

LEKE  
1.5 #33

### Doubling Your Money

Determine how much time is required for an investment to double in value if interest is earned at the rate of 6.25% compounded CONTINUOUSLY.

Solution

Continuously compounded interest is modelled by  $y = y_0 e^{kt}$  where  $y_0$  is the initial amount and  $k$  is the interest rate. Here, we have  $k = 6.25\% = 0.0625$ . The question is:  $t = ?$  when  $y = 2y_0$ . So we consider

$$y = y_0 e^{kt} \quad \text{or} \quad (2y_0) = y_0 e^{0.0625t}$$

$$\text{or} \quad 2 = e^{0.0625t}$$

We now borrow information from section 1.6 and apply a natural logarithm:

$$\ln(2) = \ln(e^{0.0625t}) = 0.0625t$$

$$\text{or} \quad t = \frac{\ln(2)}{0.0625} \approx 11.09 \text{ years.} \quad \square$$