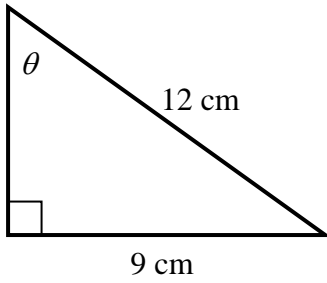


# Right-Angled Triangle Trigonometry

Level 1 – 2

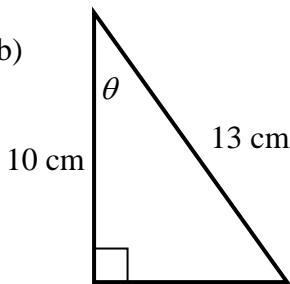
1. Find the missing length or angle

a)



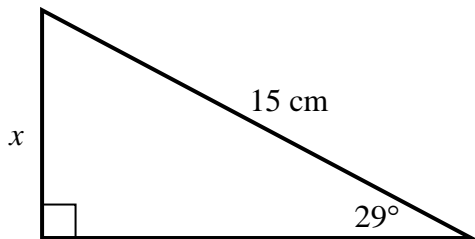
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b)



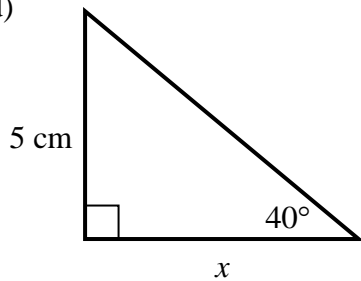
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c)



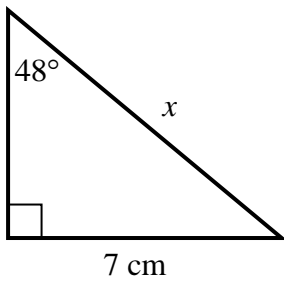
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d)



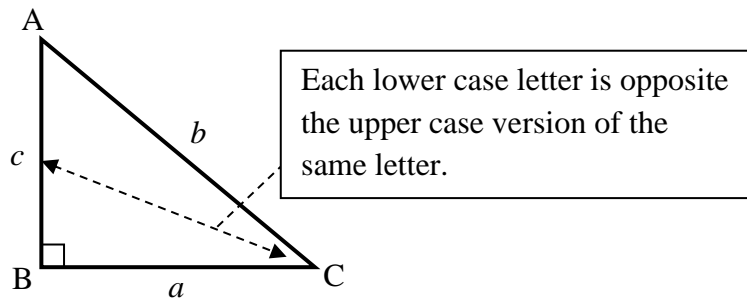
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e)



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2. When labelling the vertices and sides of a triangle, we use upper case letters for the vertices, and lower case letters for the sides. The label of a side is the same letter as the label of the opposite angle. For example:



Calculate the missing length or angle in the following right-angled triangles.

- a)  $A = 90^\circ$ ,  $C = 62^\circ$ ,  $a = 13\text{cm}$ ,  $c = ?$  .....
- .....
- .....

- b)  $C = 90^\circ$ ,  $B = 34^\circ$ ,  $b = 19\text{cm}$ ,  $a = ?$  .....
- .....
- .....

3. Determine the smallest angle between the diagonal of a rectangle of width 15 cm and height 10 cm and one of its sides.

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4. A car travels at an average speed of 30 km/h for 5 minutes up a hill inclined at  $6^\circ$  to the horizontal. Determine the change in elevation of the car. Write your answer in metres to 2 decimal places.

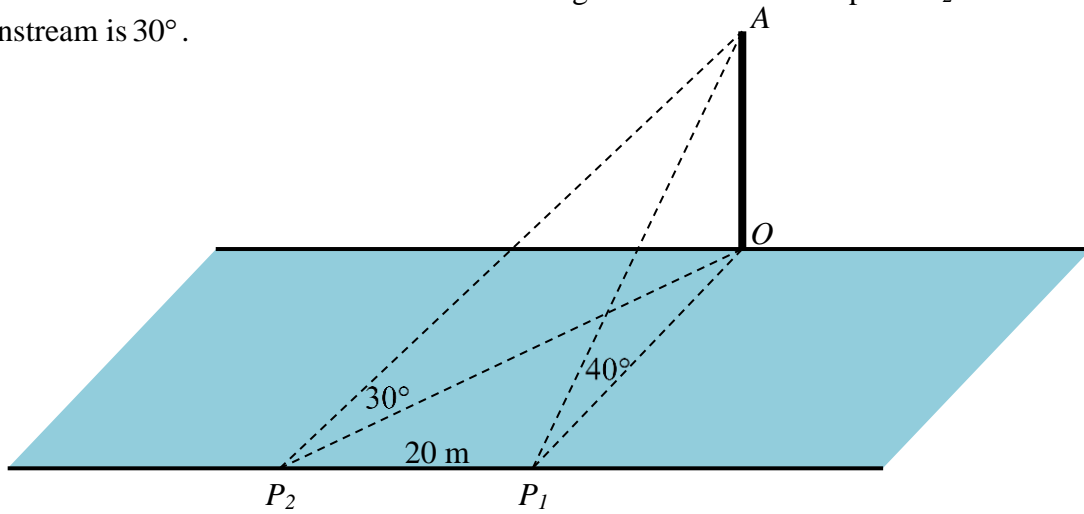
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5. A tower is located next to a river. The angle of elevation from point  $P_1$  immediately opposite the tower on the other side of the river is  $40^\circ$ . The angle of elevation from point  $P_2$  which is 20 m downstream is  $30^\circ$ .



a) Let the height of the tower be  $h$  and the width of the river be  $w$ . Label  $h$  and  $w$  on the diagram above.

b) Using triangle  $AOP_1$  write down an equation involving  $h$  and  $w$ .

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c) Determine length  $OP_2$  in terms of  $w$ .

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d) Using triangle  $AOP_2$  write down an equation involving  $h$  and  $w$ .

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e) Hence, determine the width of the river and the height of the tower to 2 decimal places.

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Width: .....

Height:.....

6. Using appropriate diagrams (and without using your calculator) complete the following table.

$\theta$	$\sin \theta$	$\cos \theta$	$\tan \theta$
30			$\frac{\sqrt{3}}{3}$
45	$\frac{\sqrt{2}}{2}$		
60			

*Draw your triangles here*

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*Level 7 – 8*

7. a) Determine an expression for the area of the largest regular  $n$ -sided polygon which fits inside a circle of radius 1 cm.

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b) Hence determine the area of a polygon to 4 decimal places with the following values of  $n$ .

i) 10 .....

ii) 100 .....

iii) 1000 .....

c) What do you notice about your answers to part b)? Explain your answer.

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8. The radius of Mars is 3,390 km. In the future, when humans live there, how many radio towers of height 500 m will have to be built on the equator so that two people with radios will be able to stand anywhere on the equator and still be able to speak to each other? Assume the radio waves travel in a straight line.

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