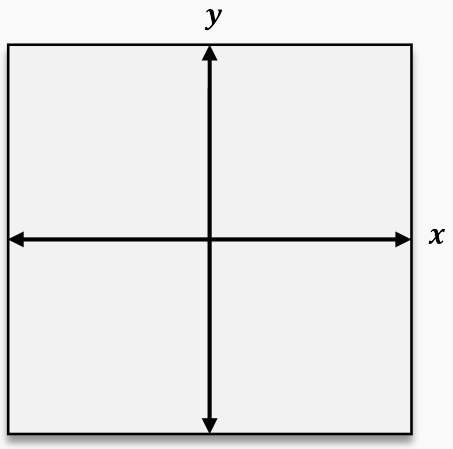
PRACTICE Graph the following ellipse:

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



PRACTICE Graph the following ellipse:

$$\frac{y^2}{64} = 1 - (x+2)^2$$



PRACTICE Graph the following ellipse:

$$4(x-1)^2 + 9(y-2)^2 = 36$$