



THIRD SPACE
LEARNING

Diagnostic Questions

Constructions & Loci |
Geometry & Measure

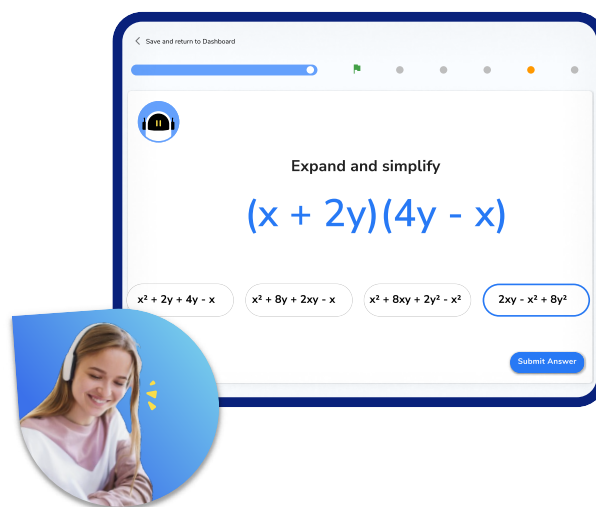
This resource in a nutshell

Diagnostic questions are a quick and easy way of assessing your students' knowledge and understanding of a particular topic.

Students may be struggling with **constructions** & **loci** for a number of different reasons.

Diagnostic questions can help to identify the particular misconception that the student has and help to determine the specific support they will need in order to improve.

They are low stakes and support students developing metacognition around how their learning is progressing and what they need to do to improve further.



At Third Space Learning, we use diagnostic questions before and after online tutoring sessions to identify gaps and track progress, an example of this is shown above.

How to use the questions in this resource

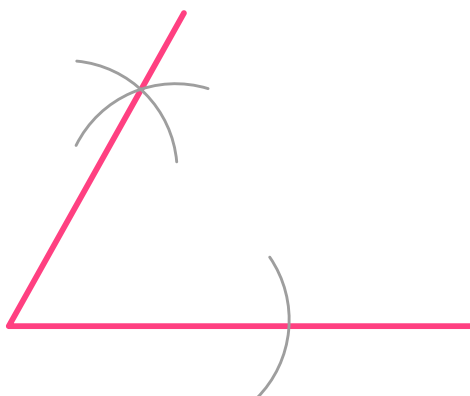
There are 12 multiple choice questions, each designed to assess each of the key skills required to master the given topic. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Incorrect / incomplete constructions**, **Shading regions**, and **Loci at the end of a line**.

When answering these questions, students should be **encouraged to explain why they have chosen a particular answer**, and why the other three answers are incorrect. This can be done verbally in small groups, or written down on the worksheet or in their books.

This resource has been designed to be as **flexible** as possible with questions that can be easily chopped up and reordered, and come with a separate answer sheet that details all of the misconceptions highlighted in the answers.

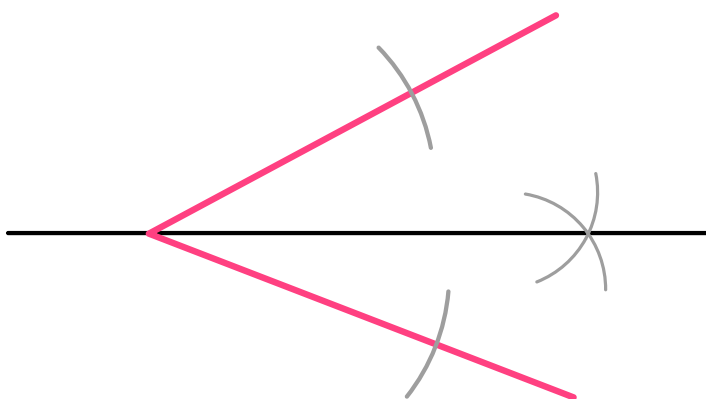
Diagnostic Questions: Constructions & Loci

1. The diagram shows a construction of what size angle?



A) 30°	B) 45°
C) 60°	D) 72°

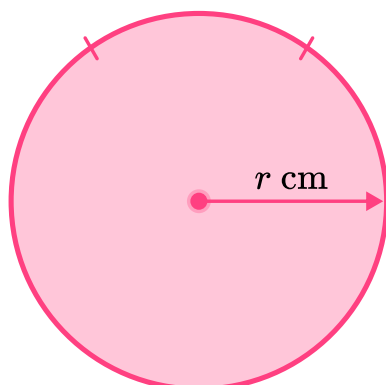
2. What type of construction is pictured in the diagram?



A) Angle bisector	B) Perpendicular bisector
C) 30° angle	D) 45° angle

Diagnostic Questions: Constructions & Loci

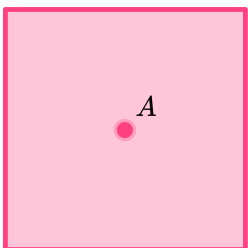
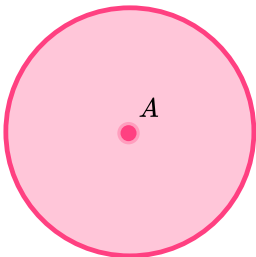
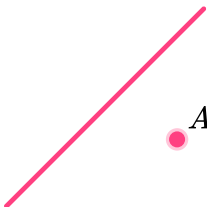
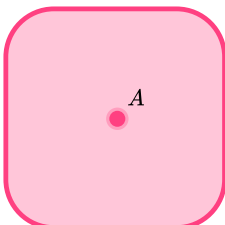
3. With a pair of compasses fixed at r cm and a straight edge, which construction is possible using the diagram:



A) Square	B) Regular octagon
C) Regular pentagon	D) Regular hexagon

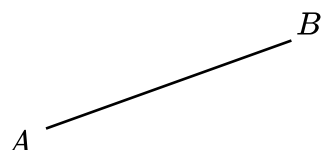
4. Draw the locus of points a fixed distance k from A:



<p>A)</p> 	<p>B)</p> 
<p>C)</p> 	<p>D)</p> 

Diagnostic Questions: Constructions & Loci

5. Draw the locus of points a fixed distance k from line segment AB:



<p>A)</p>	<p>B)</p>
<p>C)</p>	<p>D)</p>

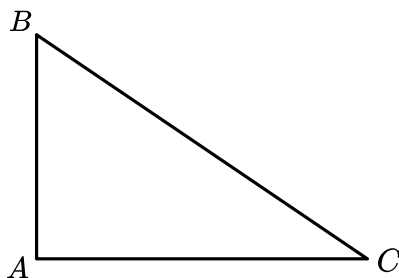
6. Draw the locus of points equidistant from the points A and B:



<p>A)</p>	<p>B)</p>
<p>C)</p>	<p>D)</p>

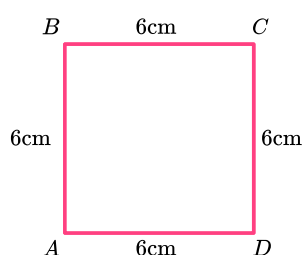
Diagnostic Questions: Constructions & Loci

7. Draw the locus of points at a fixed distance k from the perimeter of ABC on the outside of the triangle:



<p>A)</p>	<p>B)</p>
<p>C)</p>	<p>D)</p>

8. Square ABCD has side length 6 cm . Shade the region inside ABCD that is less than 3 cm from C:

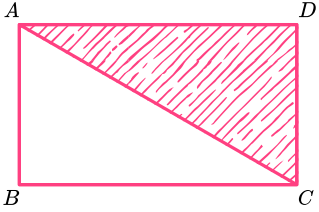
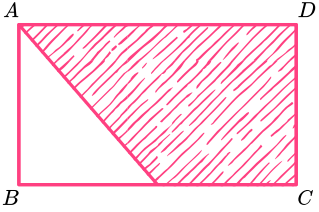
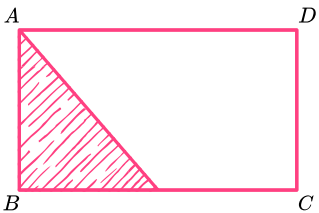



<p>A)</p>	<p>B)</p>
<p>C)</p>	<p>D)</p>

Diagnostic Questions: Constructions & Loci

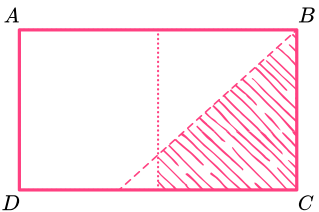
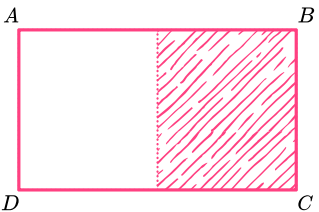
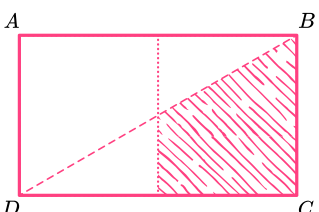
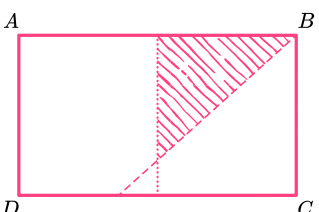
9. Consider rectangle ABCD. Shade the region of the rectangle that is closer to AD than AB:



<p>A)</p> 	<p>B)</p> 
<p>C)</p> 	<p>D)</p> 

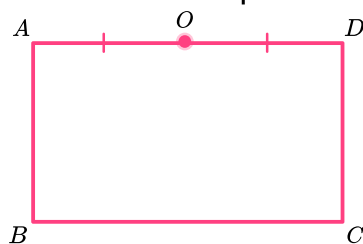
10. Consider rectangle ABCD. Shade the region that is nearer to BC than AD and nearer to BC than AB:

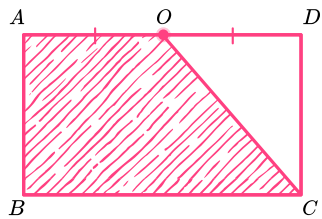
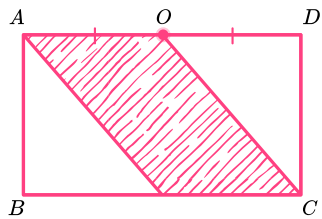
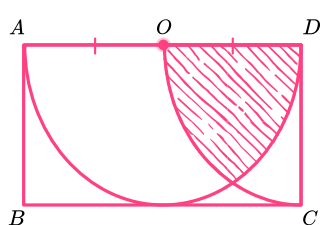
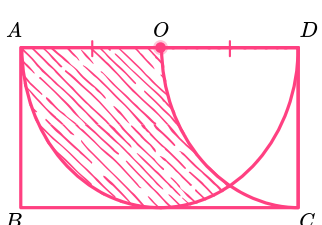


<p>A)</p> 	<p>B)</p> 
<p>C)</p> 	<p>D)</p> 

Diagnostic Questions: Constructions & Loci

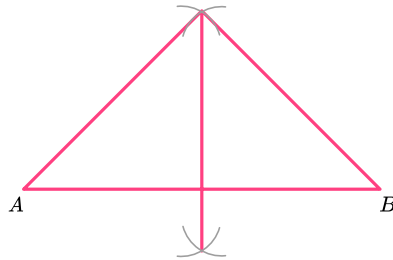
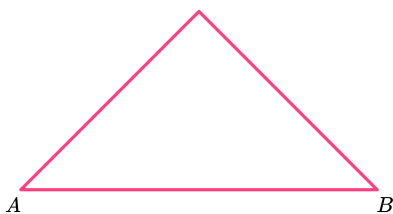
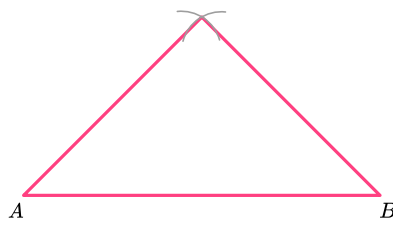
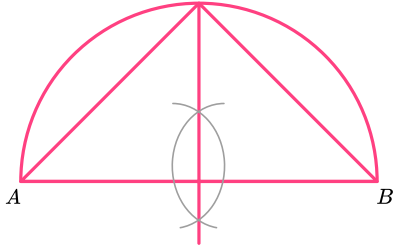
11. Consider rectangle ABCD with width k and length $2k$. Shade the region inside the rectangle that is less than k units from point O and more than k units from point D:



<p>A) </p>	<p>B) </p>
<p>C) </p>	<p>D) </p>

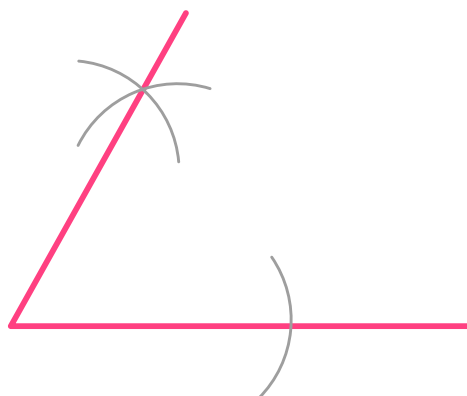
12. Given base AB, construct an equilateral triangle ABC using a straight edge and compasses:



<p>A) </p>	<p>B) </p>
<p>C) </p>	<p>D) </p>

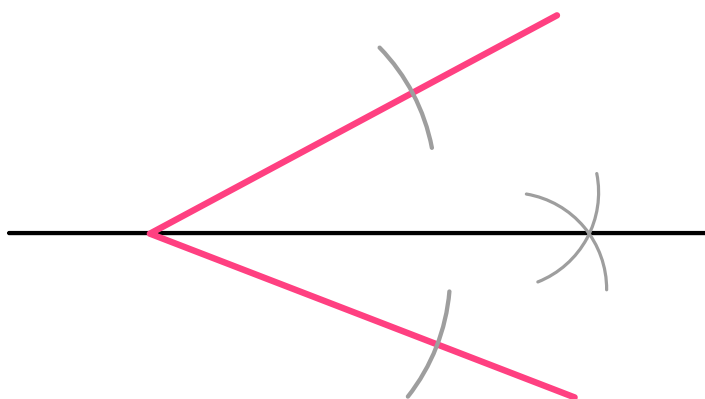
Diagnostic Questions: Constructions & Loci Answers

1. The diagram shows a construction of what size angle?



- A) 30° Student stated the complementary angle
- B) 45° Student assumed bisection of a right-angle
- C) 60° Correct answer
- D) 72° Student lacks understanding of angle construction

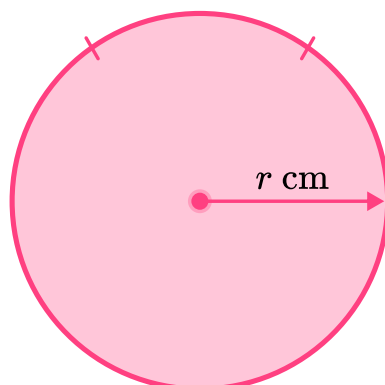
2. What type of construction is pictured in the diagram?



- A) Angle bisector Correct answer
- B) Perpendicular bisector Student confused angle / perpendicular bisectors
- C) 30° angle Student made assumptions without enough information
- D) 45° angle Student made assumptions without enough information

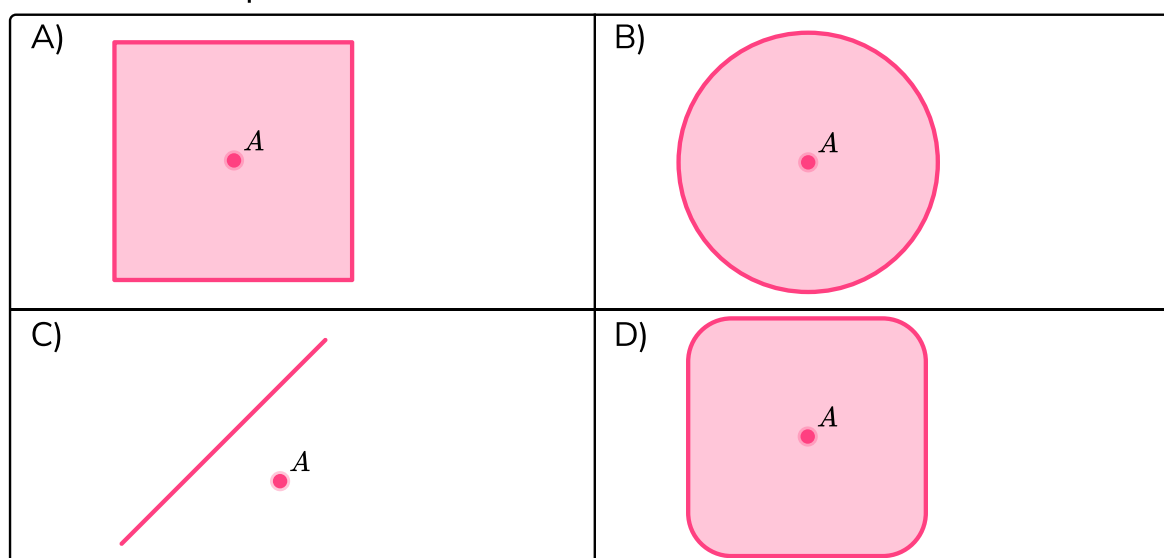
Diagnostic Questions: Constructions & Loci Answers

3. With a pair of compasses fixed at r cm and a straight edge, which construction is possible using the diagram:



- A) Square Student does not understand how to construct a hexagon
- B) Regular octagon Student does not understand how to construct a hexagon
- C) Regular pentagon Student does not understand how to construct a hexagon
- D) Regular hexagon Correct answer

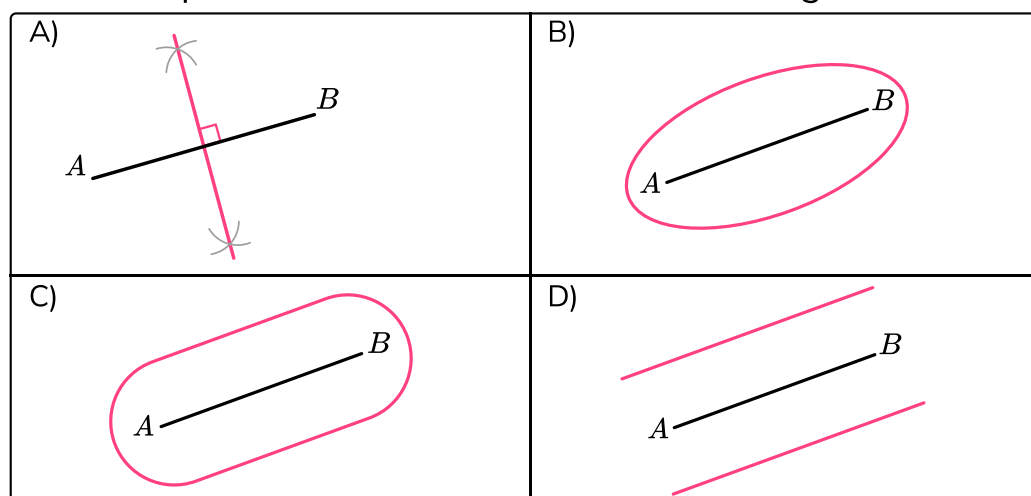
4. Draw the locus of points a fixed distance k from A:



- A) Student considered horizontal and vertical distance only
- B) Correct answer
- C) Student lacks understanding of loci
- D) Student confused loci with respect to points and line segments

Diagnostic Questions: Constructions & Loci Answers

5. Draw the locus of points a fixed distance k from line segment AB:



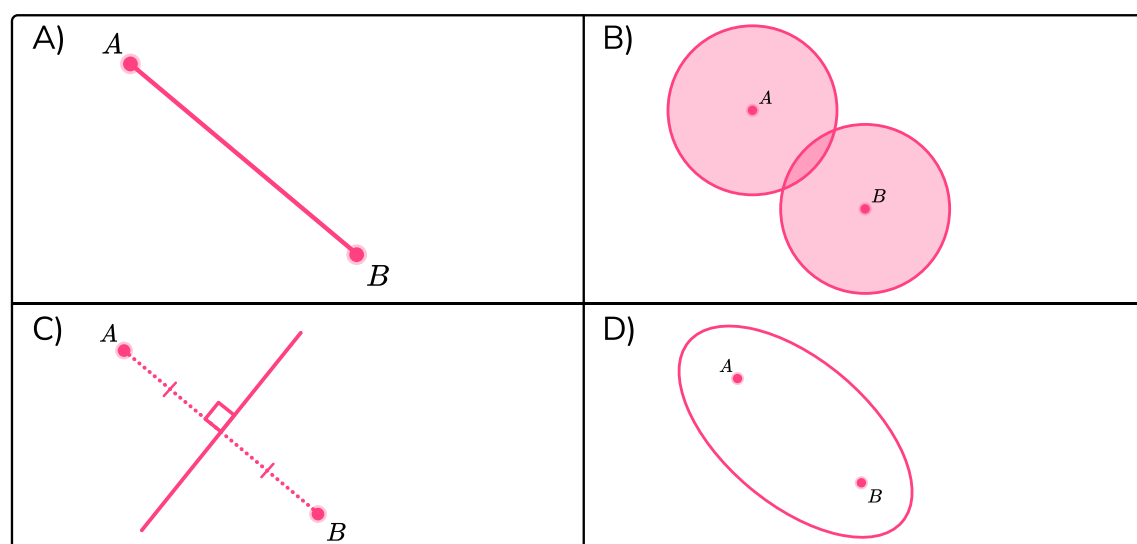
A) Student formed the locus of points equidistant from A and B

B) Student stretched the locus of a point to make an ellipse

C) **Correct answer**

D) Student forgot to consider the end points of the line segment

6. Draw the locus of points equidistant from the points A and B:



A) Student constructed the shortest distance between the points

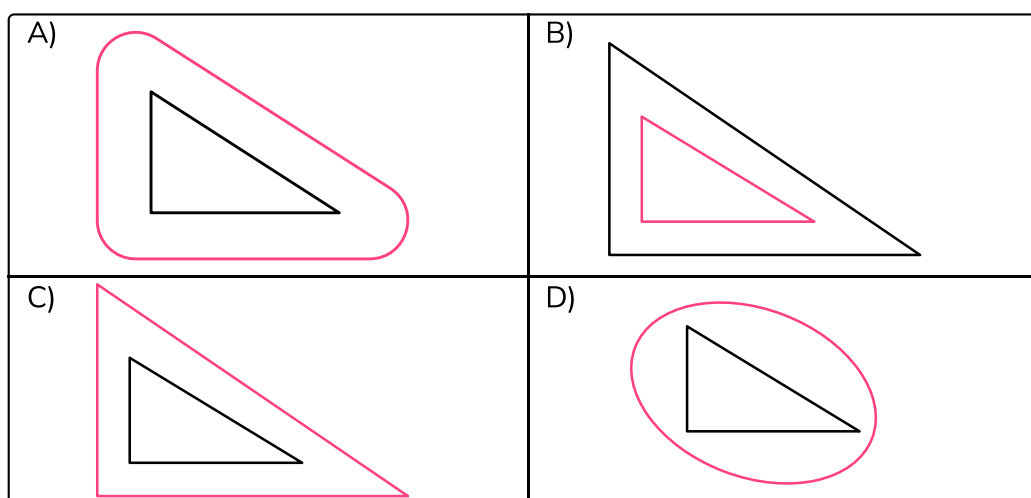
B) Student drew the loci of points a fixed distance from A and B individually

C) **Correct answer**

D) Student used an ellipse, which traces a locus using A and B as foci

Diagnostic Questions: Constructions & Loci Answers

7. Draw the locus of points at a fixed distance k from the perimeter of ABC on the outside of the triangle:



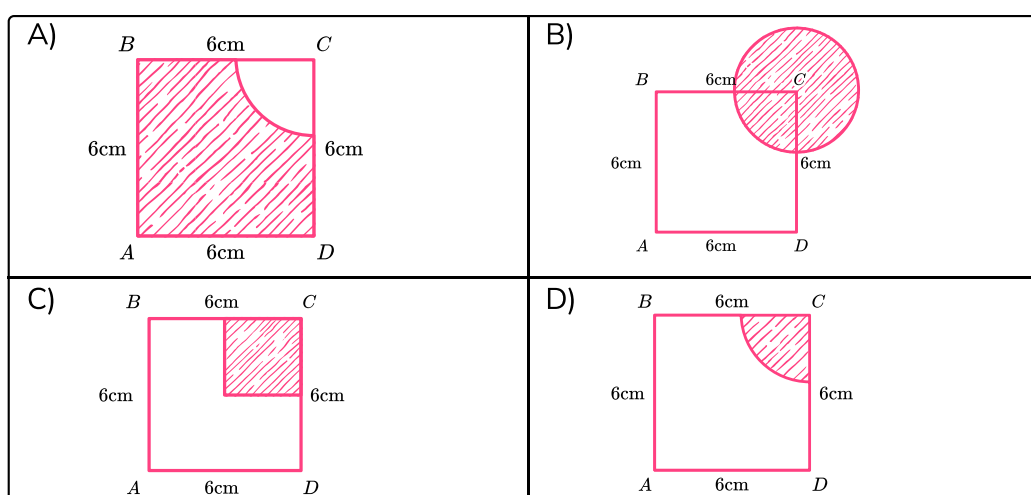
A) Correct answer

B) Student looked at the problem inside the triangle

C) Student did not consider the locus of points at each vertex

D) Student lacks understanding of loci

8. Square ABCD has side length 6 cm . Shade the region inside ABCD that is less than 3 cm from C:



A) Student shaded the region more than 3 cm from C, inside ABCD

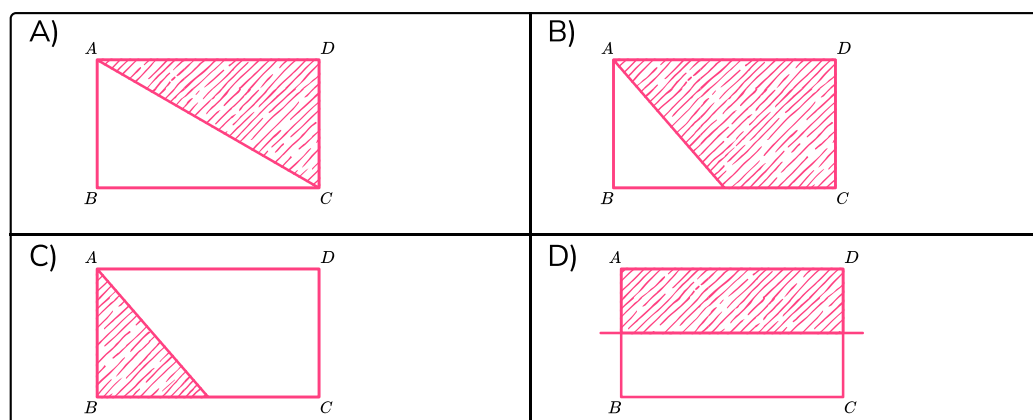
B) Student considered point C independently of square ABCD

C) Student attempted to form the region using straight lines only

D) Correct answer

Diagnostic Questions: Constructions & Loci Answers

9. Consider rectangle ABCD. Shade the region of the rectangle that is closer to AD than AB:



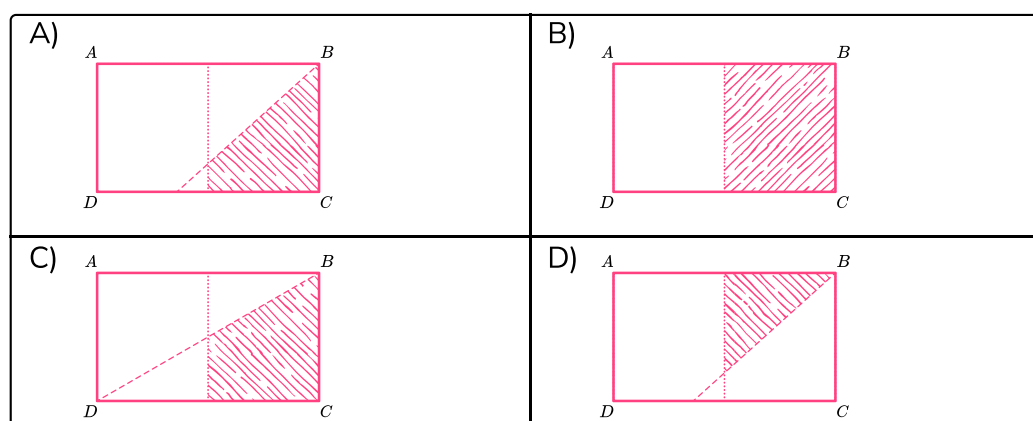
A) Student used the diagonal, instead of bisecting angle BAD

B) **Correct answer**

C) Student bisected angle BAD but shaded the region nearer to AB

D) Student shaded the region nearer to AD than BC

10. Consider rectangle ABCD. Shade the region that is nearer to BC than AD and nearer to BC than AB:



A) **Correct answer**

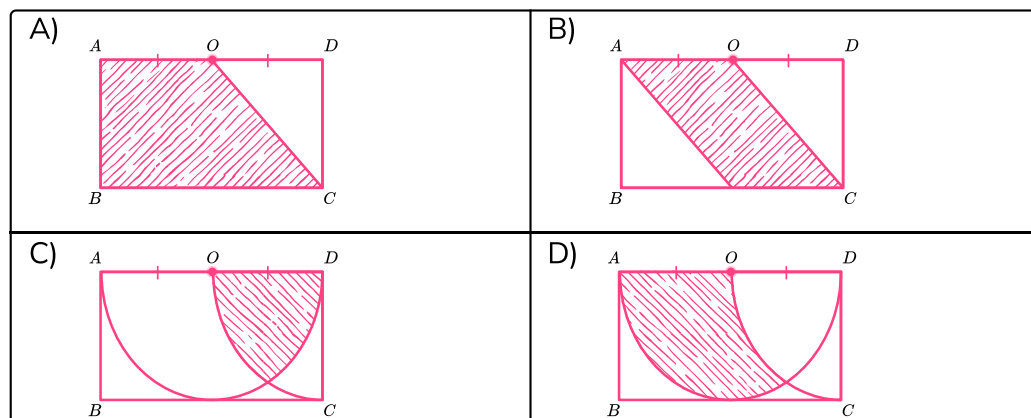
B) Student shaded the region nearer to BC than AD only

C) Student did not bisect angle ABC

D) Student shaded the region nearer to BC than AD, and nearer to AB than BC

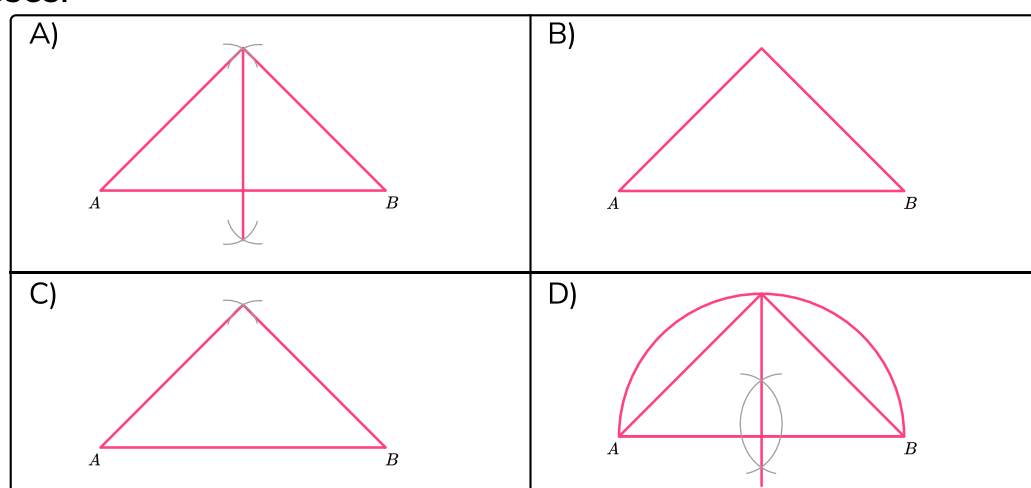
Diagnostic Questions: Constructions & Loci Answers

11. Consider rectangle ABCD with width k and length $2k$. Shade the region inside the rectangle that is less than k units from point O and more than k units from point D:



- A) Student partitioned the region using a straight-line joining points vertical / horizontal distance k from D
 B) Student attempted to use straight lines only to form the region
 C) Student shaded the region less than k units from point O and less than k units from point D
 D) **Correct answer**

12. Given base AB, construct an equilateral triangle ABC using a straight edge and compasses:



- A) Student constructed a perpendicular bisector of AB, then formed an isosceles triangle
 B) Student attempted to use a straight edge without compasses for construction lines
 C) **Correct answer**
 D) Student found the centre of AB then formed a right-angled isosceles triangle

Where to go next?

For more ^x diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

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