Practice Solutions – VI

1. Determine the number of terms, n, in the geometric sequence $25, -5, 1, ..., -0.008$.

$$t_n = t_1 r^{n-1}$$
$$-0.008 = 25\left(-\frac{1}{5}\right)^{n-1}$$
$$-0.000\,32 = \left(-\frac{1}{5}\right)^{n-1}$$
$$-\frac{1}{3\,125} = \left(-\frac{1}{5}\right)^{n-1}$$
$$\left(-\frac{1}{5}\right)^{5} = \left(-\frac{1}{5}\right)^{n-1}$$
$$5 = n - 1$$
$$6 = n$$

There are 6 terms in the geometric sequence.

2. A flower shop owner promises that their flowers will last for one week, and offers a money-back guarantee. In reality, the flowers lose 2% of their vibrancy each day.

   a. What percent of the original colour do the flowers have at the end of one week (7 days)? Note that the flowers will have 100% vibrancy on the first day.

   The first term is 100%, and with each day the flowers maintain 98%, or 0.98, of their vibrancy (100 – 2).

$t_1 = 100$
$r = 0.98$
$n = 7$
$t_7 = ?$

$$t_n = t_1 r^{n-1}$$
$$t_7 = 100(0.98)^{7-1}$$
$$t_7 = 88.584...\%$$
$$t_7 \doteq 88.6\%$$

   b. How many days will have passed when the vibrancy of the flowers is 75% ?

$t_1 = 100$
$r = 0.98$
$n = ?$
$t_7 = 75$

$$t_n = t_1 r^{n-1}$$
$$75 = 100(0.98)^{n-1}$$
$$0.75 = (0.98)^{n-1}$$

Using guess and check, determine the value of n that will satisfy the equation above.

$0.98^{15} = 0.738...$ too far

$0.98^{14} = 0.753...$ very close

$0.98^{14} = 0.98^{n-1}$

$14 = n - 1$

$15 = n$

Fifteen days will have passed when the flowers have 75% vibrancy.

c. What assumption is made in order to answer part b.?

The assumption is that the reduction in vibrancy will continue to decrease by 2% with each day and the flowers live for 15 days.

Please complete *Lesson 1.3 Explore Your Understanding Assignment* located in *Workbook 1B* before proceeding to *Lesson 1.4*.