Recall that the way to solve for a variable that is in the exponent is to take the logarithm. Recall further that if the base is not 10, to solve for $x$ in the expression

$$a^x = y: \quad x = \frac{\log y}{\log a}$$

Suppose you have a penny that doubles every day.

1. Find precisely how long you would have to wait until you had $1,000.$

2. How long before you had $1,000,000,000$? (Remember that these are pennies that are doubling, not dollars!)

3. Carbon 14 has a half life of 5700 years. Suppose carbon 14 samples from a tool contain 40% of its original carbon 14. How old is the tool.