

Pythagoras and Trigonometry in 3D Shapes



Find the required 3D diagonal first, then use the labelled right triangle for trigonometry.

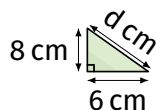
Name _____

Date _____

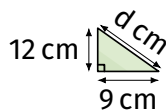
Diagram first

Use the right-angle mark to identify the hypotenuse. Show the equation, substitution, and conclusion with units where needed.

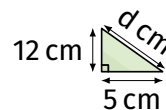
1. Find the base diagonal from base 6 by 8 cm.



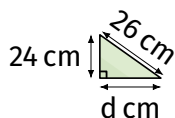
2. Find the base diagonal from base 9 m by 12 m.



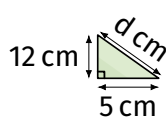
3. Find the base diagonal from base 5 cm by 12 cm.



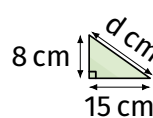
4. Space diagonal 26 cm, height 24 cm. Find the base diagonal.



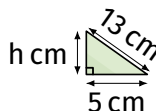
5. Base 3 by 4 cm, height 12 cm. Find the space diagonal.



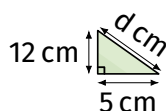
6. Base diagonal 15 m, height 8 m. Find the space diagonal.



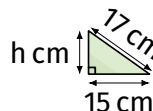
7. Find angle θ where $\sin(\theta) = 5/13$ and hypotenuse is 13 cm.



8. Find angle θ where $\tan(\theta) = 12/5$.



9. Find angle θ where $\cos(\theta) = 15/17$ and hypotenuse is 17 cm.



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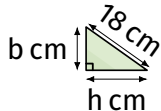
Name _____

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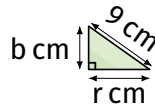
Diagram first

Use the right-angle mark to identify the hypotenuse. Show the equation, substitution, and conclusion with units where needed.

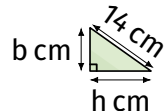
- 10.** Sloping line 18 cm makes angle 50° with base. Find vertical height.



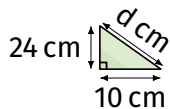
- 11.** Ladder 9 m long makes angle 42° with floor. Find the rise.



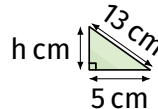
- 12.** Support 14 cm makes angle 30° with base. Find height reached.



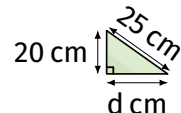
- 13.** Cuboid 8 by 6 by 24 cm. Find space diagonal to 1 d.p.



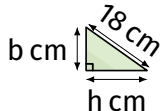
- 14.** Space diagonal 13 cm, base diagonal 5 cm. Find height.



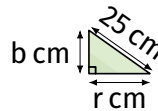
- 15.** Height 20 cm, space diagonal 25 cm, one leg 9 cm. Find other base leg.



- 16.** Line inside box 18 cm, angle 41° to base. Find vertical height.



- 17.** Support line 25 m, angle 28° to horizontal. Find rise to 1 d.p.



- 18.** Line across face 13 cm, angle 40° to bottom edge. Find height on that face.

