1. Sketch the graph of the function $y = \sin(2x)$.

2. The half-life of phosphorus-32 is about 14 days. There are 6.6 grams present initially.

   (a) Express the amount of phosphorus-32 that will remain as a function of time, $t$, which is measured in days.

   (b) When will there be 1 gram remaining? **Leave your answer in the form of a logarithm.**

   In general, $A(t) = A_0e^{rt}$. In our case, $A_0 = 6.6$ grams. When $t = 14$ days, 3.3 grams remain.

   $A(14) = 3.3 = 6.6e^{14r} = 6.6(e^r)^{14}$

   $\frac{1}{2} = (e^r)^{14}$

   $\left(\frac{1}{2}\right)^{\frac{1}{14}} = e^r$

   Thus

   $A(t) = 6.6 \left(\frac{1}{2}\right)^{\frac{t}{14}}$

   When 1 gram remains, we have

   $1 = 6.6 \left(\frac{1}{2}\right)^{\frac{t}{14}}$

   $1/6.6 = \left(\frac{1}{2}\right)^{\frac{t}{14}}$

   $6.6 = (2)^{\frac{14}{t}}$

   $\ln(6.6) = \frac{t}{14} \ln(2)$

   $t = \frac{14 \ln(6.6)}{\ln(2)} \approx 38.11$