# Year 6 Patterns and equations topic test

12 questions | 22 marks | 30 minutes

A hand-solvable review that builds from familiar skills to reasoning and practical applications.

Equivalent correct methods earn the corresponding marks.

**1.** Continue the constant-step pattern: 0.4,0.8,1.2,__ ,__. [2 marks]

Add 0.4 each time.

**Answer:** 1.6 and 2.0.

**2.** A pattern starts at $\frac{1}{4}$ and increases by $\frac{1}{4}$. Write its first five terms. [2 marks]

Keep adding a quarter across the whole.

**Answer:** $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, 1\frac{1}{4}$.

**3.** Use "$\text{term number} \times 3$, then add 2" to find term 7. [1 mark]

$7 \times 3 + 2 = 23$.

**Answer:** 23.

**4.** The constant-step values for terms 1,2,3 are 8,12,16. Give a rule using the term number. [2 marks]

$1 \times 4 + 4 = 8;\ 2 \times 4 + 4 = 12;\ 3 \times 4 + 4 = 16$.

**Answer:** Multiply the term number by 4, then add 4.

**5.** Calculate $9 + 2 \times 5$. [1 mark]

$2 \times 5 = 10;\ 9 + 10 = 19$.

**Answer:** 19.

**6.** Calculate $(9 + 2) \times 5$. [1 mark]

$9 + 2 = 11;\ 11 \times 5 = 55$.

**Answer:** 55.

**7.** Calculate $30 \div 5 \times 2$. [2 marks]

Read left to right: $30 \div 5 = 6$; $6 \times 2 = 12$.

**Answer:** 12.

**8.** Find the missing number: $\square - 14 = 27$. [1 mark]

$27 + 14 = 41$; check $41 - 14 = 27$.

**Answer:** 41.

**9.** A number is multiplied by 5 and then 2 is added. The result is 37. Find the number. [2 marks]

$37 - 2 = 35$; $35 \div 5 = 7$.

**Answer:** 7.

**10.** Start at 0.5, record it, and add 0.5 each time. Stop after recording four terms. Write the output. [2 marks]

The start is the first recorded term.

**Answer:** 0.5,1,1.5,2.

**11.** A tile design has 6 tiles at stage 1 and adds 4 tiles at every new stage. How many tiles are at stage 10? Explain. [3 marks]

There are nine increases: $6 + 9 \times 4 = 42$.

**Answer:** 42 tiles.

**12.** An algorithm starts at 3 and adds 4 until the value is exactly 20. Explain why it fails and suggest a clear stopping rule. [3 marks]

The stopping condition must be tested on the values generated.

**Answer:** It gives 3,7,11,15,19,23,... and never reaches 20. One repair is to record values while they are at most 20, then stop before 23.