Sequences

Arithmetic Sequences

tn= t1 + (n-1)d

tn= general term

t1= first term

n= term number

d= constant difference

Example 1: 5, 8, 11, 14…   Since the sequence is going up by 3, the constant difference is 3. d=3

Find the 17th term in the sequence.

tn= t1 + (n-1)d

t17= 5 + (17-1)3

t17= 5 + (16)3

t17= 5 + 48

t17= 51

Find the general formula.

tn= t1 + (n-1)d

tn= 5 + (n-1)3

tn= 5+ 3n-3

tn= 2 + 3n

Example 2: If the pattern is going down, the constant difference will be negative.

-3, -10, -17, -24…

Since the sequence is going down by 7, the constant difference is -7. d= -7

Find the 10th term in the sequence.

tn= t1 + (n-1)d

t10= -3 + (10-1)(-7)

t10= -3 + (9)(-7)

t10= -3 + -63

t10= -66

Find the general formula.

tn= t1 + (n-1)d

tn= -3 + (n-1)(-7)

tn= -3 + -7n +7

tn= 4 + -7n

Geometric Sequences

tn= t1 (r)n-1

tn= general term

t1= first term

r= common ratio

n= term number

You find the common ratio for geometric sequences by dividing neighboring terms.

Example 3:

5, 10, 20, 40…

Find r: 10/5= 2   20/10=2   40/20=2   r=2

Notice that if the pattern is getting larger, that the absolute value of r is greater than 1.

Example 4:

64, -48, 36, -27…

Find r: -48/64= -3/4   36/-48= -3/4   -27/36= -3/4   r=-3/4

Notice that if the pattern switches positive, negative, positive, negative… or negative, positive…, that r is negative. Notice that if the pattern is getting smaller that the absolute value of r is less than one.

Example 5:

200, -100, 50, -25…

Find r: -100/200= -1/2, 50/-100= -1/2, -25/50= -1/2, r= -1/2

Find the 7th term.   Find the general formula

tn= t1 (r)n-1   tn= t1 (r)n-1

t7= 200 (-1/2)7-1   tn= 200 (-1/2)n-1

t7= 200 (-1/2)6

t7= 200 (1/64)

t7= 50/16 or 3.125