

## FREE SAMPLE: THREE REASONING QUESTIONS

### Question 1 (1 mark)

A bus number is a factor of 420 and also a multiple of 3. It is greater than 22 and less than 34. What is the bus number?

Answer \_\_\_\_\_

### Question 2 (2 marks)

A triangle has a base of 18 cm and a perpendicular height of 6 cm. A rectangle has the same area and a length of 6 cm. What is the perimeter of the rectangle?

Answer \_\_\_\_\_ cm

### Question 3 (1 mark)

A sequence has  $n$ th term  $5n + 4$ . One term is 59. What is the position,  $n$ , of that term?

Answer \_\_\_\_\_

## THE WORKED ANSWERS TO THOSE 3 QUESTIONS

### Question 1 (1 mark) [Factors and multiples with constraints]

A bus number is a factor of 420 and also a multiple of 3. It is greater than 22 and less than 34. What is the bus number?

**Answer: 30**

- List the multiples of 3 that are between 22 and 34: 24, 27, 30, 33.
- Test which of them divide exactly into 420: 24 (no), 27 (no), 30 (yes), 33 (no).
- Only 30 works.

*Skill: Number, ratio and algebra · Factors and multiples with constraints*

#### KEY TAKEAWAY

List the candidates that meet the first rule, then test each against the second rule.

### Question 2 (2 marks) [Equal areas: triangle and rectangle]

A triangle has a base of 18 cm and a perpendicular height of 6 cm. A rectangle has the same area and a length of 6 cm. What is the perimeter of the rectangle?

**Answer: 30 cm**

- Area of the triangle =  $18 \times 6 \div 2 = 54 \text{ cm}^2$ .
- The rectangle's width =  $\text{area} \div \text{length} = 54 \div 6 = 9 \text{ cm}$ .
- Perimeter =  $2 \times (6 + 9) = 30 \text{ cm}$ .

*Skill: Measurement, geometry and statistics · Equal areas: triangle and rectangle*

#### KEY TAKEAWAY

Use the equal areas to find the missing side, then the perimeter.

### Question 3 (1 mark) [Find the position of a term]

A sequence has nth term  $5n + 4$ . One term is 59. What is the position,  $n$ , of that term?

**Answer: 11**

- Set the rule equal to the term:  $5n + 4 = 59$ .
- Subtract 4 from both sides:  $5n = 55$ .
- Divide by 5:  $n = 55 \div 5 = 11$ .

*Skill: Number, ratio and algebra · Find the position of a term*

#### KEY TAKEAWAY

To find which term, solve the nth-term rule for  $n$ .