Essential Skills 31

The skills in this series of worksheets appear frequently.

These are the GIFTS you must take to succeed

Using the Natural Logarithm

Solve for x:

1. $3^x = 18$
2. $5^x = 90$
3. $12^x = 3000$
4. $4^{2x} = 35$
5. $2^{3x-1} = 11$
6. $0 \cdot 7^x = 0 \cdot 9$
7. $7^{2-3x} = 5$
8. $e^{0{\cdot}6x} = 5 \cdot 2$
9. $e^{-0{\cdot}3x} = 0 \cdot 16$
10. $50e^{-0{\cdot}7x} = 45$

APPLYING QUESTIONS

1. Evaluate $\log_9 21$, giving your answer to 2 decimal places.

2. A radioactive element decays according to the formula $m_t = m_0 e^{-0{\cdot}03t}$ where m_0 is the initial mass and t is the time in years.

   (a) What mass remains of the initial 200mg of the element after 40 years?

   (b) What is the half-life of this element?

3. A colony of ants is estimated to be growing according to the formula $P = 420e^{0{\cdot}25t}$ where P is the population after t years.

   (a) What was the initial population of ants?

   (b) What is the population after 7 years?

   (c) How long will it take the population to increase by a factor of 10?