[exponential + logarithmic functions]

1. Make a 5 point sketch of the function $y = 2^x$, labelling appropriately. Then sketch the inverse. State the equation of the inverse.
2. Evaluate
   a. $\frac{3^{-1}}{2^{-1}}$
   b. $3^{-1} - 2^{-1}$
   c. $\frac{(3^{x-2})(9^{x+4})}{(27^{x-1})}$
3. Simplify
   a. $\frac{k^5 \div k^{-4}}{k^5 \times k^{-4}}$
   b. $\frac{81x^3y^4}{27x^{-2}y^3} \times \frac{(9xy^2)^2}{162x^4y^4}$
   c. $s^{2x-p} \div s^{p-x}$
4. For the function $y = \log_{10} x$ state
   a. The domain
   b. The range
   c. The x-intercept
   d. Whether or not it is a function
   e. sketch the function, labelling appropriately
5. Evaluate
   a. $\log_2 32$
   b. $\log_5 1$
   c. $\log_3 9^4$
   d. $\log 10$
   e. $\log 0.001$
   f. $\log_2 (0.5)^3$
   g. $\log_5 25\sqrt{5} + \log_{27} 9$
   h. $4^{\log_4 7}$
6. Express $2\log_5 x + \log_5 y - 4\log_5 z$ as a single logarithm.
7. Solve for x:
   a. $\log_x 9 = 2$
   b. $\log_5 \left(\frac{1}{125}\right) = x$
   c. $\log_3 x = -3$
   d. $x \log_2 8 = 3$
   e. $\log_3 x = \log_3 54 - \log_3 2$
8. Solve and verify $\log_{10}(x-2) + \log_{10}(x+1) = 1$
9. Solve using logarithms
   a. $x^{\frac{2}{5}} = 24$ to 1 decimal place
   b. $5^{2x} = 24$ to 3 decimal places
10. Given the formula $A = P(1+i)^n$ where A is amount, P is principal, i is interest rate per period, and n is the number of interest periods, find the number of years it takes for $\$35000$ to triple in value at 8% compounded semi-annually.
11. The number of cells in a culture grows according to the formula $A = 2500\left(10^{\frac{t}{5}}\right)$ where A is the number of cells after time t in seconds. How long will it take the number of cells to grow to 8.2×10^7?