



THIRD SPACE
LEARNING

Diagnostic Questions

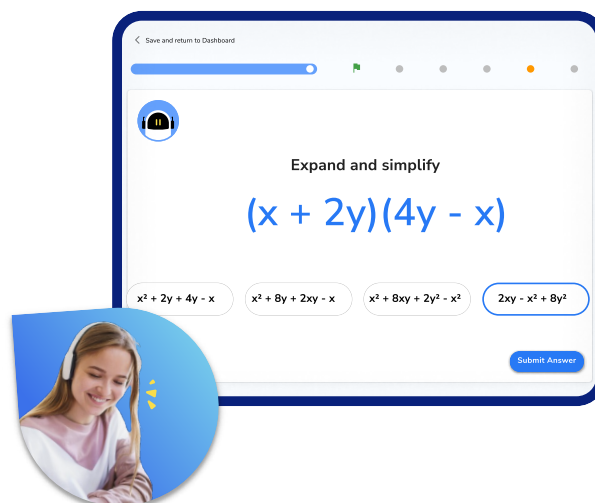
Trigonometry (basic) | Geometry & Measure

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 **trigonometry (basic)** 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

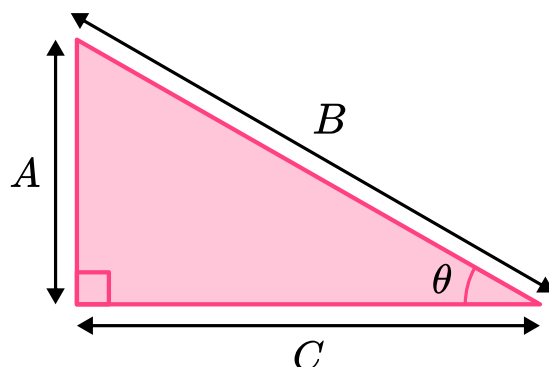
There are 15 multiple choice questions, each designed to assess each of the key skills required to master **measure in circles**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Using the correct trigonometric function (including the inverse)**, **Rearranging formulae**, **Incorrect trigonometric ratios**, and **Use of Pythagoras' Theorem**.

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.

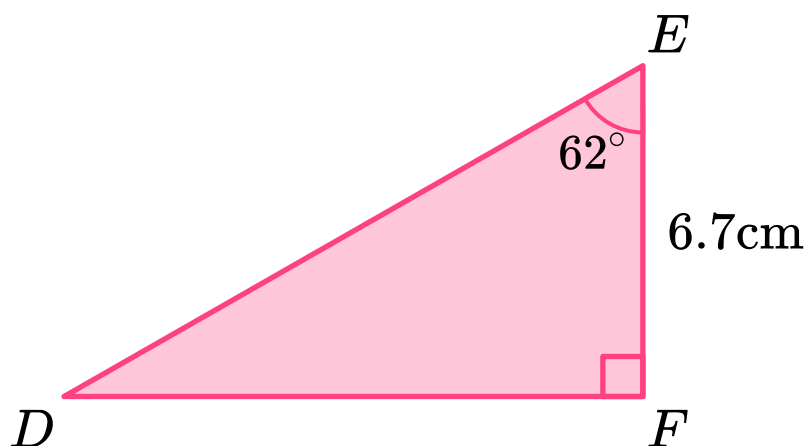
Diagnostic Questions: Trigonometry (basic)

1. Select the statement that is true for this triangle:



A) $\cos \theta = \frac{A}{B}$	B) $\sin \theta = \frac{A}{B}$
C) $\sin \frac{A}{B} = \theta$	D) $\sin \theta = \frac{B}{A}$

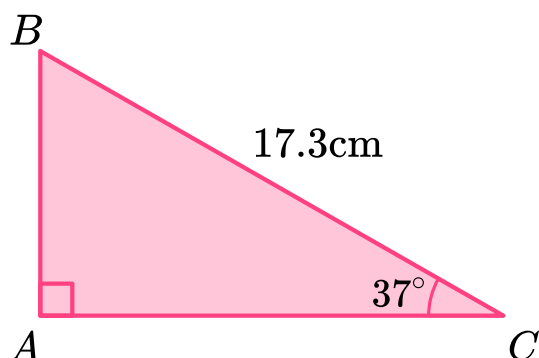
2. Determine the length of DF:



A) 3.6 cm	B) 7.3 cm
C) 3.1 cm	D) 12.6 cm

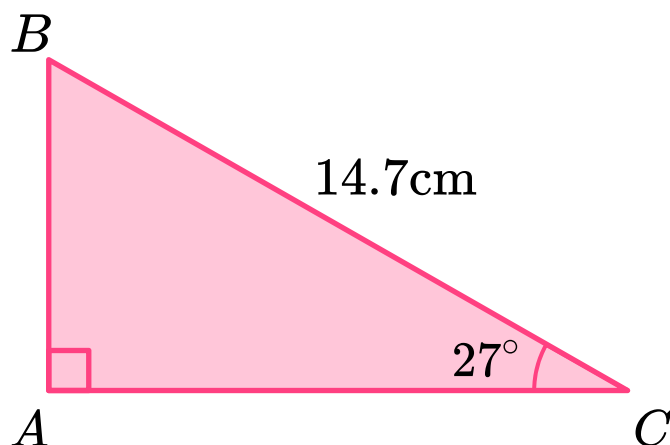
Diagnostic Questions: Trigonometry (basic)

3. Determine the length of AB:



A) 10.4 cm	B) 28.7 cm
C) 13.8 cm	D) 11.0 cm

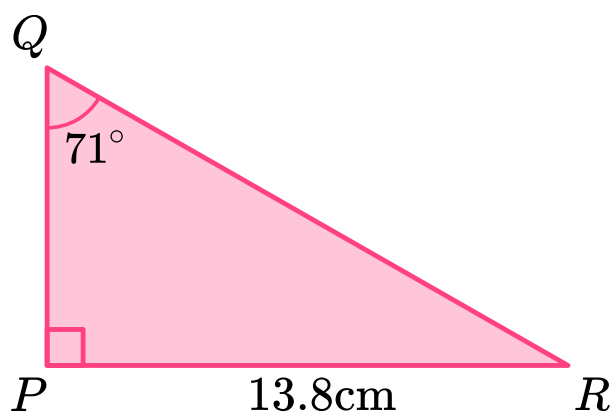
4. Determine the length of AC:



A) 13.1 cm	B) 7.5 cm
C) 6.7 cm	D) 16.5 cm

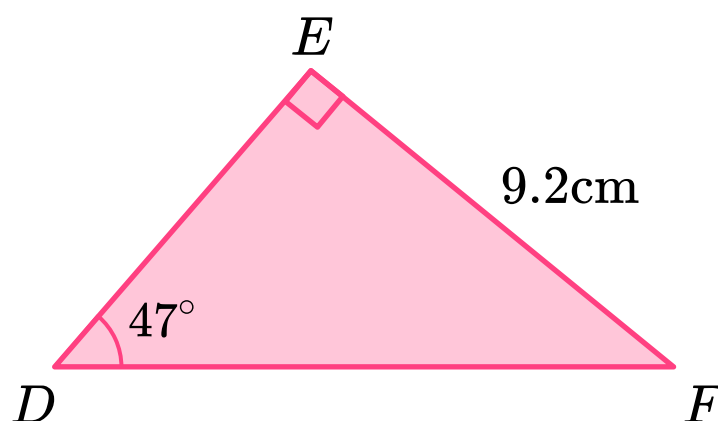
Diagnostic Questions: Trigonometry (basic)

5. Determine the length of QR:



A) 14.6 cm	B) 13.0 cm
C) 16.9 cm	D) 42.4 cm

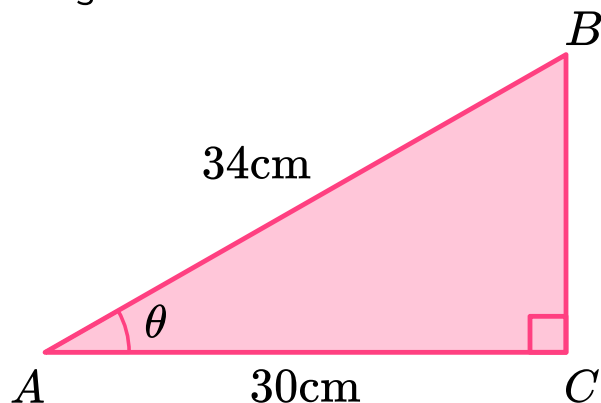
6. Determine the length of DE:



A) 6.3 cm	B) 9.9 cm
C) 7.6 cm	D) 8.6 cm

Diagnostic Questions: Trigonometry (basic)

7. Determine the size of angle θ :



A) 16°	B) 61.9°
C) 41.4°	D) 28.1°

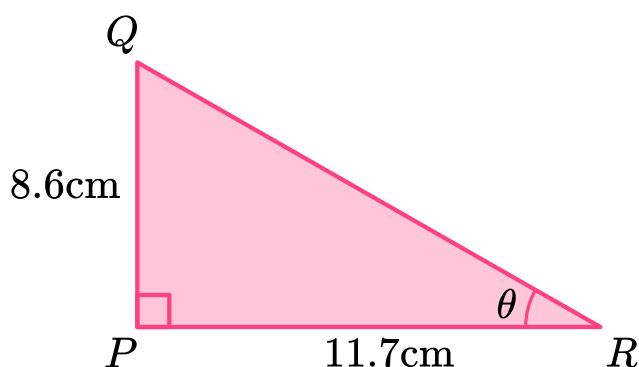
8. What is the exact value of:

$$\sin 60$$

A) $\frac{1}{2}$	B) $0.866025\dots$
C) 60°	D) $\frac{\sqrt{3}}{2}$

Diagnostic Questions: Trigonometry (basic)

9. Determine the size of angle θ :



A) 36.3°	B) 53.7°
C) 42.7°	D) 47.2°

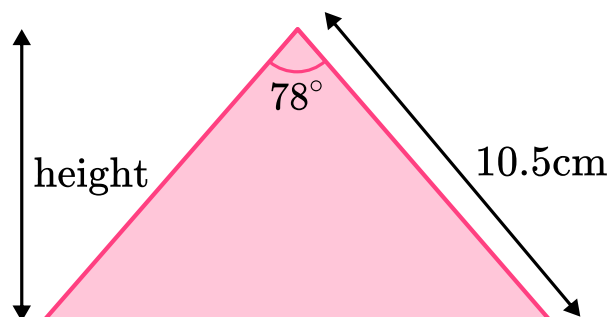
10. Write down the principal angle satisfied by

$$\tan \theta = 1$$

A) $\theta = 0^\circ$	B) $\theta = 45^\circ$
C) $\theta = 90^\circ$	D) $\theta = 360^\circ$

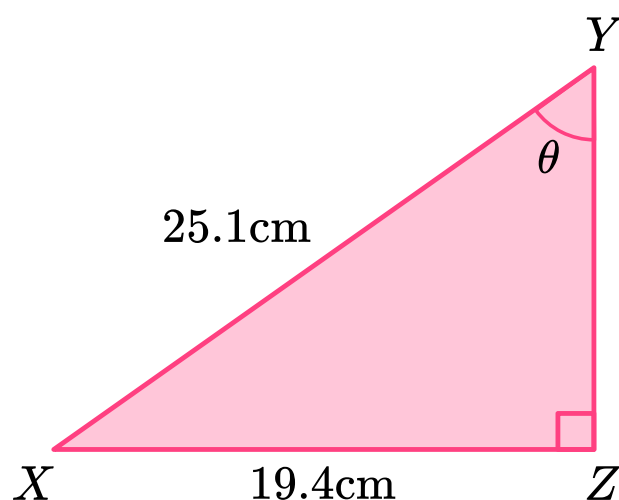
Diagnostic Questions: Trigonometry (basic)

11. Find the height of this isosceles triangle:



A) 2.2 cm	B) 8.2 cm
C) 6.6 cm	D) 10.3 cm

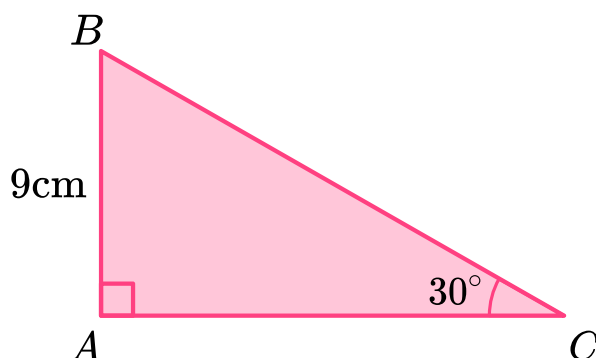
12. Determine the size of angle θ :



A) 39.4°	B) 37.7°
C) 0.01°	D) 50.6°

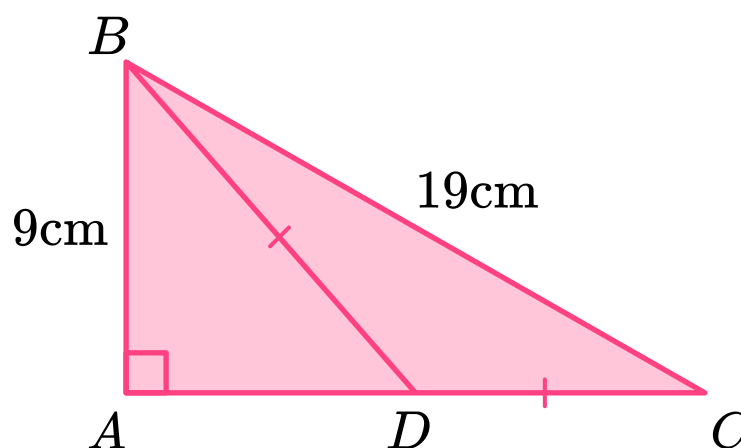
Diagnostic Questions: Trigonometry (basic)

13. Determine the area of triangle ABC:



A) 42.6 cm^2	B) 70.1 cm^2
C) 140.2 cm^2	D) 135 cm^2

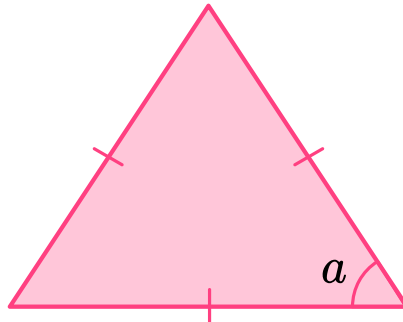
14. Determine the size of angle BDC:



A) 28.8°	B) 151.7°
C) 123.5°	D) 129.3°

Diagnostic Questions: Trigonometry (basic)

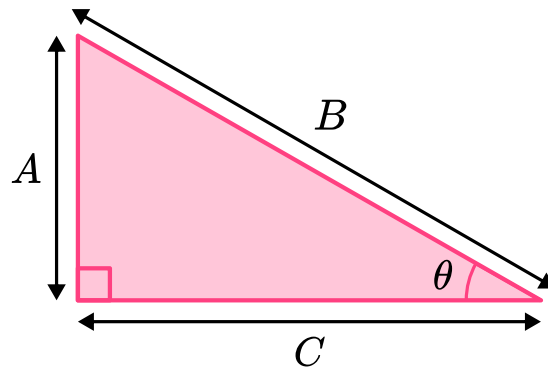
15. State the value of $\cos(a)$:



A) 0.6	B) 0.5
C) 0.33	D) 0.166

Diagnostic Questions: Trigonometry (basic) Answers

1. Select the statement that is true for this triangle:



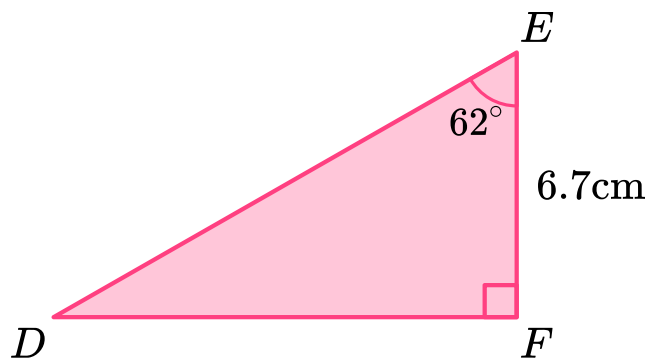
A) $\cos \theta = \frac{A}{B}$ Student confused sine and cosine ratios

B) $\sin \theta = \frac{A}{B}$ Correct answer

C) $\sin \frac{A}{B} = \theta$ Student does not understand the role of the ratio and argument

D) $\sin \theta = \frac{B}{A}$ Student inverted the ratio between opposite and hypotenuse

2. Determine the length of DF:



A) 3.6 cm Student used \tan but reversed roles of adjacent and opposite

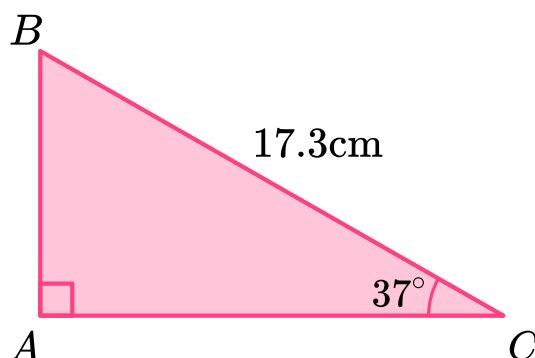
B) 7.3 cm Student does not understand how to use sides / angles in trigonometry

C) 3.1 cm Student used \cos in place of \tan

D) 12.6 cm Correct answer

Diagnostic Questions: Trigonometry (basic) Answers

3. Determine the length of AB:



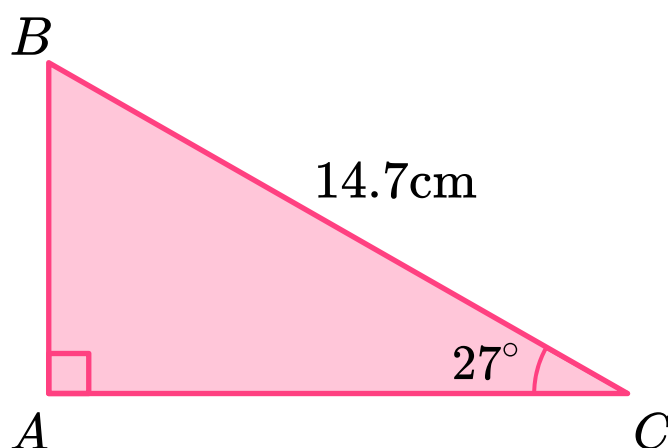
A) 10.4 cm Correct answer

B) 28.7 cm Student inverted ratio of hypotenuse and opposite

C) 13.8 cm Student used incorrect trig function (cos)

D) 11.0 cm Student confused side and angle information in sine relation

4. Determine the length of AC:



A) 13.1 cm Correct answer

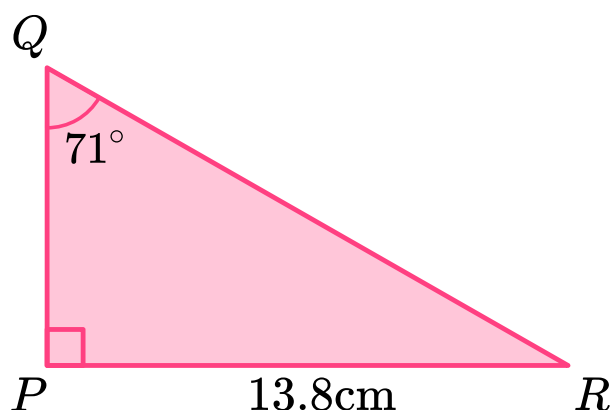
B) 7.5 cm Student used tan in place of cos

C) 6.7 cm Student used sin in place of cos (calculating length AB)

D) 16.5 cm Student rearranged the cosine relation incorrectly

Diagnostic Questions: Trigonometry (basic) Answers

5. Determine the length of QR:



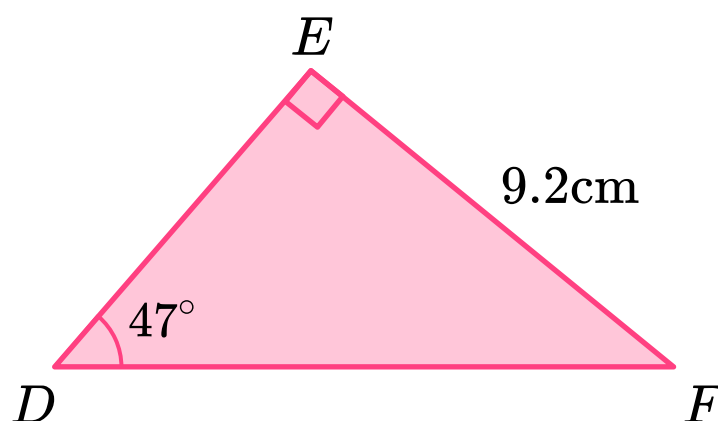
A) 14.6 cm Correct answer

B) 13.0 cm Student did not rearrange sine relation correctly

C) 16.9 cm Student misused angle and length [$71 \times \sin 13.8$]

D) 42.4 cm Student used cos in place of sin

6. Determine the length of DE:



A) 6.3 cm Student assumed EF was the hypotenuse and used cos

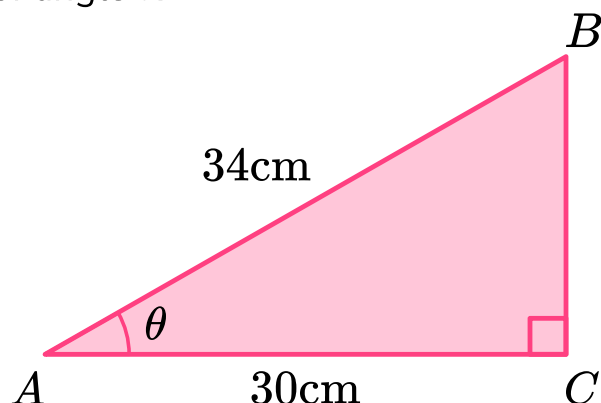
B) 9.9 cm Student confused the opposite and adjacent sides

C) 7.6 cm Student does not understand roles of angle / sides [$47 \times \tan 9.2$]

D) 8.6 cm Correct answer

Diagnostic Questions: Trigonometry (basic) Answers

7. Determine the size of angle θ :



- A) 16° Student confused methods; used Pythagoras' to obtain length BC
- B) 61.9° Student used \sin^{-1} to calculate the angle
- C) 41.4° Student used \tan^{-1} to calculate the angle
- D) 28.1° Correct answer

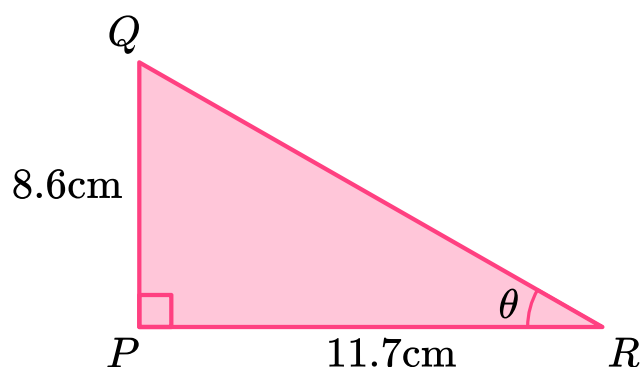
8. What is the exact value of:

$$\sin 60$$

- A) $\frac{1}{2}$ Student stated the exact value of $\cos 60$
- B) $0.866025\dots$ Student does not understand how to write an exact value
- C) 60° Student gave the angle size (lacks understanding)
- D) $\frac{\sqrt{3}}{2}$ Correct answer

Diagnostic Questions: Trigonometry (basic) Answers

9. Determine the size of angle θ :



A) 36.3° Correct answer

B) 53.7° Student used \tan^{-1} but confused opposite and adjacent sides

C) 42.7° Student used \cos^{-1} rather than \tan^{-1}

D) 47.2° Student used \sin^{-1} rather than \tan^{-1}

10. Write down the principal angle satisfied by:

$$\tan \theta = 1$$

A) $\theta = 0^\circ$ Student gave the angle satisfying $\cos \theta = 1$

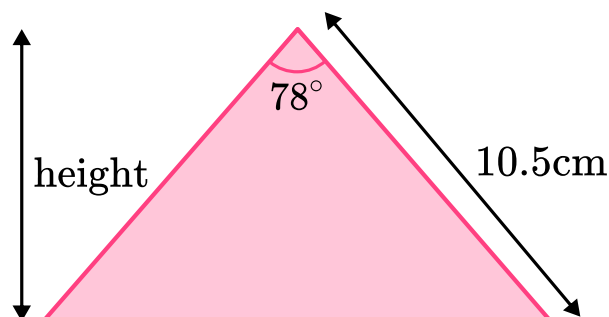
B) $\theta = 45^\circ$ Correct answer

C) $\theta = 90^\circ$ Student gave the answer satisfying $\sin \theta = 1$

D) $\theta = 360^\circ$ Student stated the number of degrees in one full turn

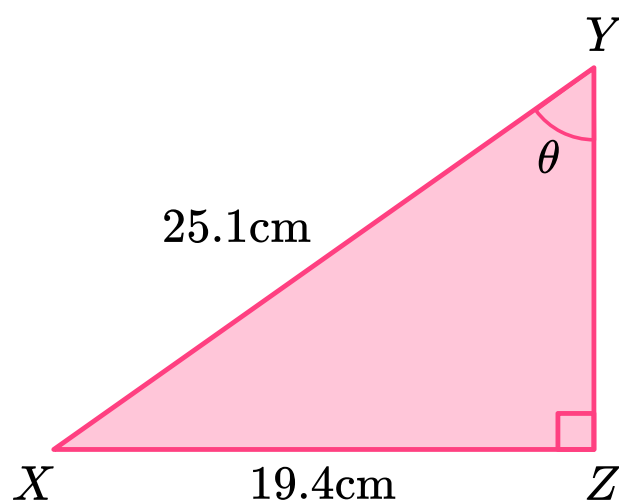
Diagnostic Questions: Trigonometry (basic) Answers

11. Find the height of this isosceles triangle:



- A) 2.2 cm Student attempted to use \cos but did not find half of 78°
 B) 8.2 cm Correct answer
 C) 6.6 cm Student found a right-angled triangle but used \sin (not \cos)
 D) 10.3 cm Student made several errors using the given information

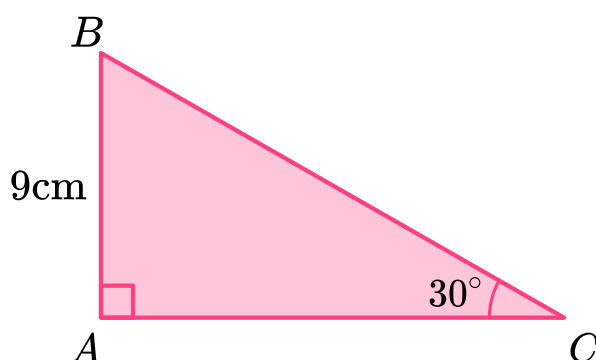
12. Determine the size of angle θ :



- A) 39.4° Student used \cos^{-1} rather than \sin^{-1}
 B) 37.7° Student used \tan^{-1} rather than \sin^{-1} (with XY as adjacent)
 C) 0.01° Student used \sin rather than \sin^{-1}
 D) 50.6° Correct answer

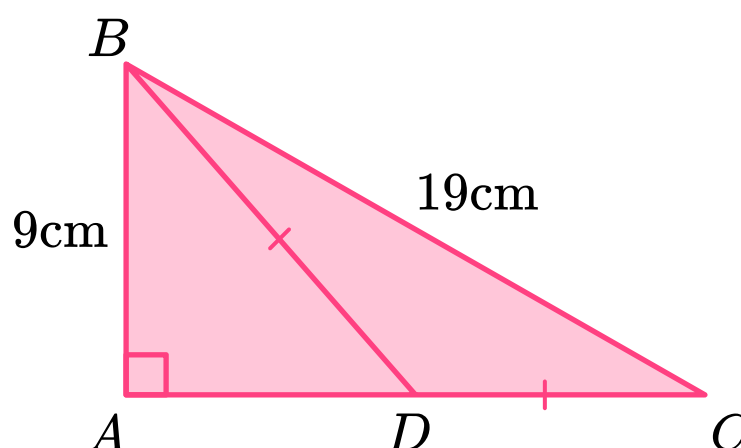
Diagnostic Questions: Trigonometry (basic) Answers

13. Determine the area of triangle ABC:



- A) 42.6 cm^2 Student confused concepts of area and perimeter
 B) 70.1 cm^2 Correct answer
 C) 140.2 cm^2 Student forgot to halve the area of the enclosing rectangle
 D) 135 cm^2 Student used angle BCA (not length AC) to calculate the area

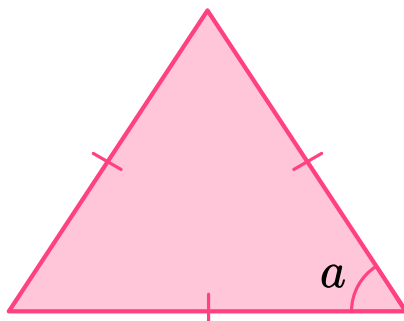
14. Determine the size of angle BDC:



- A) 28.8° Student used \sin to calculate angle ACB but went no further
 B) 151.7° Student forgot to double angle ACB before subtracting from 180°
 C) 123.5° Correct answer
 D) 129.3° Student used \tan^{-1} rather than \sin^{-1} (with BC as adjacent) to obtain angle ACB

Diagnostic Questions: Trigonometry (basic) Answers

15. State the value of $\cos(a)$:



A) 0.6 Student divided angle size by 100

B) 0.5 Correct answer

C) 0.33 Student assumed the value of one angle is a third

D) 0.166 Student expressed the angle size as a proportion of 360°

Where to go next?

For more 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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