

### Arithmetic Sequences (Worksheet #1)

A. 1.  $-1, 1, 3, 5, 7, 9, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ 2 & 2 & 2 & 2 \end{array}$   
 $t_1 = -1$   
 $d = 2$   
 $t_n = t_1 + (n-1)d$   
 $t_n = -1 + (n-1)2$   
 $t_n = -1 + 2n - 2$   
 $t_n = 2n - 3$

2.  $2, 6, 10, 14, 18, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ 4 & 4 & 4 & 4 \end{array}$   
 $t_1 = 2$   
 $d = 4$   
 $t_n = t_1 + (n-1)d$   
 $t_n = 2 + (n-1)4$   
 $t_n = 2 + 4n - 4$   
 $t_n = 4n - 2$

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3.  $-1, -3, -5, -7, -9, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ -2 & -2 & -2 & -2 \end{array}$   
 $t_1 = -1$   
 $d = -2$   
 $t_n = t_1 + (n-1)d$   
 $t_n = -1 + (n-1)(-2)$   
 $t_n = -1 - 2n + 2$   
 $t_n = -2n + 1$

4.  $2, -1, -4, -7, -10, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ -3 & -3 & -3 & -3 \end{array}$   
 $t_1 = 2$   
 $d = -3$   
 $t_n = t_1 + (n-1)d$   
 $t_n = 2 + (n-1)(-3)$   
 $t_n = 2 - 3n + 3$   
 $t_n = -3n + 5$

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5.  $-1, 2, 5, 8, 11, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ 3 & 3 & 3 & 3 \end{array}$   
 $t_1 = -1$   
 $d = 3$   
 $t_n = t_1 + (n-1)d$   
 $t_n = -1 + (n-1)3$   
 $t_n = -1 + 3n - 3$   
 $t_n = 3n - 4$

6.  $5, -1, -3, -7, -11, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ -4 & -4 & -4 & -4 \end{array}$   
 $t_1 = 5$   
 $d = -4$   
 $t_n = t_1 + (n-1)d$   
 $t_n = 5 + (n-1)(-4)$   
 $t_n = 5 - 4n + 4$   
 $t_n = -4n + 9$

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B.1.  $t_{18}$  for  $-3, 0, 3, 6, 9, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ 3 & 3 & 3 & 3 \end{array}$   
 $t_1 = -3$   
 $d = 3$   
 $t_n = t_1 + (n-1)d$   
 $t_n = -3 + (n-1)3$   
 $t_n = -3 + 3n - 3$   
 $t_n = 3n - 6$   
 To find  $t_{18}$ :  
 $n = 18$   
 $t_n = 3n - 6$   
 $t_{18} = 3(18) - 6$   
 $t_{18} = 54 - 6$   
 $t_{18} = 48$

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2.  $t_{75}$  for  $1, 3, 5, 7, \dots$   
 $\begin{array}{ccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ 2 & 2 & 2 \end{array}$   
 $t_1 = 1$   
 $d = 2$   
 $t_n = t_1 + (n-1)d$   
 $t_n = 1 + (n-1)(2)$   
 $t_n = 1 + 2n - 2$   
 $t_n = 2n - 1$   
 To find  $t_{75}$ :  
 $n = 75$   
 $t_n = 2n - 1$   
 $t_{75} = 2(75) - 1$   
 $t_{75} = 150 - 1$   
 $t_{75} = 149$

3.  $t_{45}$  for  $0, -2, -4, -6, -8, \dots$   
 $\begin{array}{cccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ -2 & -2 & -2 & -2 \end{array}$   
 $t_1 = 0$   
 $d = -2$   
 $t_n = t_1 + (n-1)d$   
 $t_n = 0 + (n-1)(-2)$   
 $t_n = 0 - 2n + 2$   
 $t_n = -2n + 2$   
 To find  $t_{45}$ :  
 $n = 45$   
 $t_n = -2n + 2$   
 $t_{45} = -2(45) + 2$   
 $t_{45} = -90 + 2$   
 $t_{45} = -88$

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C.1.  $1, 4, 7, 10, \dots, 178$  ← LAST TERM!  
 $\begin{array}{ccc} \sqrt{\phantom{x}} & \sqrt{\phantom{x}} & \sqrt{\phantom{x}} \\ 3 & 3 & 3 \end{array}$   
 $t_1 = 1$   
 $d = 3$   
 $t_n = 178$   
 $t_n = t_1 + (n-1)d$   
 $t_n = 1 + (n-1)3$   
 $t_n = 1 + 3n - 3$   
 $t_n = 3n - 2$   
 Since  $t_n = 178$   
 $178 = 3n - 2$   
 $178 + 2 = 3n$   
 $180 = 3n$   
 $\frac{180}{3} = \frac{3n}{3}$   
 $60 = n$   
 178 is the 60th term.

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