



Examples 1–3 Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

1. $3x^2 + 17x + 10$

2. $2x^2 + 22x + 56$

3. $5x^2 - 3x + 4$

4. $3x^2 - 11x - 20$

Example 4 Solve each equation. Confirm your answers using a graphing calculator.

5. $2x^2 + 9x + 9 = 0$

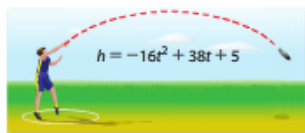
6. $3x^2 + 17x + 20 = 0$

7. $3x^2 - 10x + 8 = 0$

8. $2x^2 - 17x + 30 = 0$

9. **CCSS MODELING** Ken throws the discus at a school meet.

- What is the initial height of the discus?
- After how many seconds does the discus hit the ground?



Practice and Problem Solving

Extra Practice is on page R8.

Examples 1–3 Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

10. $5x^2 + 34x + 24$

11. $2x^2 + 19x + 24$

12. $4x^2 + 22x + 10$

13. $4x^2 + 38x + 70$

14. $2x^2 - 3x - 9$

15. $4x^2 - 13x + 10$

16. $2x^2 + 3x + 6$

17. $5x^2 + 3x + 4$

18. $12x^2 + 69x + 45$

19. $4x^2 - 5x + 7$

20. $5x^2 + 23x + 24$

21. $3x^2 - 8x + 15$

Example 4 22. **SHOT PUT** An athlete throws a shot put with an initial upward velocity of 29 feet per second and from an initial height of 6 feet.

- Write an equation that models the height of the shot put in feet with respect to time in seconds.
- After how many seconds will the shot put hit the ground?

Solve each equation. Confirm your answers using a graphing calculator.

23. $2x^2 + 9x - 18 = 0$

24. $4x^2 + 17x + 15 = 0$

25. $-3x^2 + 26x = 16$

26. $-2x^2 + 13x = 15$

27. $-3x^2 + 5x = -2$

28. $-4x^2 + 19x = -30$

29. **BASKETBALL** When Jerald shoots a free throw, the ball is 6 feet from the floor and has an initial upward velocity of 20 feet per second. The hoop is 10 feet from the floor.

- Use the vertical motion model to determine an equation that models Jerald's free throw.
- How long is the basketball in the air before it reaches the hoop?
- Raymond shoots a free throw that is 5 foot 9 inches from the floor with the same initial upward velocity. Will the ball be in the air more or less time? Explain.

30. **DIVING** Ben dives from a 36-foot platform. The equation $h = -16t^2 + 14t + 36$ models the dive. How long will it take Ben to reach the water?

