Pg. 317 #3-11 odd, 13 (find zeros only), 17, 19, 22, 25, 27, 31-35 odd

Write each expression as a polynomial in standard form.

1. $(x + 3)(x - 2)$
2. $(x + 3)(x + 4)(x + 5)$
3. $(x - 3)^2(x - 1)$
4. $x(x + 2)^2$
5. $x(x + 5)^2$
6. $x(x - 1)(x + 1)$

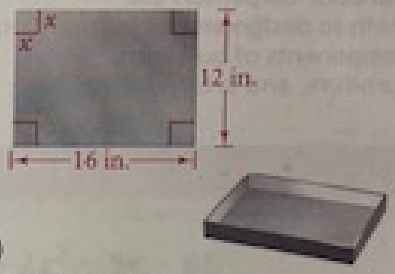
Write each polynomial in factored form. Check by multiplication.

7. $x^3 - 36x$
8. $9x^3 + 6x^2 - 3x$
9. $10x^3 - 10x^2 + 15x$
10. $x^3 + 7x^2 + 10x$
11. $x^3 + 8x^2 + 16x$
12. $x^3 - 7x^2 - 18x$

Find the relative maximum, relative minimum, and zeros of each function.

13. $f(x) = x^3 + 4x^2 - 5x$
14. $f(x) = -x^3 + 16x^2 - 76x + 96$

15. **Metalwork** A metalworker wants to make an open box from a sheet of metal, by cutting equal squares from each corner as shown.



   a. Write an expression for the length, width, and height of the open box.
   b. Use your answer from part (a) to write a function for volume. (*Hint*: Use factored form.)
   c. Graph the function. Find the maximum volume that can be contained by the box and the size of the square cut that produces this volume.

Find the zeros of each function. Then graph the function.

16. $y = (x - 1)(x + 2)$
17. $y = (x - 2)(x + 9)$
18. $y = x(x + 5)(x - 8)$
19. $y = (x + 1)(x - 2)(x - 3)$
20. $y = (x + 1)(x - 1)(x - 2)$

Write a polynomial function in standard form with the given zeros.

21. $x = 5, 6, 7$
22. $x = -2, 0, 1$
23. $x = -5, -5, 1$
24. $x = 3, 3, 3$
25. $x = 1, -1, -2$
26. $x = -1, -2, -3$
27. $x = 0, 0, 2$
28. $x = -\frac{1}{2}, 0, 4$

Find the zeros of each function. State the multiplicity of multiple zeros.

29. $y = (x + 3)^3$
30. $y = x(x - 1)^3$
31. $y = 2x^3 + x^2 - x$
32. $y = 3x^3 - 3x$
33. $y = (x - 4)^2$
34. $y = (x - 2)^2(x - 1)$
35. $y = (2x + 3)(x - 1)^2$
36. $y = (x + 1)^2(x - 1)(x - 2)$