



GUIDED PRACTICE

1. **Vocabulary** How can you tell the difference between the *major axis* and the *minor axis* of an ellipse?

SEE EXAMPLE 1

p. 736

1. Find the constant sum of an ellipse with the given foci and point on the ellipse.

2. $F_1(-5, 0), F_2(5, 0), P(0, -12)$

3. $F_1(0, -12), F_2(0, 12), P(9, 0)$

SEE EXAMPLE 2

p. 737

2. **Multi-Step** Write an equation in standard form for each ellipse with center $(0, 0)$.

4. vertex $(-9, 0)$, co-vertex $(0, 7)$

5. vertex $(0, 25)$, focus $(0, -20)$

6. co-vertex $(10, 0)$, focus $(0, 24)$

7. vertex $(-7, 0)$, focus $(\sqrt{13}, 0)$

SEE EXAMPLE 3

p. 738

3. Graph each ellipse.

8. $\frac{x^2}{36} + \frac{y^2}{81} = 1$

9. $\frac{x^2}{121} + \frac{y^2}{49} = 1$

10. $\frac{(x-5)^2}{16} + \frac{(y+2)^2}{36} = 1$

11. $\frac{(x+1)^2}{64} + \frac{(y-6)^2}{9} = 1$

SEE EXAMPLE 4

p. 739

12. **Engineering** Engineers are building semi-elliptical bridges across two rivers. The larger river is 4 times as wide as the smaller river and must accommodate boats that are 3 times as tall. The equation for the bridge over the smaller river is $\frac{x^2}{225} + \frac{y^2}{144} = 1$, measured in feet.

- a. Find the dimensions of the larger bridge.
b. Write an equation for the design of the larger bridge.

PRACTICE AND PROBLEM SOLVING

Independent Practice

For Exercises	See Example
13–14	1
15–18	2
19–22	3
23	4

- Find the constant sum of an ellipse with the given foci and point on the ellipse.

13. $F_1(-20, 0), F_2(20, 0), P(-21, 0)$

14. $F_1(0, -8), F_2(0, 8), P(9, 13.6)$

3. **Multi-Step** Write an equation in standard form for each ellipse with center $(0, 0)$.

15. vertex $(5, 0)$, co-vertex $(0, -2)$

16. co-vertex $(0, -8)$, focus $(6, 0)$

17. co-vertex $(4, 0)$, focus $(0, -3)$

18. vertex $(0, -9)$, focus $(0, 3\sqrt{5})$

Extra Practice

Skills Practice p. S22

Application Practice p. S41

- Graph each ellipse.

19. $\frac{(x+2)^2}{169} + \frac{(y-7)^2}{25} = 1$

20. $\frac{(x-6)^2}{36} + \frac{(y-4)^2}{100} = 1$

21. $\frac{x^2}{256} + \frac{y^2}{196} = 1$

22. $\frac{x^2}{225} + \frac{y^2}{289} = 1$

23. **National Parks** South of the White House in Washington, D.C., is the President's Park South, or the Ellipse, which hosts events such as the White House Garden Tours. The Ellipse is 880 ft from north to south and 1057 ft from east to west. Write an equation for the Ellipse, centered at the origin.



- Write an equation in standard form for each ellipse.

24. tangent to the x -axis at $(9, 0)$ and tangent to the y -axis at $(0, -6)$

25. center $(-4, 7)$, vertex $(-4, -3)$, focus $(-4, 0)$