Geometric sequences

Student name: _____ Score: _____

1. The fourth term, u_4, of a geometric sequence is 120. The fifth term, u_5, is 96.

(a) Find the common ratio of the sequence.

(b) Find u_1, the first term of the sequence.

2. The second term of an arithmetic sequence is 20. The sixth term is 80.

The first, second and sixth terms of this arithmetic sequence are the first three terms of a geometric sequence.

Calculate the seventh term of the **geometric** sequence.

3. Only one of the following four sequences is arithmetic and only one of them is geometric.

$$p_n = 1, 2, 3, 5, \ldots$$

$$q_n = 1, \frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \ldots$$

$$r_n = 1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \ldots$$

$$t_n = 1, 0.96, 0.92, 0.88, \ldots$$

(a) State which sequence is

(i) arithmetic

(ii) geometric

(b) for another geometric sequence $u_n = -10, -5, -\frac{5}{2}, -\frac{5}{4}, \ldots$

(i) Write down the common ratio

(ii) Find the exact value of the tenth term. Give your answer as a fraction.

4. The first three terms of a geometric sequence are $u_1 = 0.96$, $u_2 = 2.4$, $u_3 = 6$.

(a) Find the value of r.

(b) Find the fifth term of the geometric sequence.

5. Consider a geometric sequence where the first term is 832 and the second term is 624.

Find the least value of n such that the nth term of the sequence is less than 8.

6. The fourth term of a geometric sequence is 15 and the sixth term is $\frac{12}{5}$.

All the terms in the sequence are positive.

Calculate the value of the common ratio.

7. Consider the geometric sequence 4374, 2916, 1944, 1296, 864, …

(a) Find the common ratio, r.

(b) Write down the next term of the sequence, u_6.

(c) Calculate the ninth term, u_9.

8. The first term of a geometric sequence is 4 and the third term is 5.29.

Calculate

(a) The common ratio of the sequence.

(b) The ninth term of the sequence.

9. Consider the geometric sequence 27, m, 3, … where $m \in \mathbb{Z}^+$

(a) Find the common ratio, r.

(b) Find the value of m.

(c) Find the value of the eighth term.

10. A teashop opened. During the first week their profit was \$60.

The teashop's profit increases by 10% every week.

Find the teashop's profit during the 11^{th} week.

Geometric sequences

Student name: _____ANSWERS_____ Score: _____

1. The fourth term, u_4, of a geometric sequence is 120. The fifth term, u_5, is 96.

(a) Find the common ratio of the sequence. $r = 0.8$

(b) Find u_1, the first term of the sequence. 234.375

2. The second term of an arithmetic sequence is 20. The sixth term is 80.
The first, second and sixth terms of this arithmetic sequence are the first three terms of a geometric sequence.

Calculate the seventh term of the **geometric** sequence. 20 480

3. Only one of the following four sequences is arithmetic and only one of them is geometric.

$$p_n = 1, 2, 3, 5, \ldots$$

$$q_n = 1, \frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \ldots$$

$$r_n = 1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \ldots$$

$$t_n = 1, 0.96, 0.92, 0.88, \ldots$$

(a) State which sequence is

(i) arithmetic t_n

(ii) geometric q_n

(b) for another geometric sequence $u_n = -10, -5, -\frac{5}{2}, -\frac{5}{4}, \ldots$

(i) Write down the common ratio $r = 0.5$

(ii) Find the exact value of the tenth term. Give your answer as a fraction. $-\frac{5}{256}$

4. The first three terms of a geometric sequence are $u_1 = 0.96$, $u_2 = 2.4$, $u_3 = 6$.

(a) Find the value of r. $r = 2.5$

(b) Find the fifth term of the geometric sequence. $u_5 = 37.5$

5. Consider a geometric sequence where the first term is 832 and the second term is 624.

Find the least value of n such that the nth term of the sequence is less than 8. $n = 18$

6. The fourth term of a geometric sequence is 15 and the sixth term is $\frac{12}{5}$.

All the terms in the sequence are positive.

Calculate the value of the common ratio. $r = \frac{2}{5}$

7. Consider the geometric sequence 4374, 2916, 1944, 1296, 864, …

(a) Find the common ratio, r. $r = \frac{2}{3}$

(b) Write down the next term of the sequence, u_6. $u_6 = 576$

(c) Calculate the eleventh term, u_{11}. $u_{11} = 75\frac{23}{27}$ or 75.9

8. The first term of a geometric sequence is 4 and the third term is 5.29.

Calculate

(a) The common ratio of the sequence. $r = 1.15$

(b) The ninth term of the sequence. $u_9 = 12.2$

9. Consider the geometric sequence 27, m, 3, … where $m \in \mathbb{Z}^+$

(a) Find the common ratio, r. $r = \frac{1}{3}$

(b) Find the value of m. $m = 9$

(c) Find the value of the eighth term. $\frac{1}{81}$ or 0.0123

10. A teashop opened. During the first week their profit was \$60.

The teashop's profit increases by 10% every week.

Find the teashop's profit during the 8th week. 116.92