

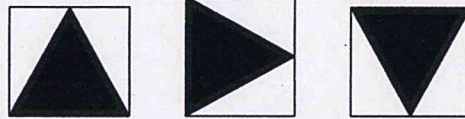
1. Pauline's Pizza Shop made 16 pizzas on Monday, 22 pizzas on Tuesday, and 28 pizzas on Wednesday. If this pattern continues, how many pizzas will Pauline's Pizza Shop make on Friday?
 $16 + 6 = 22$ $22 + 6 = 28$ $28 + 6 = 34$ $34 + 6 = 40$ pizzas
 Mon Tues wed Thurs Fri
 Add 6 more pizzas each day
2. Consider the sequence shown. 4, 12, 36, 108, 324, 972

a. Describe the pattern. *Multiply by 3*

b. What is the next number in the ^{sequence} pattern?

$$972 \times 3 = 2916$$

3. Consider the sequence shown.



a. Describe the pattern.

The figure rotates 90° clockwise.

b. Draw the next two figures of the pattern.



4. Write the first 4 terms of each sequence.

a. an arithmetic sequence with a common difference of 7 and a first term of -12

$$-12, -5, 2, 9 \quad d = 7$$

add 7 to each number

b. a geometric sequence with a common ratio of 0.1 and a first term of 100

$$100, 10, 1, 0.1 \quad r = 0.1$$

multiply by 0.1

c. an arithmetic sequence with a common difference of -0.25 and a first term of 5

$$5, 4.75, 4.5, 4.25 \quad d = -0.25$$

add -0.25

d. a geometric sequence with a common ratio of 2 and a first term of $\frac{1}{3}$

$$\frac{1}{3}, \frac{2}{3}, \frac{4}{3}, \frac{8}{3} \quad r = 2$$

multiply by 2

5. Identify each sequence as arithmetic or geometric. Then determine the common difference or common ratio for each sequence.

a. 5, 3.5, 2, 0.5, -1 *Arithmetic*

$$3.5 - 5 = -1.5$$

$$2 - 3.5 = -1.5 \quad d = -1.5$$

b. 1, 6, 36, 216, 1296 *Geometric*

$$\frac{6}{1} = 6 \quad \frac{36}{6} = 6 \quad r = 6$$

c. -19, -13, -7, -1, 5

$$-13 - (-19) = -13 + 19 = 6 \quad \text{Arithmetic}$$

$$-7 - (-13) = -7 + 13 = 6 \quad d = 6$$

Arithmetic

d. $\frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}$ *Geometric*

$$\frac{\frac{1}{8}}{\frac{1}{4}} = \frac{1}{8} \times \frac{4}{1} = \frac{1}{2} \quad r = \frac{1}{2}$$

6. Bradley makes two phone calls to his friends to tell them school is cancelled because of snow. Each of those friends makes two calls to tell their friends the same news. Each of those friends makes two calls to tell their friends the same news, and so on.

a. Write a numeric sequence to represent the number of calls made in each of the first 5 sets of phone calls. $1, 2, 4, 8, 16, \dots$

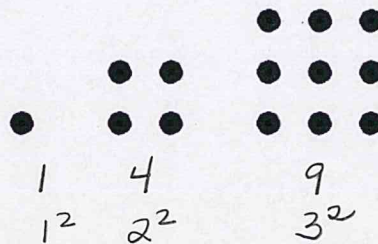
b. Is this an arithmetic or geometric sequence?

Geometric
 $r = 2$
 Multiply by 2

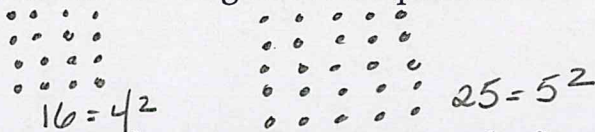
7. Consider the sequence shown.

a. Describe the pattern.

Perfect squares



b. Draw the next two figures of the pattern.



c. Write a numeric sequence to represent the first 5 figures.

$1, 4, 9, 16, 25, \dots$

8. Determine if the sequence is arithmetic or geometric. Identify the next term in the sequence.

0.4, 0.08, 0.016, 0.0032, ...

$$\frac{0.08}{0.4} = 0.2$$

$$\frac{0.016}{0.08} = 0.2$$

Geometric, $r = 0.2$

0.4, 0.08, 0.016, 0.0032, 0.00064

9. What is the common difference in the sequence -40, -12, 16, 44, ...?

$$-12 - (-40) = -12 + 40 = 28$$

$$d = 28$$

$$16 - (-12) = 16 + 12 = 28$$

10. The Robinsons are draining their family swimming pool. After one-half hour, there are 7500 gallons of water in the pool. After one hour, there are 7200 gallons of water in the pool. After one and one-half hours, there are 6900 gallons of water in the pool. If this pattern continues, how much water will be in the pool after 3 hours?

7500 -300 7200 -300 6900 -300 6600 -300 6300 -300 6000
 $\frac{1}{2}$ 1 $1\frac{1}{2}$ 2 $2\frac{1}{2}$ 3

6000 gallons of water
 after 3 hours

Decide whether each sequence is arithmetic or geometric. Then use the appropriate formula to determine each term.

$$a_n = a_1 + d(n-1)$$

$$g_n = g_1 \cdot r^{n-1}$$

11. Determine the 20th term of the sequence
30, 70, 110, ...

$$\begin{aligned} 70 - 30 &= 40 \\ 110 - 70 &= 40 \\ \text{Arithmetic} \\ d &= 40 \\ a_{20} &= 30 + 40(20-1) \\ a_{20} &= 30 + 40(19) \\ a_{20} &= 30 + 760 \\ a_{20} &= 790 \end{aligned}$$

13. Determine the 12th term of the sequence
-5, 20, -80, 320, ...

$$\begin{aligned} 20 / -5 &= -4 \\ -80 / 20 &= -4 \\ \text{Geometric} \\ r &= -4 \\ g_{12} &= -5 \cdot (-4)^{12-1} \\ g_{12} &= -5 \cdot (-4)^{11} \\ g_{12} &= -5(-4194304) \\ g_{12} &= 20971520 \end{aligned}$$

15. Determine the 15th term of the sequence
3, 9, 27, ...

$$\begin{aligned} 9 / 3 &= 3 \\ 27 / 9 &= 3 \\ \text{Geometric} \\ r &= 3 \\ g_{15} &= 3 \cdot 3^{15-1} \\ g_{15} &= 3 \cdot 3^{14} \\ g_{15} &= 3(4782969) \\ g_{15} &= 14348907 \end{aligned}$$

17. Determine the 35th term of the sequence
120, 104, 88, ...

$$\begin{aligned} 104 - 120 &= -16 \\ 88 - 104 &= -16 \\ \text{Arithmetic} \\ d &= -16 \\ a_{35} &= 120 - 16(35-1) \\ a_{35} &= 120 - 16(34) \\ a_{35} &= 120 - 544 \\ a_{35} &= -424 \end{aligned}$$

12. Determine the 25th term of the sequence
-25, -50, -75, ...

$$\begin{aligned} -50 - (-25) &= -25 \\ -50 + 25 &= -25 \\ -75 - (-50) &= -25 \\ -75 + 50 &= -25 \\ \text{Arithmetic} \\ d &= -25 \\ a_{25} &= -25 + (-25)(24) \\ a_{25} &= -25 - 600 \\ a_{25} &= -625 \end{aligned}$$

14. Determine the 30th term of the sequence
16, 24, 32, ...

$$\begin{aligned} 24 - 16 &= 8 \\ 32 - 24 &= 8 \\ \text{Arithmetic} \\ d &= 8 \\ a_{30} &= 16 + 8(30-1) \\ a_{30} &= 16 + 8(29) \\ a_{30} &= 16 + 232 \\ a_{30} &= 248 \end{aligned}$$

16. Determine the 8th term of the sequence
300, 30, 3, ...

$$\begin{aligned} 30 / 300 &= 1/10 \\ 3 / 30 &= 1/10 \\ \text{Geometric} \\ r &= 1/10 \\ g_8 &= 300 \cdot (1/10)^{8-1} \\ g_8 &= 300 \cdot (1/10)^7 \\ g_8 &= \frac{300}{10000000} \\ g_8 &= 0.00003 \end{aligned}$$

18. Determine the 11th term of the sequence
-8000, 4000, -2000, 1000, ...

$$\begin{aligned} 4000 / -8000 &= -1/2 \\ -2000 / 4000 &= -1/2 \\ \text{Geometric} \\ r &= -1/2 \\ g_{11} &= -8000 \cdot (-1/2)^{11-1} \\ g_{11} &= -8000 \cdot (-1/2)^{10} \\ g_{11} &= \frac{-8000}{1024} \\ g_{11} &= -7.8125 \end{aligned}$$