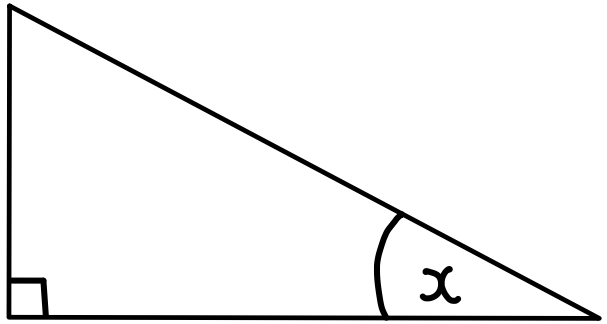
Trigonometry

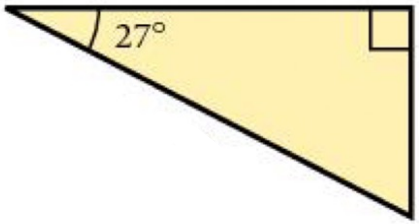
Part1 : Right angle triangles

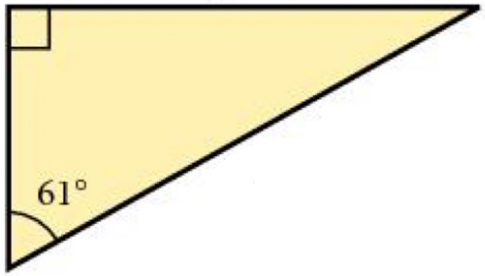
By .... Kru ชี่

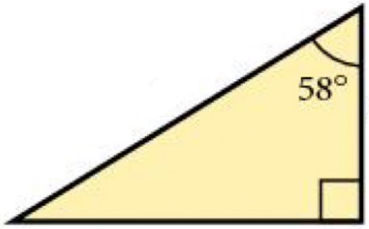
Naming each side on right angle triangle



Try to label each side







The ratio between sides in right angle triangles

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How to remember

Calculate missing length by using SIN , COS , TAN

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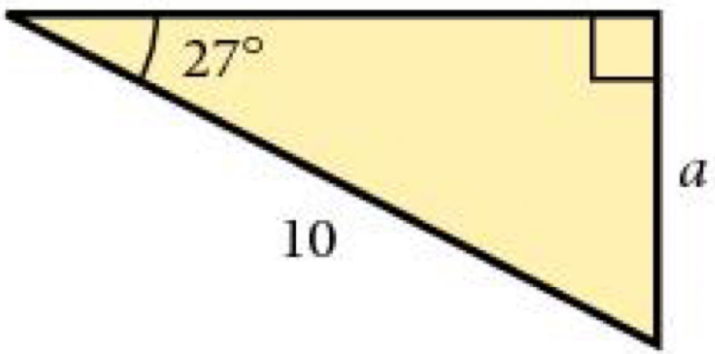
Example



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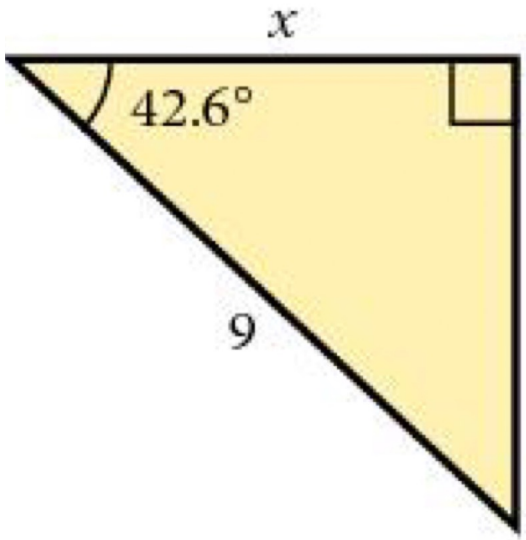

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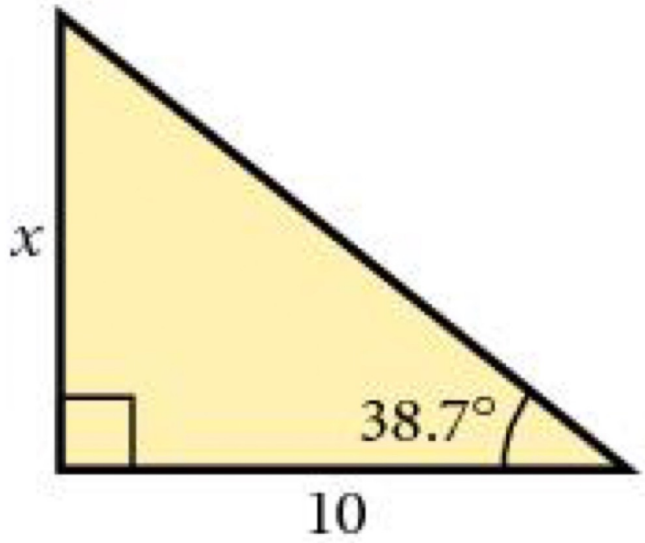

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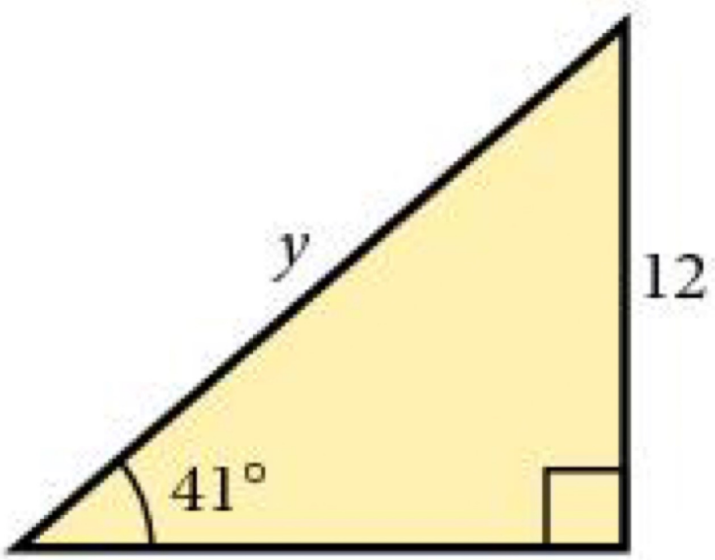

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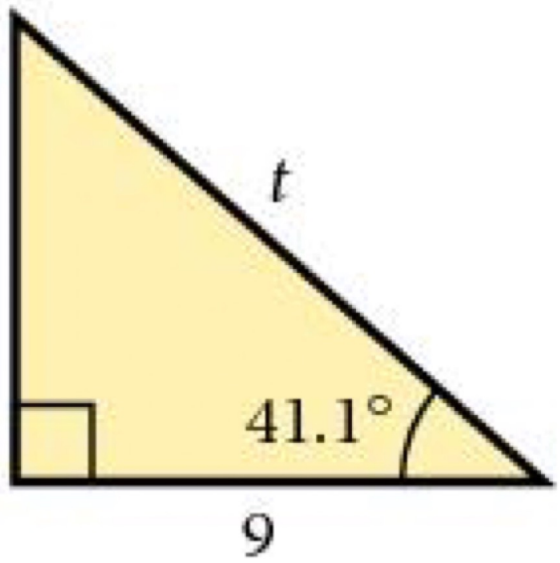

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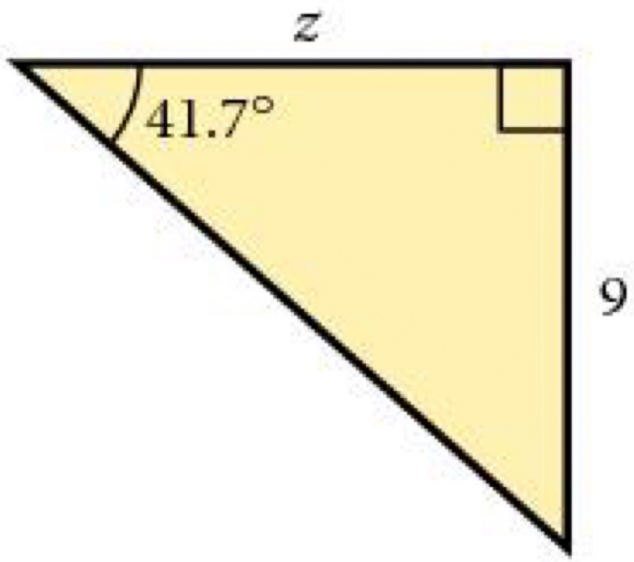

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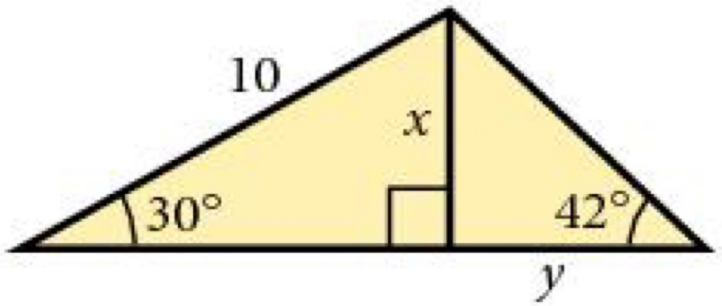

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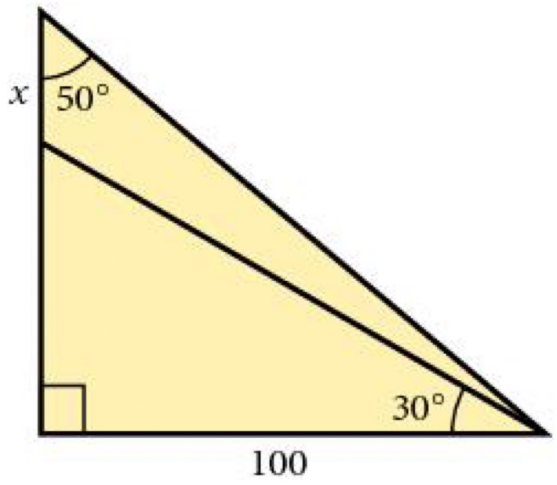


Example

$B\hat{A}D = A\hat{C}D = 90°$

$C\hat{A}D = 35°$

$B\hat{D}A = 41°$

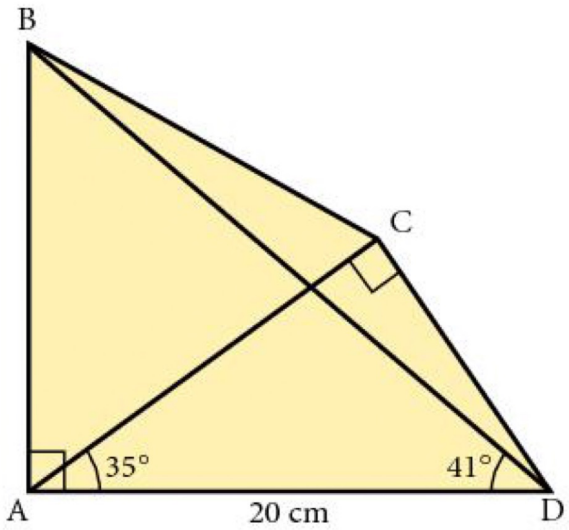
$AD = 20$ cm

Calculate:

a) AB

b) DC

c) BD



Calculate missing angle by using SIN^{-1}, COS^{-1}, TAN^{-1}

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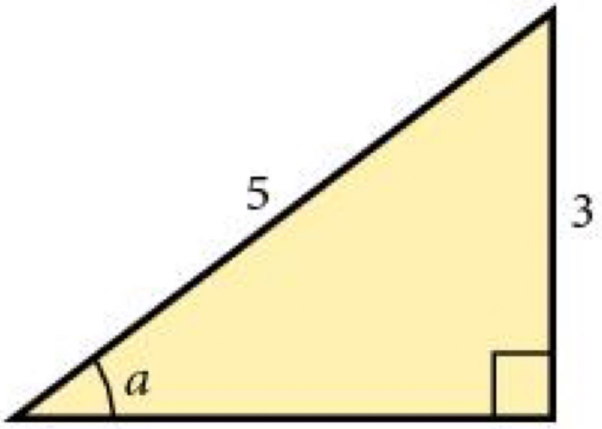
Example



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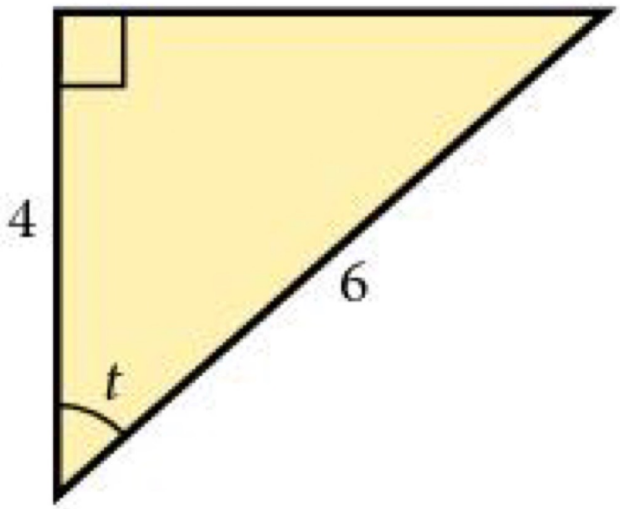

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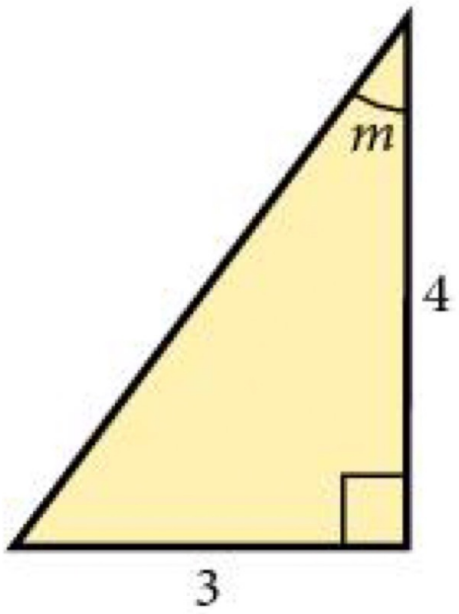

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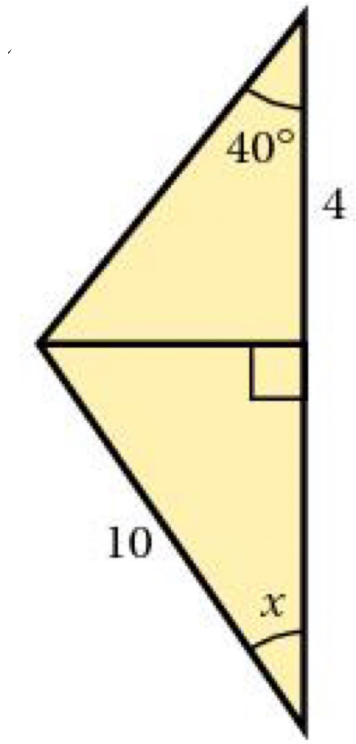

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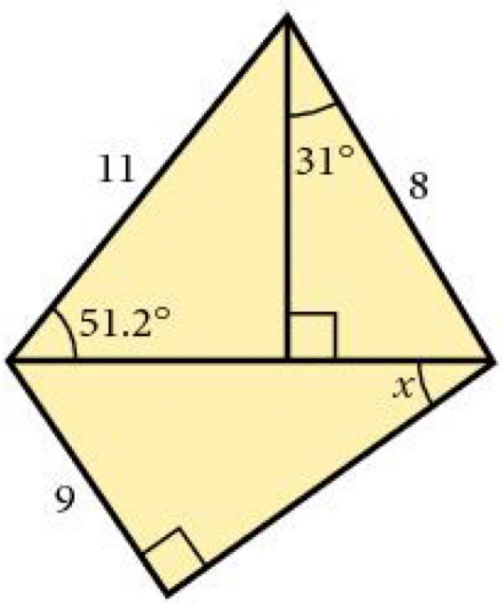

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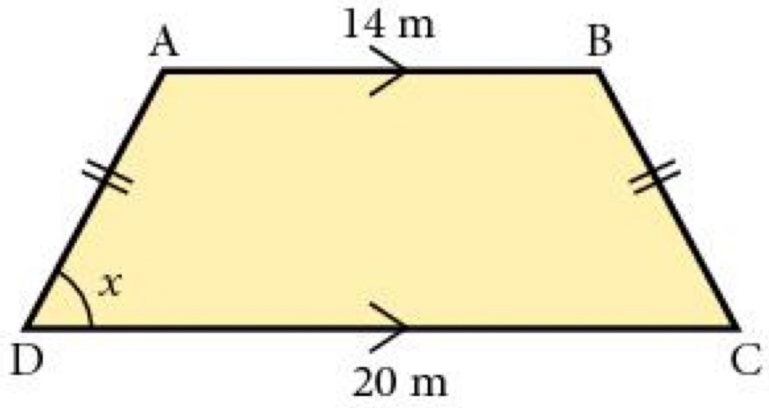


Problems about trigonometry

How to solve ?

Example

A ladder of length 6 m leans against a vertical wall so that the base of the ladder is 2 m from the wall. Calculate the angle between the ladder and the wall.

Example

A ladder of length 8 m rests against a wall so that the angle between the ladder and the wall is 31°. How far is the base of the ladder from the wall?

Bearing

Example

A ship sails 35 km on a bearing of 042°.

a) How far north has it travelled?

b) How far east has it travelled?

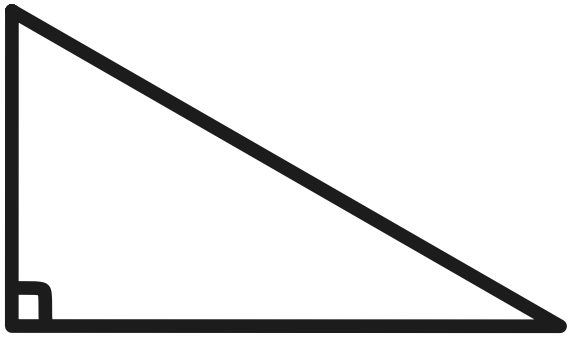
Example

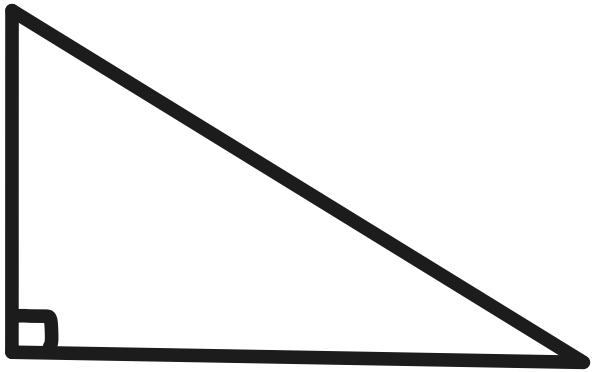
A ship sails 200 km on a bearing of 243.7°.

a) How far south has it travelled?

b) How far west has it travelled?

Angle of depression and elevation



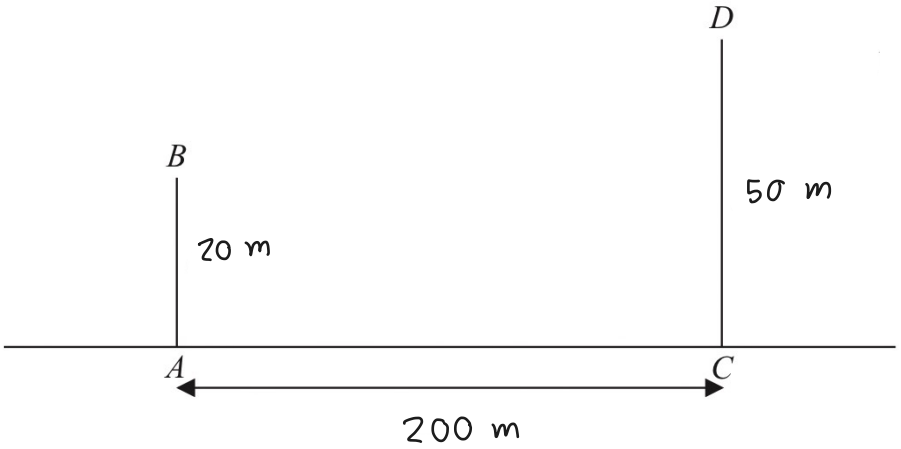


Example If a person standing at the top of the building of height 50 ft is looking at her daughter standing at a distance of 30 ft away from the building, what will be the angle of depression formed?

Example From a hot air balloon that is flying at a height of 100 ft, the angle of depression of a person on the ground is 30 degrees. Find the length of the rope that is tied from the person on the ground to the balloon.

Example

The diagram shows two vertical phone masts, AB and CD, on horizontal ground.

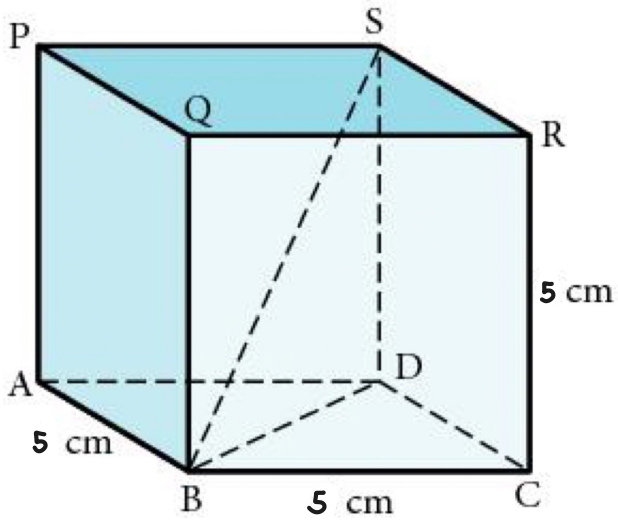


Work out the size of the angle of depression of B from D
Give your answer correct to one decimal place.

Example From the top of a tower of height 75 m, a man sees two goats, both due west of him. If the angles of depression of the two goats are 10° and 17°, calculate the distance between them.

3D Trigonometry

Example



In the cube shown, find:

a) BD

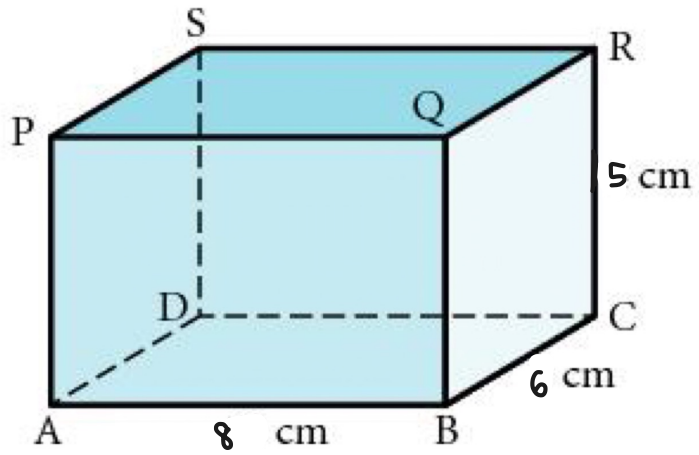
b) AS

c) BS

d) the angle SBD

e) the angle ASB

Example



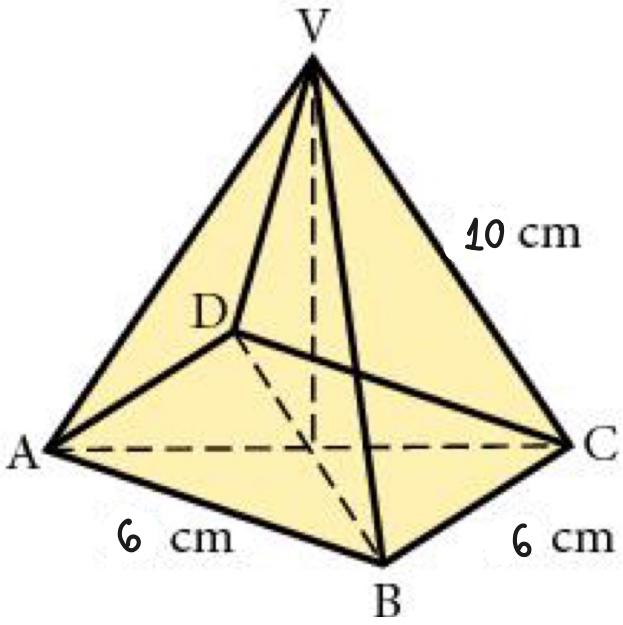
In the rectangular box shown, find:

a) AC

b) AR

c) the angle between AC and AR.

Example



a) AC

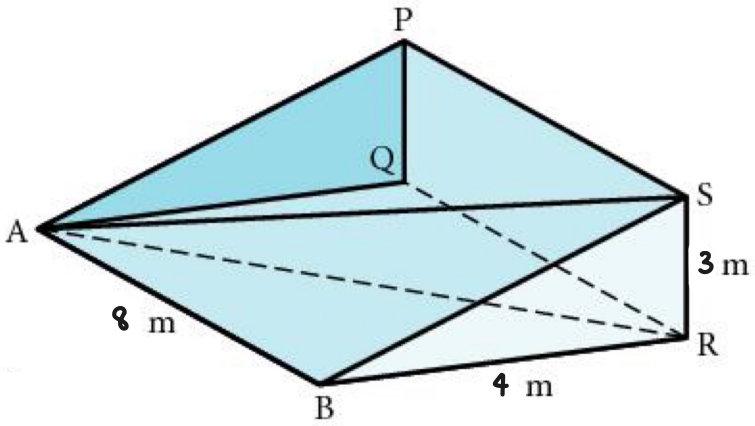
b) the height of the pyramid

c) the angle between VC and the base ABCD

d) the angle AVB

e) the angle AVC

Example



a) BS

b) AS

c) angle BSR

d) angle ASR

e) angle PAS