

Name: KEY

Exercise 7.1 (part 2)

1. Write the first four terms of the arithmetic sequence that has the values shown.

a) $t_1 = -18$ et $d = 7$

$$-18, -11, -4, 3$$

b) $t_1 = 21$ et $d = -12$

$$21, 9, -3, -15$$

2. For each sequence, determines the terms indicated.

a) 12, 16, 20 ... ; t_{18} et t_{41}

$$t_1 = 12$$

$$d = 4$$

$$t_{18} = 12 + (18-1)(4)$$

$$t_{18} = 12 + 68$$

$$\boxed{t_{18} = 80}$$

$$t_{41} = 12 + (41-1)(4)$$

$$t_{41} = 12 + 160$$

$$\boxed{t_{41} = 172}$$

b) 5, -1, -7 ... ; t_n et t_{30}

$$t_1 = 5$$

$$d = -6$$

$$t_n = 5 + (n-1)(-6)$$

$$t_n = 5 + (-6n) + 6$$

$$\boxed{t_n = 11 - 6n}$$

$$t_{30} = 5 + (30-1)(-6)$$

$$t_{30} = 5 - 174$$

$$\boxed{t_{30} = -169}$$

3. Determine the number of terms in the sequence.

a) 10, 15, 20, ..., 250

$$t_1 = 10$$

$$d = 5$$

$$t_n = 250$$

$$n = ?$$

$$250 = 10 + (n-1)(5)$$

$$250 = 10 + 5n - 5$$

$$245 = 5n$$

$$\boxed{n = 49}$$

b) -11, -7, -3, ..., 153

$$t_1 = -11$$

$$d = 4$$

$$t_n = 153$$

$$n = ?$$

$$153 = -11 + (n-1)(4)$$

$$153 = -11 + 4n - 4$$

$$168 = 4n$$

$$\boxed{n = 42}$$

4. The first two terms of the arithmetic sequence are 5 and -3.

a) Determine the 17th term of the sequence.

$$\begin{aligned} t_1 &= 5 & t_{17} &= ? & t_{17} &= 5 + (17-1)(-8) \\ t_2 &= -3 & & & t_{17} &= 5 + (-128) \\ d &= -8 & & & & \boxed{t_{17} = -123} \end{aligned}$$

b) Determine which term has a value of -267.

$$\begin{aligned} n &= ? \\ -267 &= 5 + (n-1)(-8) \\ -267 &= 5 - 8n + 8 \\ -290 &= -8n \\ \boxed{n} &= \boxed{35} \end{aligned}$$

6. The 3th term of the arithmetic sequence is 24 and the 9th term is 54. Determine:

a) d

$$\begin{aligned} t_3 &= 24 & t_9 &= 54 & 24 &= t_1 + 2d \\ t_3 &= t_1 + (3-1)d & t_9 &= t_1 + (9-1)d & - (54 &= t_1 + 8d) \\ 24 &= t_1 + 2d & 54 &= t_1 + 8d & \hline -30 &= -6d & & & \frac{-30}{-6} &= \frac{-6d}{-6} \\ & & & & \boxed{d} &= \boxed{5} \end{aligned}$$

b) t_1

$$\begin{aligned} 24 &= t_1 + 2d \\ 24 &= t_1 + 2(5) \\ \boxed{t_1} &= \boxed{14} \end{aligned}$$

c) t_n

$$\begin{aligned} t_n &= t_1 + (n-1)d \\ t_n &= 14 + (n-1)(5) \\ t_n &= 14 + 5n - 5 \\ \boxed{t_n} &= \boxed{9 + 5n} \end{aligned}$$

7. The 2nd term of the arithmetic sequence is 12 and the 13th term is -21. Determine:

$$\begin{aligned} a) \ d \quad t_2 &= 12 & t_{13} &= -21 \\ 12 &= t_1 + (2-1)d & -21 &= t_1 + (13-1)d \\ 12 &= t_1 + d & -21 &= t_1 + 12d \end{aligned}$$

$$\begin{aligned} 12 &= t_1 + d \\ -(-21 &= t_1 + 12d) \\ \hline \frac{33}{-11} &= \frac{-11d}{-11} \\ \boxed{d} &= \boxed{-3} \end{aligned}$$

b) t_1

$$12 = t_1 + d$$

$$12 = t_1 - 3$$

$$\boxed{t_1 = 15}$$

c) t_n

$$t_n = 15 + (n-1)(-3)$$

$$t_n = 15 + (-3n) + 3$$

$$\boxed{t_n = 18 - 3n}$$

8. The 8th term of the arithmetic sequence is 5.3 and the 14th term is 8.3. Determine the value of the 5th term of the sequence.

$$t_8 = 5.3$$

$$t_{14} = 8.3$$

$$t_8 = t_1 + (8-1)d$$

$$t_{14} = t_1 + (14-1)d$$

$$5.3 = t_1 + 7d$$

$$8.3 = t_1 + 13d$$

$$\begin{aligned} 5.3 &= t_1 + 7d \\ - (8.3 &= t_1 + 13d) \\ \hline \frac{-3}{-6} &= \frac{-6d}{-6} \\ \boxed{d} &= \boxed{\frac{1}{2}} \end{aligned}$$

$$5.3 = t_1 + 7(0.5)$$

$$5.3 = t_1 + 3.5$$

$$\boxed{t_1 = 1.8}$$

$$t_5 = t_1 + (n-1)d$$

$$t_5 = 1.8 + (5-1)(0.5)$$

$$\boxed{t_5 = 3.8}$$

9. The expressions $5x + 2$, $7x - 4$, and $10x + 6$ are consecutive terms of an arithmetic sequence. Determine the value of x and the value of the three terms.

$$d = (7x - 4) - (5x + 2)$$

$$d = 7x - 4 - 5x - 2$$

$$d = 2x - 6$$

$$d = (10x + 6) - (7x - 4)$$

$$d = 10x + 6 - 7x + 4$$

$$d = 3x + 10$$

$$2x - 6 = 3x + 10$$

$$\boxed{-16 = x}$$

$$t_1 = 5x + 2$$

$$t_1 = 5(-16) + 2$$

$$t_1 = -80 + 2$$

$$\boxed{t_1 = -78}$$

$$t_2 = 7x - 4$$

$$t_2 = 7(-16) - 4$$

$$t_2 = -112 - 4$$

$$\boxed{t_2 = -116}$$

$$t_3 = 10x + 6$$

$$t_3 = 10(-16) + 6$$

$$t_3 = -160 + 6$$

$$\boxed{t_3 = -154}$$