

Lesson 3.1 Part 2

Using the formula to find other values other than u_n .

EXAMPLE #1

The fourth term of an arithmetic sequence is 17. The first term is 5. Find the common difference.

$$u_4 = 17$$

$$u_1 = 5$$

$$u_n = u_1 + (n-1)d$$

$$17 = 5 + (4-1)d$$

$$17 = 5 + 3d$$

$$12 = 3d$$

$$\boxed{4 = d}$$

EXAMPLE #2

Find the common difference and the number of terms in the sequence 49, 43, 37, ... , 1.


-6 -6

a) common difference = -6

b) $u_n = u_1 + (n-1)d$

$$1 = 49 + (n-1)(-6)$$

$$1 = 49 - 6n + 6$$

$$1 = -6n + 55$$

$$-54 = -6n$$

$$\boxed{9 = n}$$

EXAMPLE #3

If the third term of an arithmetic sequence is 12 and the eighth term is 27, find the first term and the common difference.

$$u_n = u_1 + (n-1)d$$

$$12 = u_1 + (3-1)d \Rightarrow 12 = u_1 + 2d$$

$$27 = u_1 + (8-1)d \Rightarrow 27 = u_1 + 7d$$

$$-15 = -5d$$

$$\boxed{3 = d}$$

$$12 = u_1 + 2(3)$$

$$12 = u_1 + 6$$

$$\boxed{6 = u_1}$$

EXAMPLE #4

Maya is training for a marathon. She builds up her fitness by running an extra 3 km each week. She runs 5 km the first week.

a) How far will she run in the third week?

b) In which week will she run more than 25 km?

$$d=3$$

$$u_1=5$$

$$a) u_n = u_1 + (n-1)d$$

$$u_3 = 5 + (3-1)(3)$$

$$u_3 = 5 + 6$$

$$u_3 = \boxed{11 \text{ km}}$$

$$b) u_1 + (n-1)d > u_n$$

$$5 + (n-1)(3) > 25$$

$$5 + 3n - 3 > 25$$

$$3n + 2 > 25$$

$$3n > 23$$

$$n > 7.67$$

$\boxed{8 \text{ weeks}}$