

### 11-2 Arithmetic Sequences

Is the sequence arithmetic? If so, identify the common difference.

1)  $-3, 1, 5, \dots$

2)  $6, 2, -1, \dots$

3)  $2, 4, 8, \dots$

4) Write an equation for the sequence:  $-20, -15, -10, \dots$

5) Find the 12<sup>th</sup> term of the sequence:  $18, 11, 4, \dots$

6) Find the 8<sup>th</sup> term of the sequence:  $a_{10} = 18, d = 3$

① Yes  $d=4$     ② No    ③ No

④  $d=5$      $a_0 = -25$      $a_n = -25 + 5n$

⑤  $d=-7$      $a_0 = 25$      $a_n = 25 - 7n$      $a_{12} = 25 - 7(12) = 25 - 84$   
 $-59$

⑥  $\frac{12}{8^{\text{th}}}, \frac{15}{9^{\text{th}}}, \frac{18}{10^{\text{th}}},$      $a_8 = 12$

### 11-3 Geometric Sequences

What type of sequence? If it is geometric, then what is the common ratio and the next 2 terms.

1) 3, 6, 9, ...

2) -6, 12, -24, ...

3) 9, 3, 1, ...

4) Write an equation for the sequence. Generate the first 5 terms:  $a_1 = 3, r = 4$

5) Find the 9<sup>th</sup> term of the sequence:  $a_7 = 5, r = 3$

6) Find the 10<sup>th</sup> term of the sequence:  $a_{12} = -12, r = -2$

① Arithmetic  $d=3$     ② Geometric  $r=-2$     ③ Geometric  $r=\frac{1}{3}$

④  $\frac{3}{4}, 3, 12, 48, 192, 768$     ⑤  $\frac{5}{7^{\text{th}}}, \frac{15}{8^{\text{th}}}, \frac{45}{9^{\text{th}}}$     ⑥  $\frac{-3}{10^{\text{th}}}, \frac{6}{11^{\text{th}}}, \frac{-12}{12^{\text{th}}}$

$$a_0 = \frac{3}{4}$$

$$a_n = a_0(r)^n$$

$$a_n = \frac{3}{4}(4)^n$$

$$a_9 = 45$$

$$a_{10} = -3$$

### 11-4 Arithmetic Series

Tell if it is a *sequence* or *series*. Tell if it is *infinite* or *finite*.

1) 17, 15, 13, ...

2)  $3 + 5 + 7 + 9 + \dots$

3)  $3 + 2 + 1$

4) Write the related series.

Evaluate the series: -1, 4, 9, 14

5) The sequence has 7 terms.

Evaluate the series: -12, -9, ..., 6

6) Evaluate the series to the

10<sup>th</sup> term:  $2 + 6 + 10 + \dots$

① Infinite Sequence

② Infinite Series

③ Finite Series

④  $-1 + 4 + 9 + 14 = \boxed{26}$

⑤  $S_7 = \frac{7}{2}(-12 + 6)$

$S_7 = \frac{7}{2}(-3 - 6)$

$S_7 = 7(-3)$

$S_7 = \boxed{-21}$

⑥  $a_{10} = -2 + 4(10) = 38$

$S_{10} = \frac{10}{2}(2 + 38)$

$5(40)$

$S_{10} = \boxed{200}$

### 11-5 Geometric Series

|   |  |
|---|--|
| 1) Evaluate for the specified number of terms:<br>$-1 + 4 - 16 + \dots ; n = 6$ | Which series have a sum?<br>2) $2 + 8 + 32 + \dots$<br>3) $150 + 15 + 1.5 + \dots$   |
| 4) Evaluate the infinite geometric series:<br>$30 + 10 + \frac{10}{3} + \dots$  | 5) Is the series <i>arithmetic</i> or <i>geometric</i> ? Evaluate for the specified number of terms.<br>$-2 + 10 - 50 + \dots ; n = 5$ |

$$\textcircled{1} a_1 = -1 \quad r = -4$$

$$S_6 = \frac{-1(1 - (-4)^6)}{1 - (-4)}$$

$$S_6 = \frac{-1(1 - 4096)}{5}$$

$$S_6 = \frac{-1(-4095)}{5}$$

$$S_6 = 819$$

$\textcircled{2}$  None (Growth)       $\textcircled{3}$  Yes (Decay)

$$\textcircled{4} S = \frac{30}{1 - \frac{1}{3}} = \frac{30}{\frac{2}{3}} = 30 \cdot \frac{3}{2} = 45$$

$\textcircled{5}$  Geometric  $a_1 = -2 \quad r = -5$

$$S_5 = \frac{-2(1 - (-5)^5)}{1 - (-5)} = \frac{-2(1 - (-3125))}{6} =$$

$$S_5 = \frac{-1(1 + 3125)}{3} = \frac{3126}{-3} = -1042$$