Higher Check In - 8.02 Ruler and compass constructions

1. Construct the locus of points at a constant distance of 3 cm from a fixed point B.

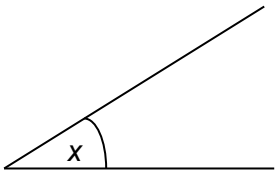
2. Use a ruler and a compass to draw an equilateral triangle with sides of length 6 cm.

3. A plot of land is in the shape of a triangle with sides 600 m, 800 m and 1.2 km.
   Using a ruler and compass, draw the triangle accurately (using an appropriate scale).

4. Use a ruler and a compass to draw an angle of 120°.

5. Draw a straight horizontal line of length 5 cm. Construct the locus of all points that stay a fixed distance from the straight line.

6. Orla has been asked to construct the angle bisector of the angle marked *x* below, using only a ruler and a compass. Explain in words how she would do this.



7. A mobile phone mast needs to be positioned 8 km from X and from Y. Show where the mast could be positioned.

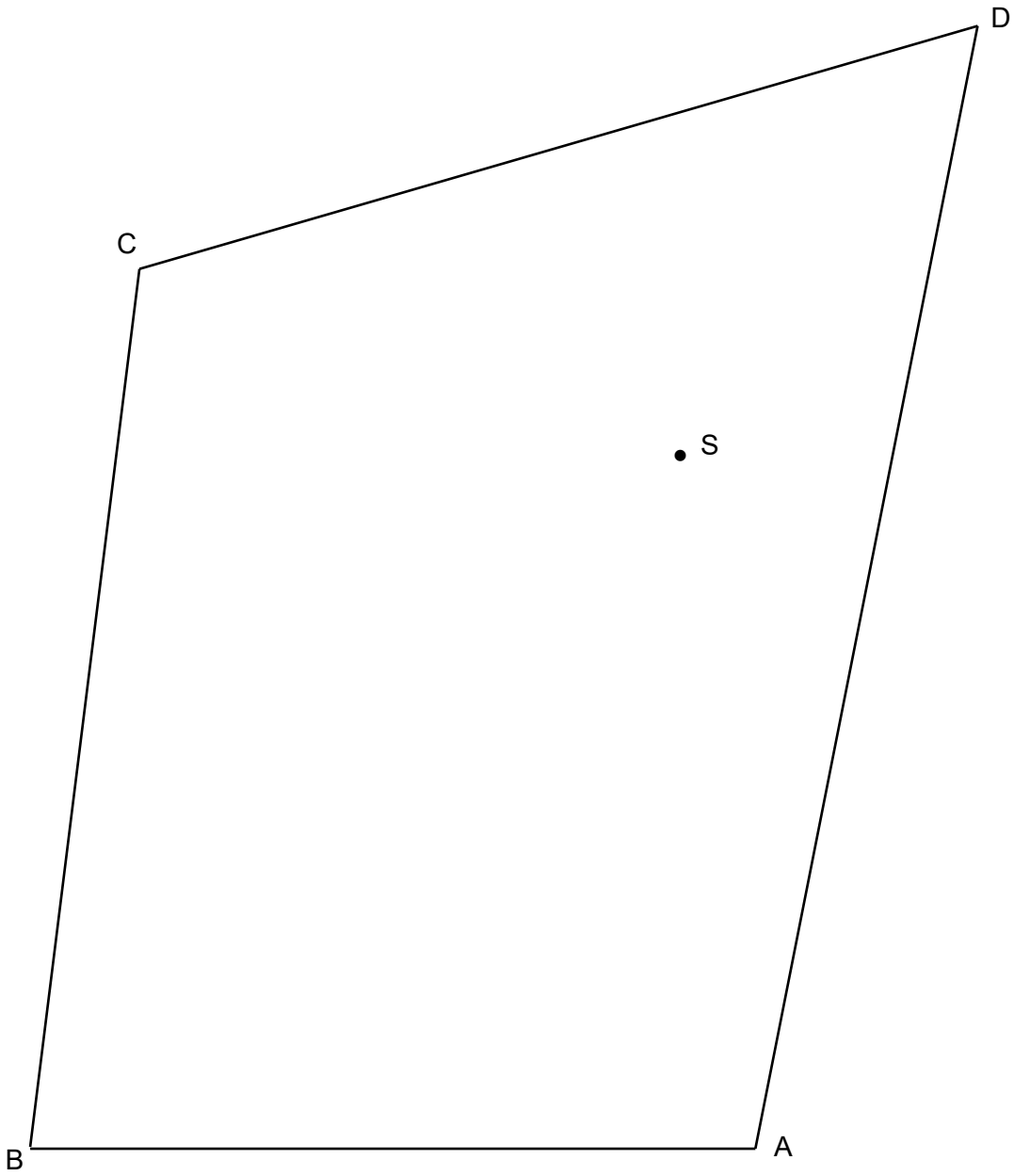
Scale: 1 cm to 2 km

8. Fletcher is asked to find a point on the perpendicular bisector of the straight line PQ when P is (2, 6) and Q is (3, 7). He thinks the point (2, 6.5) will be on the perpendicular bisector. Is he correct? Explain your answer.

9. On a one centimetre grid, a straight line joins A (-4, 2) and B (2, 2). Point C (*x*, *y*) lies on the perpendicular bisector of the line AB, such that triangle ABC has a perimeter of 16 cm. Work out the the values of *x* and *y*.

10. The diagram represents a plan of a camping site ABCD. There is a shower block at S, a field of cows beyond the boundary CD, AD is bordered by trees and a road runs adjacent to AB. The scale used is 1 cm represents 10 m.

    Locate the region to set up camp that satisfies all of the following:
    - closer to the trees than the field of cows
    - within 70 m of the shower block
    - more than 55 m from the road.

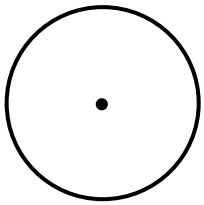


Extension

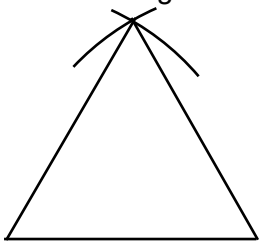
Draw the locus of points that are equidistant from points (2, 6) and (6, 10). What is the equation of this line?

Answers

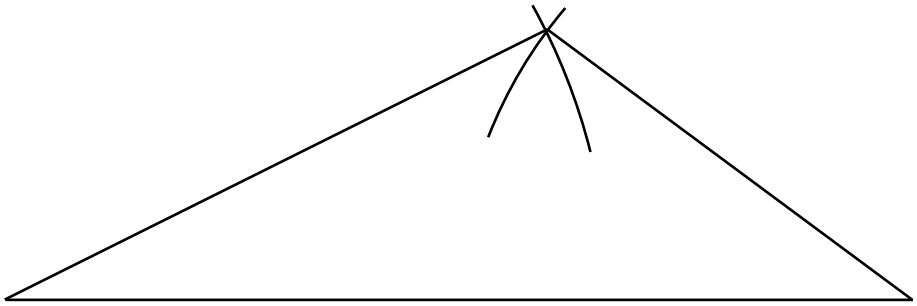
1. A circle with centre B and radius 3 cm.



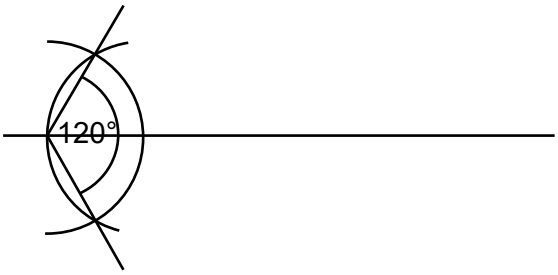
2. An equilateral triangle with sides of length 6 cm (arcs should be shown).



3. Correctly drawn triangle (arcs should be shown). Appropriate scale could be 1 cm to 100 m.



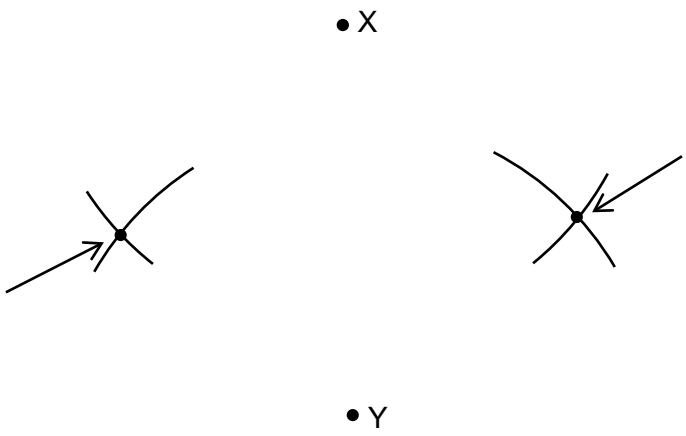
4. Diagram showing 120 degree construction.



5. Parallel lines above and below the horizontal line (at a fixed distance from the horizontal line) joined by a semicircle at each end (radius same as the fixed distance).

6. Place your compass on A and draw an arc that crosses both sides of the angle, label the crossing points B and C. Place your compass on B and draw an arc **between** the two sides of the angle. Do not adjust your compass, place it on C and draw another arc that cuts the one that you have just drawn. Label this point D and draw a straight line from A to D. The line AD bisects the angle.

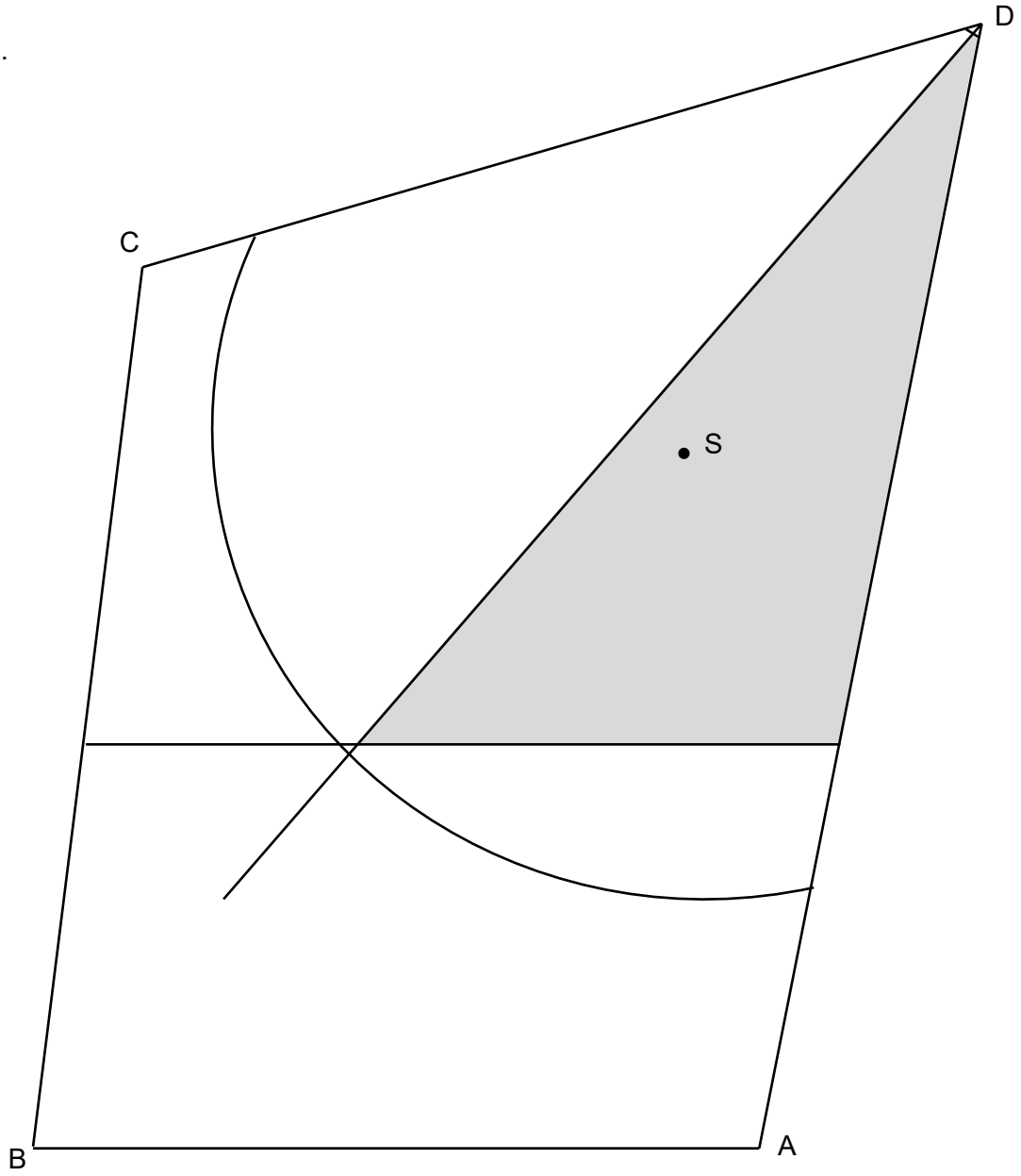
7. Mast plotted in correct positions with correct arcs, 4 cm from X and Y.



8. No he is not correct. The midpoint of line PQ is (2.5, 6.5) which is where the perpendicular bisector crosses line PQ, therefore, no other point on the perpendicular bisector can have a *y* coordinate of 6.5.

9. (-1 , 6) or (-1, -2)

10.



Extension

$y = -x + 12$ or $y = 12 - x$

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AO1	1	Apply ruler and compass constructions to identify the loci of points			
AO1	2	Apply ruler and compass constructions to construct figures			
AO1	3	Apply ruler and compass constructions to construct figures			
AO1	4	Apply ruler and compass constructions to construct a given angle			
AO1	5	Apply ruler and compass constructions to identify the loci of points			
AO2	6	Describe how to construct the bisector of an angle formed from two lines			
AO2	7	Apply ruler and compass constructions to identify the loci of points			
AO2	8	Construct the midpoint of a line segment and interpret the position of coordinates on the perpendicular bisector			
AO3	9	Construct the midpoint of a line segment and the perpendicular bisector to solve a problem			
AO3	10	Apply ruler and compass constructions to solve a real life problem			

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