



CAMI Mathematics: Grade 11

12.2 Patterns, sequences and series

12.2 Geometric sequences

1. Determine which term will be -512 for the sequence $-2 ; 8 ; -32 ; \dots$
2. In a geometric sequence, $T_4 = -16$ and $T_9 = 512$. Determine the first three terms of the sequence.
3. The value of the first term in a geometric sequence is -1 and the value $T_2 = 2$. Determine the value of T_7 .
4. Consider the geometric sequence $3 ; -9 ; 27 ; \dots$
Which term is equal to -729?
5. The first term in a geometric sequence is 2, and $T_6 = -2048$.
Determine the constant ratio between the terms.
6. In a geometric sequence $T_8 = 6561$ and the constant ratio is -3.
Determine the first three terms of the sequence.
7. Determine the geometric mean of $-3q^4$ and $-48q^8$
8. Place two geometric means between 2 and -16.
9. Place two geometric means between 2 and 128.
10. In a geometric sequence $T_3 = -12$ and $T_4 = -24$.
Determine the first three terms of the sequence



MEMO

Geometric sequences [5.6.1.1, 5.6.1.2; 5.6.2]

1. $-2 ; 8 ; -32 ; \dots$

$$a = -2 ; r = -4$$

$$T_n = ar^{n-1}$$

$$-512 = (-2)(-4)^{n-1}$$

$$256 = (-4)^{n-1}$$

$$256 = (-4)^n \cdot (-4)^{-1}$$

$$-1024 = -4^n$$

$$\therefore n = 5$$

2.

$$T_4 = -16$$

$$-16 = ar^3$$

$$T_9 = 512$$

$$512 = ar^8$$

$$\frac{ar^8}{ar^3} = \frac{512}{-16}$$

$$\therefore r^5 = -32$$

$$\therefore r = -2$$

$$\therefore a = 2$$

Sequence: $2 ; -4 ; 8$

3. $T_1 = a = -1$

$$T_2 = ar = 2$$

$$\therefore r = -2$$

$$T_7 = ar^6$$

$$T_7 = (-1)(-2)^6$$

$$T_7 = -64$$



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4. $3 ; -9 ; 27 ; \dots$

$$a = 3 ; r = -3$$

$$T_n = ar^{n-1}$$

$$-729 = (3)(-3)^{n-1}$$

$$-243 = (-3)^n (-3)^{-1}$$

$$729 = -3^n$$

$$(-3)^6 = (-3)^n$$

$$\therefore n = 6$$

5. $a = 2$ and $T_6 = -2048$

$$T_6 = -2048$$

$$-2048 = (2)(r)^5$$

$$-1024 = r^5$$

$$(-4)^5 = r^5$$

$$\therefore r = -4$$

6. $T_8 = 6561$ and $r = -3$

$$T_8 = ar^7$$

$$6561 = a(-3)^7$$

$$\therefore a = -3$$

Sequence; $-3 ; 9 ; -27$

7.

$$GM = \sqrt{-3q^4 \times -48q^8}$$

$$GM = \sqrt{144q^{12}}$$

$$GM = \pm 12q^6$$

8.

$$T_1 = a = 2$$

$$T_4 = -16$$

$$-16 = (2)r^3$$

$$-8 = r^3$$

$$\therefore r = -2$$

Sequence: $2 ; -4 ; 8 ; -16$



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9.

$$T_1 = a = 2$$

$$T_4 = 128$$

$$128 = (2)r^3$$

$$64 = r^3$$

$$\therefore r = 4$$

Sequence: 2 ; 8 ; 32 ; 128

10.

$$T_3 = -12$$

and

$$T_4 = -24$$

$$-12 = ar^2$$

$$-24 = ar^3$$

$$\frac{ar^3}{ar^2} = \frac{-24}{-12}$$

$$r = 2$$

$$a = -3$$

Sequence: -3 ; -6 ; -12

