

## 11. 1 Ellipses

Area of an ellipse  
 $A = \pi ab$

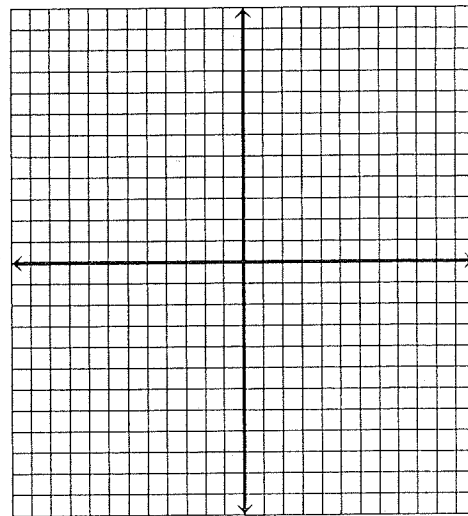
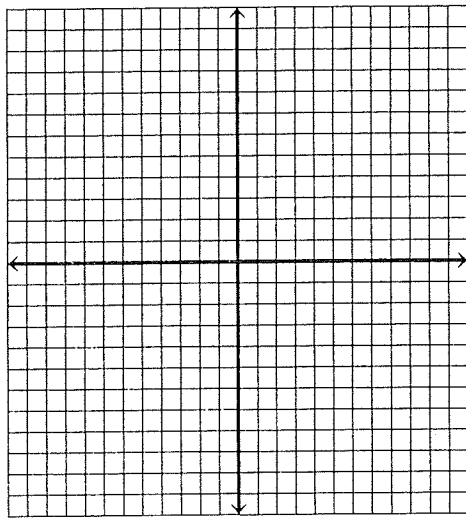
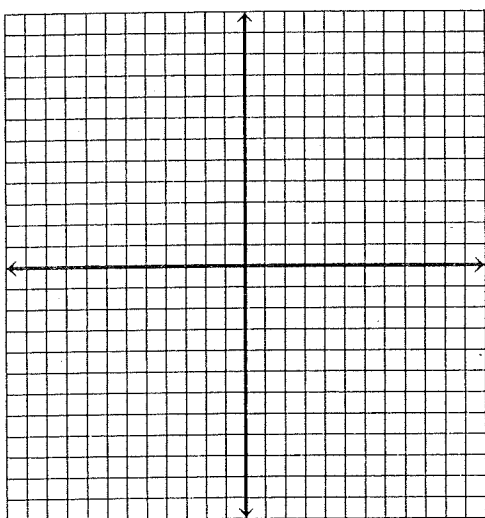
Name \_\_\_\_\_

Calculus can be used to show that the area of an ellipse with the equation  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  is  $A = \pi ab$ . Use this fact to find the area of the following ellipses.

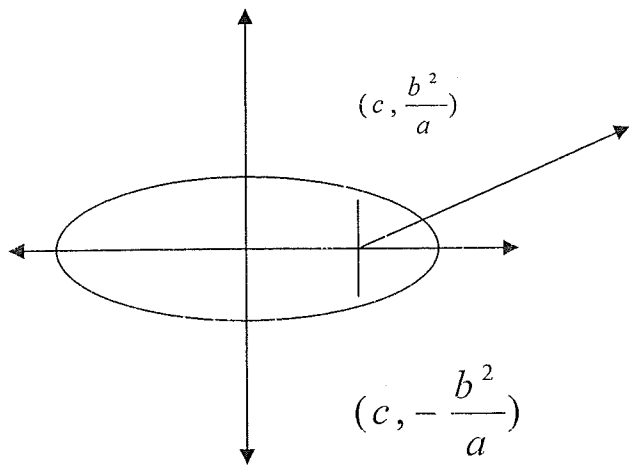
1.  $\frac{x^2}{16} + \frac{y^2}{4} = 1$

2.  $\frac{x^2}{25} + \frac{y^2}{100} = 1$

3.  $3x^2 + 4y^2 = 12$



The latus rectum of an ellipse is the length of chord that is perpendicular to the major axis and goes through the foci.



The length of the latus rectum is  $\frac{2b^2}{a}$

Write the equation of the ellipse which satisfies the given conditions.

1. The ellipse is centered at the origin and given the foci is on the y axis, the major axis is 20 and the minor axis is 18.
2. Find an equation of an ellipse given vertices  $(8,0)$  and  $(-8,0)$  and the minor axis is 8 units long.
2. The center is  $(0,0)$ , one vertex is  $(0, -7)$  and one end of the minor axis if  $(5,0)$ .
3. The foci is  $(-5,0)$  and  $(5,0)$  and the length of the latus rectum is  $8/5$ .
4. The foci are  $(-4,2)$  and  $(4,2)$  and length of the major axis is 10.
5. The center is  $(5,4)$ , length of the horizontal major axis is 16, length of the minor axis is 10.