Exponentiation and logarithms

1. Warm-up: Sketch a graph of $y = 2^x$ as well as $y = 2^{-x}$
   What is the relationship between the 2 curves?
2. Solve the following exponential equations. You only have to provide the real number answers
   a. $x^{3/2} = 8$
   b. $z^4 = 1$
   c. $2^k = 1024$
3. Logarithms are the inverse of exponentiation, sketch a graph of $y = \log_2 x$ on the same graph as q1, what is the relationship between $y = \log_2 x$ and $y = 2^x$?
4. Now let's apply logarithms to solve some equations
   a. $3^x + 10 = 739$
   b. $49^x - 5 \cdot 7^x + 6 = 0$
   c. $\frac{e^x + e^{-x}}{2} = 8$
5. Using logarithmic properties, solve the following equations
   a. $\log_3(x + 5) + 1 = \log_3(x^2 - 3)$
   b. $\log_y 10 = \log_{10} y + 1$ (calculate *y* to 3 s.f.)
6. The rate of a chemical reaction (*k*) is found to obey the following relationship:

$$k = Ae^{-\frac{g}{RT}}$$

   Where A is a constant, T is the temperature, and R is the universal gas constant. (take R ≈ 8.31). A scientist found that the rate doubled when T increased from 298K to 323K (K is Kelvin; a unit of temperature)

   Using this information, find the value of *g*.