SATPREP
Assignment : *Geometric Sequence*

1 For the geometric sequence with first two terms given, find b and c:

a 2, 6, b, c, ... **b** 10, 5, b, c, ... **c** 12, -6, b, c, ...

2 Find the 6th term in each of the following geometric sequences:

a 3, 6, 12, 24, ... **b** 2, 10, 50, ... **c** 512, 256, 128, ...

3 Find the 9th term in each of the following geometric sequences:

a 1, 3, 9, 27, ... **b** 12, 18, 27, ... **c** $\frac{1}{16}, -\frac{1}{8}, \frac{1}{4}, -\frac{1}{2}$, ... **d** a, ar, ar^2, ...

4 **a** Show that the sequence 5, 10, 20, 40, ... is geometric.

b Find u_n and hence find the 15th term.

5 **a** Show that the sequence $12, -6, 3, -\frac{3}{2}$, ... is geometric.

b Find u_n and hence write the 13th term as a rational number.

6 Show that the sequence $8, -6, 4.5, -3.375$, ... is geometric. Hence find the 10th term as a decimal.

7 Show that the sequence $8, 4\sqrt{2}, 4, 2\sqrt{2}$, ... is geometric. Hence show that the general term of the sequence is $u_n = 2^{\frac{7}{2}-\frac{1}{2}n}$.

8 Find k given that the following are consecutive terms of a geometric sequence:

a 7, k, 28 **b** k, $3k$, $20 - k$ **c** k, $k + 8$, $9k$

9 Find the general term u_n of the geometric sequence which has:

a $u_4 = 24$ and $u_7 = 192$ **b** $u_3 = 8$ and $u_6 = -1$

c $u_7 = 24$ and $u_{15} = 384$ **d** $u_3 = 5$ and $u_7 = \frac{5}{4}$

10 **a** Find the first term of the sequence 2, 6, 18, 54, ... which exceeds 10 000.

b Find the first term of the sequence $4, 4\sqrt{3}, 12, 12\sqrt{3}$, ... which exceeds 4800.

c Find the first term of the sequence 12, 6, 3, 1.5, ... which is less than 0.0001.

Answer

1 **a** $b = 18,\ c = 54$ **b** $b = 2\frac{1}{2},\ c = 1\frac{1}{4}$

c $b = 3,\ c = -1\frac{1}{2}$

2 **a** 96 **b** 6250 **c** 16

3 **a** 6561 **b** $\frac{19\,683}{64}$ **c** 16 **d** ar^8

4 **a** $u_1 = 5,\ r = 2$ **b** $u_n = 5 \times 2^{n-1},\ u_{15} = 81\,920$

5 **a** $u_1 = 12,\ r = -\frac{1}{2}$

b $u_n = 12 \times (-\frac{1}{2})^{n-1},\ u_{13} = \frac{3}{1024}$

6 $u_1 = 8,\ r = -\frac{3}{4},\ u_{10} \approx -0.600\,677\,490\,2$

7 $u_1 = 8,\ r = \frac{1}{\sqrt{2}}$ **Hint:** $u_n = 2^3 \times (2^{-\frac{1}{2}})^{n-1}$

8 **a** $k = \pm 14$ **b** $k = 2$ **c** $k = -2$ or 4

9 **a** $u_n = 3 \times 2^{n-1}$ **b** $u_n = 32 \times (-\frac{1}{2})^{n-1}$

c $u_n = 3 \times (\pm\sqrt{2})^{n-1}$ **d** $u_n = 10 \times (\pm\sqrt{2})^{1-n}$

10 **a** $u_9 = 13\,122$ **b** $u_{14} = 2916\sqrt{3} \approx 5050.7$

c $u_{18} \approx 0.000\,091\,55$

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