Answers for Lesson 6-6 Exercises

1. 3 complex roots; number of real roots: 1 or 3
possible rational roots: ± 1

2. 2 complex roots; number of real roots: 0 or 2
possible rational roots: $\pm\frac{1}{3}, \pm\frac{7}{3}, \pm 1, \pm 7$

3. 4 complex roots; number of real roots: 0, 2, or 4
possible rational roots: 0

4. 5 complex roots; number of real roots: 1, 3, or 5
possible rational roots: $\pm\frac{1}{2}, \pm 1, \pm\frac{5}{2}, \pm 5$

5. 7 complex roots; number of real roots: 1, 3, 5, or 7
possible rational roots: $\pm 1, \pm 3$

6. 1 complex root number of real roots: 1
possible rational roots: $\pm\frac{1}{4}, \pm\frac{1}{2}, \pm 1, \pm 2, \pm 4, \pm 8$

7. 6 complex roots; number of real roots: 0, 2, 4, or 6
possible rational roots: $\pm\frac{1}{2}, \pm 1, \pm\frac{7}{2}, \pm 7$

8. 10 complex roots; number of real roots: 0, 2, 4, 6, 8, or 10
possible rational roots: ± 1

9. $-1, \frac{1 \pm i\sqrt{7}}{4}$

10. $3, \pm i$

11. $4, \frac{1 \pm i\sqrt{3}}{2}$

12. $2, \pm\sqrt{3}$

13. $\pm 2, \pm\sqrt{2}$

14. $\pm 2, \pm i$

15. $0, \frac{3 \pm 3\sqrt{5}}{2}$

16. $-6, \pm i$

17. 4 complex roots; number of real roots: 0, 2, or 4
possible rational roots: $\pm\frac{1}{2}, \pm 1, \pm 2, \pm\frac{13}{2}, \pm 13, \pm 26$

18. 5 complex roots; number of real roots: 1, 3, or 5
possible rational roots: $\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18$

19. 3 complex roots; number of real roots: 1 or 3
possible rational roots: $\pm\frac{1}{3}, \pm\frac{2}{3}, \pm 1, \pm\frac{4}{3}, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

20. 6 complex roots; number of real roots: 0, 2, 4, or 6
possible rational roots: $\pm\frac{1}{4}$, $\pm\frac{1}{2}$, $\pm\frac{3}{4}$, ±1, $\pm\frac{3}{2}$, ±2, ±3, ±4, ±6, ±8, ±12, ±24

21. $4, \pm3i$

22. $-2, \pm\sqrt{5}$

23. $-6, \frac{-1 \pm i}{2}$

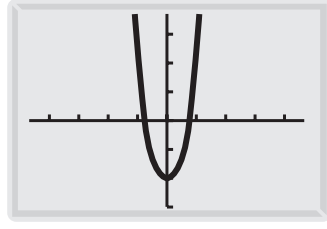
24. $-\frac{1}{4}, -1 \pm 2i$

25. $\frac{1}{2}, \pm2i\sqrt{5}$

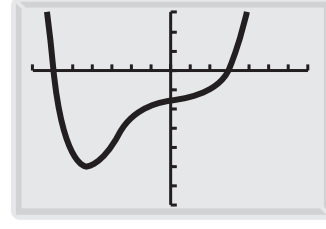
26. $\frac{2}{5}, \frac{-1 \pm i\sqrt{11}}{6}$

27. Answers may vary. Sample: $y = x^4 + 3x^2 + 2$

28. ±0.75



29. $-3.24, 1.24$



30. If you have no constant, then all terms have an x that can be factored out. The resulting expression will have a constant that can be used in the Rational Root Theorem.

31. Yes; for example, $2x^2 - 11x + 5 = 0$ has roots 0.5 and 5.