

Pre-Calculus 11  
Geometric Sequences & Series Practice

- Is each sequence geometric? If it is, state the common ratio and a formula to determine the general term in the form  $t_n = t_1 r^{n-1}$ .
  - 11, 33, 99, 297, ...
  - 6, 12, 18, 24, ...
- Write the first four terms of each geometric sequence.
  - $t_1 = -8, r = \frac{1}{2}$
  - $t_n = 3(0.6)^{n-1}$
- Determine the number of terms in each geometric sequence.
  - 4, 12, 36, ..., 78 732
  - $t_1 = 5, r = -\frac{1}{2}, t_n = \frac{5}{64}$
- Determine the  $n$ th term of each geometric sequence.
  - 6, -18, 54, -164, ...
  - $t_1 = 7, t_5 = 1792$
- Determine the unknown terms in each geometric sequence.
  - 18,  $\square$ ,  $\square$ , 6174
  - $\square$ , 4,  $\square$ ,  $\square$ , 108
- Determine the first term, the common ratio, and an expression for the general term of each geometric sequence.
  - $t_5 = 900, t_7 = 0.09$
  - $t_3 = -1728, t_6 = 373\ 248$
- The following sequences are geometric. What is the value of each variable?
  - $8x - 12, 16, 64, 256, \dots$
  - $25, 5, 1, 2y - 1, \dots$
- An excavating company has a digger that was purchased for \$240 000. It is depreciating at 12% per year.
  - Determine the next three terms of this geometric sequence.
  - Determine the general term. Define your variables.
    - How much will the digger be worth in 7 years?
    - How long will it take before the equipment is worth less than \$120 000?
- For each geometric series, state the values of  $t_1$  and  $r$ . Then, determine each partial sum.
  - $0.43 + 0.0043 + 0.000\ 043 + \dots, (S_6)$
  - $5 - 5 + 5 - \dots, (S_{10})$
- Determine the partial sum,  $S_n$ , for each geometric series described.
  - $t_1 = -4, r = 2, n = 10$
  - $t_n = (-5)(0.5)^{n-1}, n = 5$
- Determine the partial sum,  $S_n$ , for each geometric series.
  - $2 + 6 + 18 + \dots + 354\ 294$
  - $t_1 = -3, r = -2, t_n = 6144$
- Determine the first term for each geometric series.
  - $S_n = 3932.4, t_n = 4915.2, r = -4$
  - $S_n = 292\ 968, n = 8, r = 5$
- Determine the number of terms in each geometric series.
  - $4 + 20 + 100 + \dots + t_n = 15\ 624$
  - $1792 - 896 + 448 - \dots - t_n = 1197$
- The fourth term of a geometric series is 30; the ninth term is 960. Determine the sum of the first nine terms.
- The first term of a geometric series is 3. The sum of the first two terms of the series is 15 and the sum of the first three terms of the series is 63. Determine the common ratio.
- A ball is dropped from the top of a 25-m ladder. In each bounce, the ball reaches a vertical height that is  $\frac{3}{5}$  the previous height. Determine the total vertical distance travelled by the ball when it contacts the ground for the sixth time. Express your answer to the nearest tenth of a metre.

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**Key**

1. **a)** geometric,  $r = 3$ ,  $t_n = 11(3)^{n-1}$  **b)** not geometric

2. **a)**  $-8, -4, -2, -1$  **b)**  $3, 1.8, 1.08, 0.648$

3. **a)** 10 **b)** 7

4. **a)**  $t_n = 6(-3)^{n-1}$  **b)**  $t_n = 7(4)^{n-1}$

5. **a)** 126, 882 **b)**  $\frac{4}{3}, 12, 36$

6. **a)**  $t_1 = 9 \times 10^{10}$ ,  $r = \pm 0.01$ ,

$t_n = (9 \times 10^{10})(\pm 0.01)^{n-1}$

**b)**  $t_1 = -48$ ,  $r = -6$ ,  $t_n = (-48)(-6)^{n-1}$

7. **a)**  $x = 2$  **b)**  $y = \frac{6}{10}$  or  $\frac{3}{5}$

8. **a)** \$211 200, \$185 856, \$163 553

**b)**  $t_n = 240\,000(0.88)^{n-1}$ ,  $t_n =$  value of digger,  
in dollars,  $n - 1 =$  years since purchase

**c)** \$98 082 **d)** 6 years

9. **a)**  $t_1 = 0.43$ ,  $r = 0.01$ ,  $S_6 = \frac{43}{99}$

**b)**  $t_1 = 5$ ,  $r = -1$ ,  $S_{10} = 0$

10. **a)**  $-4092$  **b)**  $\frac{-155}{16}$

11. **a)** 531 440 **b)** 4095

12. **a)** 1.2 **b)** 3

13. **a)** 6 **b)** 9

14. 1916.25 **15.** 4

16. 94.2 m