

5.27

Roots of a Sum of Polynomials

• Example 1

Find all solutions for the equation

$$2x^2 - 3x + 7 = (x + 1)^2.$$

We first rewrite and simplify the equation, and then factor appropriately. We obtain in succession,

$$\begin{aligned} 0 &= 2x^2 - 3x + 7 - (x + 1)^2 && \text{(gathering all terms to one side)} \\ &= 2x^2 - 3x + 7 - x^2 - 2x - 1 && \text{(expanding } (x + 1)^2\text{)} \\ &= x^2 - 5x + 6 && \text{(gathering like terms and simplifying)} \\ &= (x - 2)(x - 3) && \text{(factoring)} \end{aligned}$$

The solutions for the original equation are $x = 2$ and $x = 3$.

● ● ● CHECK YOURSELF 1

Find all solutions for the equation.

$$2x^2 - 10x + 12 = (x - 3)^2$$

● ● ● CHECK YOURSELF ANSWER

1. 1, 3.

5.27 Exercises

Name _____

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A N S W E R S

1. _____

2. _____

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4. _____

5. _____

6. _____

7. _____

8. _____

Find all solutions for the following equations.

1. $2x^2 + x + 6 = (x + 2)^2$

2. $2x^2 + 5x + 13 = (x - 1)^2$

3. $x^2 - 9x + 10 = (x + 3)^2$

4. $x^2 + 2x + 4 = (x - 7)^2$

5. $3x^2 + 4x + 18 = (x + 4)^2$

6. $8x^2 - 7x + 7 = (2x + 1)^2$

7. $2x^2 + 8x - 33 = x^2 + 4x - 12$

8. $(2x + 3)^2 = x^2 + 25x + 19$