Part 2

5. Consider the following population scenarios. In each, determine if an exponential, linear, or neither of these models would be a suitable fit. Explain your choice. If exponential or linear, find an equation to best describe the population as a function of time measured in years, assuming at $t = 0$ the population is 500,000.

a) each year, the town grows by roughly 1000 residents.

b) each year, the town grows by roughly 9%.

c) each year, the town is decreasing at a continuous rate of 4%.

d) each year, the town shrinks by roughly 15%.

e) each year, the town loses roughly 2500 residents.

6. Write the following expressions with no terms in the exponent and no negative exponents.
   a) 2^{x+3}
   b) 3^{2x-1}
   c) $\dfrac{1}{3^{x-3}}$
   d) $2(5^{-x+2})$

7. Solve the following exactly:
   (A) $\log_2(1-x) + \log_2(4-x) = 3$

   (B) $e^{2x} - 4e^x = 5$

   (C) $18^x = 3^{2x-1}$

   (D) $2\log_4(3x+1) + 4 = 9$

   (E) $\log(x) - 2\log(x-3) = 1$