

Name: Keyj
 Date: _____ Period: _____

Unit 6: Sequences
 Practice: Geometric Sequences

Determine whether each sequence is a geometric sequence. If yes, identify the common ratio.

1. 4, 12, 36, 108, ...

$$\frac{12}{4} = 3 \quad \frac{108}{36} = 3 \quad \boxed{\text{yes}} \\ r = 3$$

2. 5, 10, 15, 20, ...

$$\frac{10}{5} = 2 \quad \boxed{\text{no}} \\ \frac{15}{10} = \frac{3}{2} = 1.5$$

3. 120, -60, 30, -15, ...

$$\frac{-60}{120} = -\frac{1}{2} \quad \frac{-15}{30} = -\frac{1}{2} \quad \boxed{\text{yes}} \\ r = -\frac{1}{2}$$

4. 1, -4, 16, -64, ...

$$\frac{-4}{1} = -4 \quad \frac{-64}{16} = -4 \quad \boxed{\text{yes}} \\ r = -4$$

5. 50, 35, 20, ...

$$\frac{35}{50} = \frac{7}{10} \quad \boxed{\text{no}} \\ \frac{20}{35} = \frac{4}{7}$$

6. 625, 125, 25, 5, ...

$$\frac{125}{625} = \frac{1}{5} \quad \frac{5}{25} = \frac{1}{5} \quad \boxed{\text{yes}} \\ r = \frac{1}{5}$$

Find the next three terms of each geometric sequence.

7. 4, 8, 16, 32, 64, 128

$$\frac{8}{4} = 2 = r$$

8. 1, -6, 36, -216, 1296, -7776

$$\frac{-6}{1} = -6 = r$$

9. 486, 162, 54, 18, 6, 2

$$\frac{162}{486} = \frac{1}{3} = r$$

10. 3, 15, 75, 375, 1875, 9375

$$\frac{15}{3} = 5 = r$$

11. 240, -120, 60, -30, 15, $-\frac{15}{2}$ (-7.5)

$$\frac{-120}{240} = -\frac{1}{2} = r$$

12. -5, -20, -80, -320, -1280, -5120

$$\frac{-20}{-5} = 4 = r$$

Write an equation to find the n^{th} term of each sequence. Then find a_9 .

13. 5, 20, 80, ...

$$a_1 = 5 \quad a_n = 5(4)^{n-1}$$

$$\frac{20}{5} = 4 = r$$

$$\boxed{a_n = 5(4)^{n-1}}$$

$$a_9 = 5(4)^8$$

$$\boxed{a_9 = 327,680}$$

14. -2, 10, -50, ...

$$a_1 = -2$$

$$\frac{10}{-2} = -5 = r$$

$$\boxed{a_n = -2(-5)^{n-1}}$$

$$a_9 = -2(-5)^{9-1}$$

$$a_9 = -2(-5)^8$$

$$\boxed{a_9 = -781,250}$$

15. -65536, 16384, -4096, ...

$$a_1 = -65536$$

$$\frac{16384}{-65536} = -\frac{1}{4} = r$$

$$a_n = -65536\left(-\frac{1}{4}\right)^{n-1}$$

$$a_9 = -65536\left(-\frac{1}{4}\right)^{9-1}$$

$$a_9 = -65536\left(-\frac{1}{4}\right)^8$$

$$a_9 = -1$$

16. 6, -18, 54, ...

$$a_1 = 6$$

$$\frac{-18}{6} = -3 = r$$

$$a_n = 6(-3)^{n-1}$$

$$a_9 = 6(-3)^{9-1}$$

$$a_9 = 6(-3)^8$$

$$a_9 = 39,366$$

17. 1536, 768, 384, ...

$$a_1 = 1536$$

$$\frac{768}{1536} = \frac{1}{2} = r$$

$$a_n = 1536\left(\frac{1}{2}\right)^{n-1}$$

$$a_9 = 1536\left(\frac{1}{2}\right)^{9-1}$$

$$a_9 = 1536\left(\frac{1}{2}\right)^8$$

$$a_9 = 6$$

18. -1, -7, -49, ...

$$a_1 = -1$$

$$\frac{-7}{-1} = 7 = r$$

$$a_n = -1(7)^{n-1}$$

$$a_9 = -1(7)^{9-1}$$

$$a_9 = -1(7)^8$$

$$a_9 = -5,764,801$$

A ball is dropped from a height of 500 meters. The table shows the height of each bounce.

Bounce	Height (m)
1	400
2	320
3	256

19. Write a rule to represent the height of the ball after each bounce.

$$a_1 = 400$$

$$\frac{320}{400} = \frac{4}{5} = r$$

$$a_n = 400\left(\frac{4}{5}\right)^{n-1}$$

20. How high does the ball bounce on the 6th bounce?

$$a_6 = 400\left(\frac{4}{5}\right)^{6-1}$$

$$a_6 = 400\left(\frac{4}{5}\right)^5$$

$$a_6 = 131.072 \text{ m}$$