

Sequences – Series – Patterns

chapter

4

Revision Exercise 4 (Core)

PROJECT MATHS
Text & Tests 6

165

2. The third term of an arithmetic sequence is 71 and the seventh term is 55.
Find the first term and the common difference.

$$T_n = a + (n-1)d$$

$$T_3 = 71$$

$$a + 2d = 71 \quad (1)$$

$$T_7 = 55$$

$$a + 6d = 55 \quad (2)$$

$$(2) - (1)$$

$$4d = -16 \Rightarrow d = -4$$

$$\Rightarrow$$

$$a + 2(-4) = 71$$

$$a = 79$$

7. €2000 is invested in a savings scheme which offers 2.5% compound interest. Explain how the expression $A = €2000(1.025)^5$ represents the value of the investment after 5 years.

$$F = P(1+i)^t$$

Compound interest

F = future value
 P = present value
 i = rate of interest
 t = units of time

P = €2000
 i = 2.5%
 t = 5

$$F \text{ (or } A) = 2000(1+2.5\%)^5$$

$$F = 2000(1.025)^5$$

$$F = P(i) + P$$

$$= P(1+i)$$

Geometric

a = 2000, = P
 R = 1.025

$$T_n = ar^{n-1} = 2000(1.025)^5$$

y ₁	F ₁ = P(1+i)	}
	= 2000(1.025)	
y ₂	F ₂ = 2000(1.025) ²	
y ₃	F ₃ = 2000(1.025) ³	
y ₄	F ₄ = 2000(1.025) ⁴	
y ₅	F ₅ = 2000(1.025) ⁵	

10. Evaluate $\sum_{r=3}^{16} (2r + 1)$.

arithmetic

3, 4, 5, ... 16
 ⇒ 14 terms

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

a = 7
 d = 2

$$T_1 = 2(3) + 1 = 7$$

$$T_2 = 2(4) + 1 = 9 \quad \left. \begin{array}{l} \uparrow \\ \uparrow \end{array} \right\} +2 = d$$

$$T_3 = 2(5) + 1 = 11$$

$$\vdots$$

$$T_{14} = 2(16) + 1 = 33$$

Series: 7 + 9 + 11 + ... + 33

$$S_{14} = \frac{14}{2} [2(7) + (14-1)2]$$

$$= 280$$