

Example 1: Finding a specific term

$-10, -3, 4, \dots$ What is t_{22} ?

$$\begin{aligned} t_1 &= -10 \\ d &= 7 \\ n &= 22 \end{aligned}$$

$$t_n = t_1 + (n-1) \cdot d$$

$$t_{22} = -10 + (22-1) \cdot 7$$

$$t_{22} = -10 + 147$$

$$\underline{\underline{t_{22} = 137}}$$

Example 2: Finding the general term, t_n

$$\begin{aligned} t_1 &= -10 \\ d &= 7 \\ n &= n \end{aligned}$$

$$t_n = t_1 + (n-1) \cdot d$$

$$t_n = -10 + (n-1) \cdot 7$$

where $n \in \mathbb{N}$

$$t_n = \textcircled{-10} + \underline{7n} \textcircled{-7}$$

$$\underline{\underline{t_n = 7n - 17}}$$

$$t_{\textcircled{22}} = 7(22) - 17$$

$$= 154 - 17$$

$$= \underline{\underline{137}}$$

Ex 3 Finding 'n'

170 is the ? term of -4, 2, 8, ...

$$\begin{aligned}t_1 &= -4 \\d &= 6 \\t_n &= 170\end{aligned}$$

$$t_n = t_1 + (n-1)d$$
$$170 = -4 + (\underline{n-1}) \cdot 6$$

$$170 = \textcircled{-4} + 6n - \textcircled{6}$$

$$170 = 6n - \underline{10}$$
$$+10 \qquad +10$$

$$\frac{180}{6} = \frac{6n}{6} \quad \boxed{n = 30}$$

$$2, \underline{1.5}, 1, \underline{.5}, \dots \quad d = -0.5$$

$$2, \frac{3}{2}, 1, \frac{1}{2}, \dots \quad d = -\frac{1}{2}$$

Find n if $t_n = -14$ for $2\frac{1}{5}, 2, 1\frac{4}{5}, \dots$

$$t_n = -14$$

$$d = -\frac{1}{5}$$

$$t_1 = 2\frac{1}{5} = \frac{11}{5}$$

$$d = t_3 - t_2$$

$$\text{or } t_2 - t_1$$

$$d = 2 - 2\frac{1}{5}$$

$$= -\frac{1}{5}$$

$$t_n = t_1 + (n-1) \cdot d$$

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$$-14 = \frac{11}{5} + (n-1) \left(-\frac{1}{5}\right)$$

$$-70 = 11 + (n-1) \cdot (-1)$$

$$-70 = 11 - n + 1$$

$$-70 = 12 - n$$

$$-12 \quad -12$$

$$-82 = -n$$

$$n = 82$$

Three consecutive terms in an arith. seq.

are: $\overset{t_1}{\textcircled{5x+2}}$, $\overset{t_2}{\textcircled{7x-4}}$ and $\overset{t_3}{\textcircled{10x+6}}$

$+d$ $+d$

Find the value of x and state the three terms.

$$t_1 + d = t_2$$

$$t_2 + d = t_3$$

OR

$$\begin{array}{l} \underline{t_2 - t_1 = d} \\ \downarrow \\ \underline{t_3 - t_2 = d} \end{array}$$

Since $(t_2 - t_1) = \underline{d}$ and $(t_3 - t_2) = \underline{d}$

then $\underline{(t_2 - t_1)} = \underline{(t_3 - t_2)}$

$$\underline{(7x-4)} - \underline{(5x+2)} = \underline{(10x+6)} - \underline{(7x-4)}$$

$$\underline{7x} - \underline{4} - \underline{5x} - \underline{2} = \underline{10x} + \underline{6} - \underline{7x} + \underline{4}$$

$$\begin{array}{r} 2x - 6 = 3x + 10 \\ -2x \qquad -2x \end{array}$$

$$\begin{array}{r} -6 = x + 10 \\ -10 \qquad -10 \end{array}$$

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

$$\begin{array}{l} 5x+2 = 5(-16)+2 = -78 \\ 7x-4 = 7(-16)-4 = -116 \\ 10x+6 = 10(-16)+6 = -154 \end{array}$$

Tada!

$$\begin{array}{l}
 2x + 3y = 6 \\
 -3(3x + y = 12)
 \end{array}
 \Rightarrow
 \begin{array}{l}
 2x + 3y = 6 \\
 -9x - 3y = -36
 \end{array}$$

$$\begin{array}{r}
 -7x = -30 \\
 \hline
 -7 \qquad \hline
 -7
 \end{array}$$

$$x = \frac{30}{7}$$

$$2x + 3y = 6$$

$$\begin{array}{l}
 3x + y = 12 \\
 -3x
 \end{array}$$

$$\Rightarrow y = -3x + 12$$

$$2x + 3(-3x + 12) = 6$$

$$\begin{array}{r}
 2x - 9x + 36 = 6 \\
 - 36 - 36
 \end{array}$$

$$-7x = -30$$

$$x = \frac{30}{7}$$