

Writing a Quadratic Equation Given the Roots and the Leading Coefficient

• Example 1

Give the quadratic expression in the variable y which has roots at $y = 2$ and $y = -3$ and has a leading coefficient of 1.

A quadratic expression with roots at $y = 2$ and $y = -3$ satisfies the following equation

$$k(y - 2)(y + 3) = 0$$

where k is any non-zero constant.

The left-hand side of the equation written in the standard form of a quadratic yields

$$ky^2 + ky - 6k.$$

Since the leading coefficient is the coefficient of the y^2 term, k must equal 1 and the quadratic expression is

$$y^2 + y - 6.$$

● ● ● CHECK YOURSELF 1

Give the quadratic expression in the variable w which has roots at $w = -1$ and $w = -4$ and has a leading coefficient of 1.

● ● ● CHECK YOURSELF ANSWER

1. $w^2 + 5w + 4$.

6.30 Exercises

Name _____

Section _____

Date _____

A N S W E R S

1. _____

2. _____

3. _____

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11. _____

12. _____

For each of the following, give the quadratic expression in the variable specified that satisfies the given conditions.

1. Roots: $x = 3$, $x = 4$; Leading coefficient: 1

2. Roots: $t = -7$, $t = 2$; Leading coefficient: 2

3. Roots: $s = 1$, $s = -1$; Leading coefficient: -1

4. Roots: $z = -5$, $z = -3$; Leading coefficient: 7

5. Roots: $w = -2$, $w = 0$; Leading coefficient: -3

6. Roots: $v = 10$, $v = -10$; Leading coefficient: 1

7. Roots: $r = 11$, $r = -3$; Leading coefficient: -1

8. Roots: $p = 8$, $p = -7$; Leading coefficient: 1

9. Roots: $m = 14$, $m = -10$; Leading coefficient: -2

10. Roots: $l = 9$, $l = -12$; Leading coefficient: 10

11. Roots: $n = 20$, $n = -5$; Leading coefficient: -5

12. Roots: $q = 100$, $q = -120$; Leading coefficient: 1