Single Pure - Exponentials And Logarithms

1. Sketch the following exponential graphs.
   (a) $y = e^{-x}$.
   (b) $y = -e^{-x}$.
   (c) $y = 2e^{x} - 3$.
   (d) $y = 4 - e^{1-x}$.
2. Sketch the following logarithmic graphs.
   (a) $y = \ln x$.
   (b) $y = \ln(-x)$.
   (c) $y = \ln(2x + 1)$.
   (d) $y = 3 + \ln(1 - x)$.
3. Solve the following equations.
   (a) $e^{2x} = 3$.
   (b) $2e^{x} - 2 = 5$.
   (c) $3 \times e^{x-1} = 7^{x+1}$.
   (d) $3^{x}e^{x-2} = 4$.
   (e) $1 = \ln(2x + 1)$.
   (f) $\ln x + \ln(x + 1) = 2$.
   (g) $\ln(x + 2) = \ln(x - 2) + 1$.
   (h) $e^{2x} + 2 = 3e^{x}$.
   (i) $3e^{2x} + 7e^{x} = 6$.
   (j) $e^{2x} + e^{x} = 1$.
4. The mass in grams of a fungus after t hours is given by $M = 10e^{t/10}$.
   (a) What is the initial mass of the fungus?
   (b) Find the mass of the fungus after a day.
   (c) After how many hours is the mass of the fungus 300 grams.
5. The population of the earth is increasing exponentially. The population was 6 billion in 1999 AD. The population was 7 billion in 2011 AD.
   (a) What was the population in year 0 AD?
   (b) What will the population be in 2100 AD?
   (c) When will the population be 1 trillion?
6. The pressure in the Enterprise warp core is increasing exponentially. After 4 hours it is 2000 Pascals. After 7 hours it is 300000 Pascals.
   (a) Find the pressure initially.
   (b) Find the pressure after 9 hours.
   (c) After how many hours is the pressure 2×10^{9} Pascals.