Use these exercises to help determine if you need to reinforce any concepts from algebra. Immediately review any areas of weakness.

Use the quadratic formula to find the zeros of the following functions:

1. \( f(x) = 3x^2 + 2x - 1 \)  
2. \( f(x) = -2x^2 + 3x - 4 \)  
3. \( f(x) = 9x^2 - 12x + 4 \)

Factor the following polynomials.

4. \( x^2 + 8x + 3x^2 \)  
5. \( 15x + 12x - 3x^2 \)  
6. \( 4x^2 - 1 \)  
7. \( 3x - 6x^2 \)

Find the points of intersection of the pairs of curves:

8. \( y = 2x^2 - 5x - 6, \ y = 3x + 4 \)  
9. \( y = x^2 - 4x + 4, \ y = 12 + 2x - x^2 \)  
10. \( y = \frac{1}{3}x^3 - 2x^2, \ y = 2x \)

Solve the following equations:

11. \( x + \frac{2}{x - 6} = 3 \)  
12. \( 1 = \frac{5}{x} + \frac{6}{x^2} \)

Compute the following numbers without the aid of a calculator:

13. \( (.1)^4 \)  
14. \( (16)^{3/2} \)  
15. \( (1.8)^0 \)

16. \( \left(\frac{1}{4}\right)^{-2} \)  
17. \( \left(\frac{1}{5}\right)^{-\frac{3}{2}} \)

Simplify the following algebraic expressions. Your answer should not involve parentheses or negative exponents.

18. \( (x^3 \cdot y^6)^{1/3} \)  
19. \( \sqrt{1 + x(1 + x)^{3/2}} \)  
20. \( (9x)^{-\frac{1}{3}} \)

21. \( \frac{(25xy)^{3/2}}{x^2y} \)  
22. \( (-32y^{-5})^{3/5} \)  
23. \( \sqrt{x\left(\frac{1}{4x}\right)^{5/2}} \)

Express \( f(x) + g(x) \), \( f(x) \cdot g(x) \), and \( \frac{f(x)}{g(x)} \) as rational functions (that is, as ratios of polynomials). Carry out all multiplications.

24. \( f(x) = \frac{2}{x - 3}, \ g(x) = \frac{1}{x + 2} \)  
25. \( f(x) = \frac{x + 6}{x - 6}, \ g(x) = \frac{x - 6}{x + 6} \)

26. \( f(x) = \frac{x - 1}{x^2 - 5x + 6}, \ g(x) = \frac{x - 3}{x - 2} \)  
27. \( f(x) = x^2, \ g(x) = \frac{1}{x} \)