

In this question candidates were required to use ratio in calculating lines before finding area of a given plot. The final task was to find a value of an unknown angle.

Weaknesses

Candidates lacked knowledge on ratios. Many were not able to interpret the information given in order to tackle the demands of the question.

Expected Responses

In part (a) of the question, candidates were required to find the length of the side BC.

Letting the length BC of the plot ABC be x m, the other side would therefore be $AB = \frac{2}{3}x$

$$\text{and } AC = \frac{2}{3}x \times \frac{9}{4} = \frac{3}{2}x$$

Since the perimeter of the plot is given as 38 m then:

$$x + \frac{2}{3}x + \frac{3}{2}x = 38$$

$$x = \frac{38 \times 6}{19} = 12 \text{ m}$$

In part b(i), the area of the plot can be found by the formula:

$A = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{1}{2}(a+b+c)$ and a, b, c are the lengths of the triangular plot.

$$\text{Thus } S = \frac{1}{2} \times 38 = 19, \quad AB = 8 \text{ and } AC = 18$$

$$\begin{aligned} \text{Area} &= \sqrt{19(19-12)(19-18)(19-8)} \\ &= \sqrt{19 \times 7 \times 1 \times 11} \\ &= \sqrt{1463} \\ &= 38.25 \text{ m}^2 \end{aligned}$$

In part b (ii), the size of angle ABC can be obtained as shown below:

$$\frac{1}{2} \times AB \times BC \sin \angle ABC = 38.25$$

$$\frac{1}{2} \times 8 \times 12 \sin \angle ABC = 38.25$$

$$\sin \angle ABC = \frac{38.25}{48} = 0.7969$$