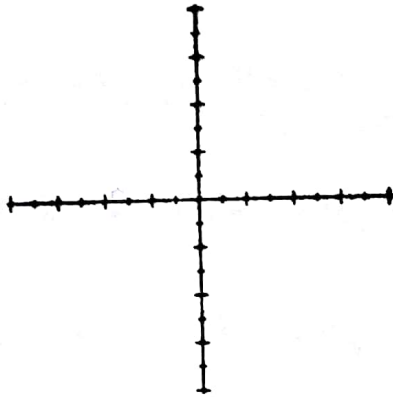


SEC 3.5 GEOMETRIC SEQUENCES

REVIEW

- ① GRAPH $y = 3^x$. STATE DOMAIN + RANGE + DESCRIBE END BEHAVIOR



- ② TELL WHETHER THE GRAPHS OF THE FOLLOWING EQUATIONS ARE PARALLEL, PERPENDICULAR, OR NEITHER.

$$y = -2x + 11 \quad \text{AND} \quad y + 2x = 23$$

- ③ WRITE AN EQUATION FOR THE FUNCTION WHOSE VALUES ARE LISTED IN THE TABLE.

x	0	1	2	3	4	5
$f(x)$	0	3	6	9	12	15

ARITHMETIC SEQUENCES - PREVIOUSLY WE HAVE SEEN THAT A SEQUENCE OF NUMBERS WITH A COMMON DIFFERENCE (d) IS AN ARITHMETIC SEQUENCE.

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

ex) $5, 9, 13, 17, \dots$ $d =$

* THE n TH TERM IS $a_n =$

* THE 25TH TERM IS $a_{25} =$

* WHAT TERM EQUALS 73?

GEOMETRIC SEQUENCES

THE SEQUENCE $1, 5, 25, 125, \dots$ IS AN EXAMPLE OF A GEOMETRIC SEQUENCE. INSTEAD OF A COMMON DIFFERENCE, IT HAS A COMMON RATIO. THE COMMON RATIO CAN BE FOUND BY _____.

EXAMPLE 1. DETERMINE WHETHER EACH SEQUENCE IS GEOMETRIC, ARITHMETIC, OR NEITHER.

(A) $256, 128, 64, 32, \dots$

(B) $4, 9, 12, 18, \dots$

(C) $25, 21, 17, \dots$

APPLICATION 1. DETERMINE WHETHER EACH SEQUENCE IS GEOMETRIC, ARITHMETIC, OR NEITHER.

(1) $1, 3, 9, 27, \dots$

(2) $-20, -15, -10, -5, \dots$

(3) $2, 8, 14, 22, \dots$

EXAMPLE 2. FIND THE NEXT 3 TERMS IN EACH SEQUENCE.

(A) $1, -4, 16, -64, \dots$

(B) $9, 3, 1, \frac{1}{3}, \dots$

(C) $24, 36, 54, \dots$

APPLICATION 2. FIND THE NEXT 3 TERMS OF EACH SEQUENCE.

① $-3, 15, -75, 375, \dots$

④ $15, 11, 7, 3, \dots$

⑤ $24, 36, 54, 81, \dots$

* FORMULA FOR THE n TH TERM *

JUST LIKE THE ARITHMETIC SEQUENCE, THERE IS A FORMULA FOR THE n TH TERM OF A GEOMETRIC SEQUENCE, a_n .

①* SUPPOSE WE HAVE THE SEQUENCE $1, 2, 4, 8, \dots$

WHAT IS THE COMMON RATIO, r ?

WHAT DO YOU DO TO THE 1ST TERM a_1 , TO GET a_2 ?

WHAT DO YOU DO TO THE 2ND TERM a_2 TO GET a_3 ?

HOW DO YOU GET THE n TH TERM?

FORMULA FOR a_n : $a_n =$

EXAMPLE 3. FIND THE FORMULA FOR THE n TH TERM, a_n .

① $-6, 12, -24, 48, \dots$

② $81, 9, 1, \frac{1}{9}, \dots$

APPLICATION 3. GIVE THE FORMULA FOR THE n th TERM, a_n .

① 96, 48, 24, 12, ...

② 212, 106, 53, ...

PRACTICE

① ARITHMETIC, GEOMETRIC, OR NEITHER?

Ⓐ 4, 1, 2, ...

Ⓑ 10, 20, 30, 40, ...

Ⓒ 4, 20, 100, ...

Ⓓ 212, 106, 53, ...

Ⓔ -10, -8, -6, -4

Ⓕ 5, -10, 20, 40, ...

② FIND THE NEXT 3 TERMS.

Ⓐ 2, -10, 50, ...

Ⓑ 36, 12, 4, ...

Ⓒ 4, 12, 36, ...

Ⓓ 400, 100, 25, ...

Ⓔ -6, -42, -294, ...

Ⓕ 1024, -128, 16, ...

③ THE FIRST TERM OF A GEOMETRIC SEQUENCE IS 1 AND THE COMMON RATIO IS 9. WHAT IS THE 8th TERM, a_8 ?

④ $a_1 = 2$, $r = 4$. WHAT IS THE 14th TERM, a_{14} ?

7-7**Practice****Geometric Sequences as Exponential Functions**

Determine whether each sequence is *arithmetic*, *geometric*, or *neither*. Explain.

1. 1, -5, -11, -17, ...

2. $3, \frac{3}{2}, 1, \frac{3}{4}, \dots$

3. 108, 36, 12, 4, ...

4. -2, 4, -6, 8, ...

Find the next three terms in each geometric sequence.

5. 64, 16, 4, ...

6. 2, -12, 72, ...

7. 3750, 750, 150, ...

8. 4, 28, 196, ...

9. Write an equation for the n th term of the geometric sequence 896, -448, 224,
Find the eighth term of this sequence.

10. Write an equation for the n th term of the geometric sequence 3584, 896, 224,
Find the sixth term of this sequence.

11. Find the sixth term of a geometric sequence for which $a_2 = 288$ and $r = \frac{1}{4}$.

12. Find the eighth term of a geometric sequence for which $a_3 = 35$ and $r = 7$.

13. **PENNIES** Thomas is saving pennies in a jar. The first day he saves 3 pennies, the second day 12 pennies, the third day 48 pennies, and so on. How many pennies does Thomas save on the eighth day?