[exponential + logarithmic functions]

1. Simplify
   a. $(x^3)^4 \div x^4$
   b. $(a^{2x-y})(a^{y-2z}) \div (a^{x+y})$
2. Evaluate
   a. $8^{\frac{2}{3}}$
   b. $\left(\frac{25}{9}\right)^{-\frac{1}{2}}$
   c. $12^0 - 4^{\frac{1}{2}} - \left(\frac{1}{27}\right)^{-\frac{2}{3}}$
3. Express each of the following with positive exponents.
   a. $\frac{27x^{-3}y^2}{3xy^{-1}}$
   b. $x^{-3} \div x^2$
4. Simplify
   a. $\frac{\sqrt[3]{64x^2}}{\sqrt[2]{16x}}$
5. Michelle was doing her Ph.D. in nuclear physics when a 12 mg sample of radioactive material decayed to 3 mg in about 6 min. Determine the half-life of this substance.
6. If Chris invests $500 at 7% after 5 years how much will he have?
7. Evaluate
   a. $\log_3 3^5$
   b. $\log_5\left(\frac{1}{125}\right)$
   c. $\log_4 \sqrt{4}$
   d. $\log_2 16$
   e. $\log_4 32 - \log_4 2$
   f. $\log_6 3 + \log_6 2$
8. Evaluate:
   a. $\log_5 x = -3$
   b. $\log_x 64 = 3$
9. Solve:
   a. $3\log x = \log 512 - \log 8$
   b. $\log_3(x) + \log_x(x-2) = 1$
   c. $12^x = 29$
10. Solve:
    a. $2^{3x-1} = 5^{2x}$
11. Jack invested $2000 into an RRSP which paid 6% per year compounded annually. How long will it take for this money to accumulate to $3638.79? (Give a logarithmic solution, accurate to 2 decimal places.)