EXAMPLE 5 Find the zeros of quadratic functions

UNDERSTAND REPRESENTATIONS

If a real number k is a zero of the function $y = ax^2 + bx + c$, then k is an x-intercept of this function's graph and k is also a root of the equation $ax^2 + bx + c = 0$.

Find the zeros of the function by rewriting the function in intercept form.

a. $y = x^2 - x - 12$
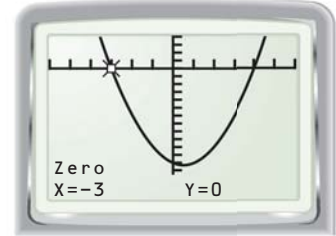
b. $y = x^2 + 12x + 36$

Solution

a. $y = x^2 - x - 12$ **Write original function.**

    $= (x + 3)(x - 4)$ **Factor.**

The zeros of the function are -3 and 4.

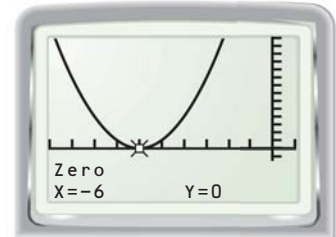**CHECK** Graph $y = x^2 - x - 12$. The graph passes through $(-3, 0)$ and $(4, 0)$.


```
Zero
X=-3        Y=0
```

b. $y = x^2 + 12x + 36$ **Write original function.**

    $= (x + 6)(x + 6)$ **Factor.**

The zero of the function is -6.

CHECK Graph $y = x^2 + 12x + 36$. The graph passes through $(-6, 0)$.


```
Zero
X=-6        Y=0
```

✓ **GUIDED PRACTICE**   for Example 5

Find the zeros of the function by rewriting the function in intercept form.

10. $y = x^2 + 5x - 14$ **11.** $y = x^2 - 7x - 30$ **12.** $f(x) = x^2 - 10x + 25$

4.3 EXERCISES

HOMEWORK KEY

◯ = **WORKED-OUT SOLUTIONS**
on p. WS1 for Exs. 33, 47, and 67

🔺 = **TAKS PRACTICE AND REASONING**
Exs. 41, 56, 58, 63, 71, 73, and 74

◆◆ = **MULTIPLE REPRESENTATIONS**
Ex. 68

SKILL PRACTICE

1. VOCABULARY What is a zero of a function $y = f(x)$?

2. WRITING *Explain* the difference between a monomial, a binomial, and a trinomial. Give an example of each type of expression.

EXAMPLE 1
on p. 252
for Exs. 3–14

FACTORING Factor the expression. If the expression cannot be factored, say so.

3. $x^2 + 6x + 5$ **4.** $x^2 - 7x + 10$ **5.** $a^2 - 13a + 22$

6. $r^2 + 15r + 56$ **7.** $p^2 + 2p + 4$ **8.** $q^2 - 11q + 28$

9. $b^2 + 3b - 40$ **10.** $x^2 - 4x - 12$ **11.** $x^2 - 7x - 18$

12. $c^2 - 9c - 18$ **13.** $x^2 + 9x - 36$ **14.** $m^2 + 8m - 65$

4.3   Solve $x^2 + bx + c = 0$ by Factoring   **255**