

**WRITING EQUATIONS** Write an equation of the conic section.

13. Circle with center at  $(-5, 1)$  and radius 6
14. Circle with center at  $(9, -1)$  and radius 2
15. Parabola with vertex at  $(-4, -3)$  and focus at  $(1, -3)$
16. Parabola with vertex at  $(5, 3)$  and directrix  $y = 6$
17. Ellipse with vertices at  $(-3, 4)$  and  $(5, 4)$  and foci at  $(-1, 4)$  and  $(3, 4)$
18. Ellipse with vertices at  $(-2, 1)$  and  $(-2, 9)$  and co-vertices at  $(-4, 5)$  and  $(0, 5)$
19. Hyperbola with vertices at  $(6, -3)$  and  $(6, 1)$  and foci at  $(6, -6)$  and  $(6, 4)$
20. Hyperbola with vertices at  $(1, 7)$  and  $(7, 7)$  and foci at  $(-1, 7)$  and  $(9, 7)$

21. **ERROR ANALYSIS** Describe and correct the error in writing an equation of the ellipse with vertices at  $(-7, 3)$  and  $(3, 3)$  and co-vertices at  $(-2, 6)$  and  $(-2, 0)$ .

Axis is horizontal;  $(h, k) = (-2, 3)$ ;

$$a = |-7 - (-2)| = 5; b = |6 - 3| = 3;$$

$$\text{Equation: } \frac{(x - 2)^2}{25} + \frac{(y + 3)^2}{9} = 1$$



53. **CHALLENGE** A *degenerate* conic results when the intersection of a plane with a double-napped cone is not a parabola, circle, ellipse, or hyperbola.

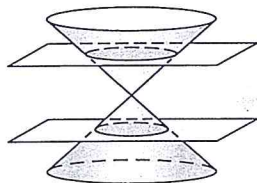


Diagram 1

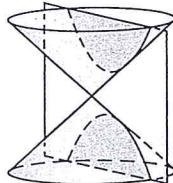


Diagram 2

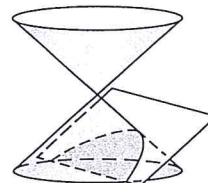


Diagram 3

- a. In Diagram 1, a plane perpendicular to the cone's axis passes through the cone, intersecting it in a circle whose radius decreases and then increases. When is the intersection not a circle? What is it?
- b. In Diagram 2, a plane parallel to the cone's axis passes through the cone, intersecting it in a hyperbola whose vertices get closer together and then farther apart. When is the intersection not a hyperbola? What is it?
- c. In Diagram 3, a plane parallel to the cone's nappe passes through the cone, intersecting it in a parabola that first gets narrower, then flips and gets wider. When is the intersection not a parabola? What is it?

## Assignment

Date \_\_\_\_\_ Period \_\_\_\_\_

**Find the value that completes the square and then rewrite as a perfect square.**

1)  $x^2 - 26x$

2)  $y^2 - 4y$

3)  $x^2 + 11x$

4)  $p^2 + 5p$

5)  $5n^2 - 10n$

6)  $3r^2 + 12r$

7)  $3n^2 - 18n$

8)  $5p^2 - p$

**Find the value that completes the square and then rewrite as a perfect square. Be sure to add to BOTH sides of the equation. You do not need to finish solving.**

9)  $7r^2 - 14r - 56 = 0$

10)  $2b^2 - 20b + 42 = 0$

11)  $5n^2 + 20n - 13 = 0$

12)  $8b^2 + b - 69 = 0$