GCSE (F) Topic Test 2: Everyday Algebra

Assessment Details	Specifications
Topics Covered	Solving Linear Equations, Number Sequences, and Coordinates
Tier	Foundation (Target Grades 3 - 5)
Time Allowed	45 minutes
Total Marks	40 marks
Your Total Mark	**/ 40**

Instructions & Exam Tips:

- Answer all questions in the spaces provided.
- **Show all working out** — method marks may be awarded even if the final answer is incorrect.
- Calculators allowed.
- Check your answers carefully if you finish before the time limit.

Question 1 (3 marks)

Here is a number sequence:

7, 11, 15, 19, 23, . . .

(a) Write down the next term in the sequence.
(1 mark)

(b) Explain how you found your answer.

(1 mark)

(c) Is 53 a term in this sequence? You must show working to justify your answer.

(1 mark)

Question 2 (3 marks)

Solve the following single-step equations:

(a) $x + 7 = 19$

(1 mark)

(b) $y - 4 = 11$

(1 mark)

(c) $5p = 35$

(1 mark)

Question 3 (2 marks)

Solve:

$$\frac{w}{4} = 6$$

(2 marks)

Question 4 (3 marks)

Point A has coordinates $(3, -2)$ and Point B has coordinates $(-1, 4)$.

(a) State which quadrant Point A lies in.

(1 mark)

(b) Find the coordinates of the midpoint of the line segment joining A and B. *(2 marks)*

Question 5 (4 marks)

Solve the two-step equations:

(a) $3m + 5 = 26$

(2 marks)

(b) $4k - 9 = 15$

(2 marks)

Question 6 (4 marks)

The nth term of a linear sequence is given by $4n - 3$.

(a) Find the first three terms of this sequence.

(2 marks)

(b) Find the $20th$ term of this sequence.

(1 mark)

(c) Which term of the sequence is equal to 97?

(1 mark)

Question 7 (2 marks)

Here are the first five terms of an arithmetic sequence:

2, 7, 12, 17, 22, . . .
Find an expression, in terms of n, for the nth term of this sequence.

(2 marks)

Question 8 (3 marks)

Solve the following equation:

$$2(3x - 4) = 22$$

Question 9 (3 marks)

Solve the equation with unknowns on both sides:

$$7x - 5 = 3x + 11$$

(3 marks)

Question 10 (4 marks)

Three vertices of a rectangle $PQRS$ are:

- $P(1, 2)$
- $Q(1, 7)$
- $R(8, 7)$

(a) Write down the coordinates of vertex S.

(1 mark)

(b) Calculate the perimeter of rectangle $PQRS$.

(2 marks)

(c) Calculate the area of rectangle $PQRS$.

(1 mark)

Question 11 (6 marks)

Real-World Context: Window Cleaning Costs

A local window cleaner calculates the charge (C, in pounds) for cleaning the windows of an office using the formula:

$$C = 15 + 8w$$

where w is the number of windows cleaned.

(a) Work out the total charge for cleaning an office with 9 windows.

(2 marks)

(b) A customer was charged £111 for a job. Work out how many windows were cleaned.

(2 marks)

(c) Another window cleaner uses a different pricing model where the total costs for $1, 2, 3$, and 4 windows form an arithmetic sequence starting at £22, £30, £38, £46.

Write down a formula for the total cost, T, in terms of the number of windows, w.

(2 marks)