Test answers - Angles and parallel lines

Year: Year 7 · Duration: 45 minutes · /20

Answer to Question 1 (4 marks)

a. Angles on a straight line add up to 180°, so $3x + 2x + 20 = 180$ (1 mark). Collect the x terms: $5x + 20 = 180$. Subtract 20: $5x = 160$. Divide by 5: $x = 32$ (1 mark).
b. Substitute $x = 32$ into each angle. The first is $3 \times 32 = 96^\circ$ and the second is $2 \times 32 + 20 = 84^\circ$. The largest angle is **96°**. (1 mark)
c. The reason is: angles on a straight line add up to 180°. The full wording is needed for the mark. (1 mark)

Check: $96 + 84 = 180$, so the two angles really do fit together on a straight line.

Answer to Question 2 (4 marks)

a. The three angles of any triangle add up to 180°. Subtract the two known angles: $180 - 47 - 85 =$**48°**. (1 mark)
b. In an isosceles triangle the two base angles are equal. Take the apex away from 180°: $180 - 54 = 126^\circ$, then share it equally between the two base angles: $126 \div 2 =$**63°**. (1 mark)
c. A quadrilateral splits into two triangles, so its angles add up to 360° (1 mark for using 360°). The three known angles total $88 + 102 + 79 = 269^\circ$, so the fourth angle is $360 - 269 =$**91°** (1 mark).

Check (b): $63 + 63 + 54 = 180$. Check (c): $269 + 91 = 360$.

Answer to Question 3 (4 marks)

a. The angle x and the 72° angle sit next to each other on the same straight line, so $x = 180 - 72 =$**108°**. Reason: angles on a straight line add up to 180°. (1 mark for value and reason)
b. The angle y is in the same position at the second crossing as the 72° angle is at the first crossing, so $y = 72^\circ$. Reason: corresponding angles on parallel lines are equal. (1 mark)
c. The angle z is vertically opposite the angle that corresponds to x, so $z = 108^\circ$ (1 mark). Both reasons must be stated: corresponding angles are equal and vertically opposite angles are equal (1 mark).

Check: $y + z = 72 + 108 = 180$, which is correct because y and z lie on one straight line at the second crossing.

Answer to Question 4 (4 marks)

a. The roof is isosceles, so both base angles are 35°. Together they make $2 \times 35 = 70^\circ$. The angles of a triangle add up to 180°, so the apex angle is $180 - 70 =$**110°**. (1 mark)
b. The vertical post joins the apex to the middle of the base, so it is the line of symmetry and cuts the apex angle in half: $110 \div 2 =$**55°** on each side (1 mark). Check with one of the small right-angled triangles: $90 + 35 + 55 = 180$ (1 mark).
c. The steepness of a roof is measured by its angle with the horizontal. Since $40^\circ > 35^\circ$, the **40° roof** is steeper. (1 mark)

Answer to Question 5 (4 marks)

a. A regular octagon has 8 equal interior angles, so share the total equally: $1080 \div 8 =$**135°**. (1 mark)
b. At each vertex the interior and exterior angles lie on a straight line, so together they make 180°. Each exterior angle is $180 - 135 =$**45°**. (1 mark)
c. The exterior angles of any polygon add up to 360° (1 mark). For a regular polygon they are all equal, so the number of sides is $360 \div 40 =$**9**. The polygon is a nonagon (1 mark).

Check (b): $8 \times 45 = 360$, as it should be. Check (c): each interior angle of the nonagon is $180 - 40 = 140^\circ$, and $9 \times 140 = 1260 = (9 - 2) \times 180$.