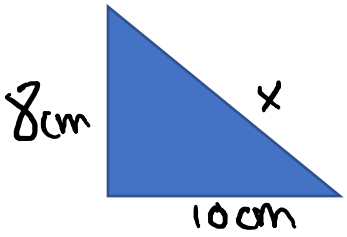
Grade 10 Academic Math
Trigonometry Practice

Using Pythagorean theorem:

$A^2 + B^2 = C^2$

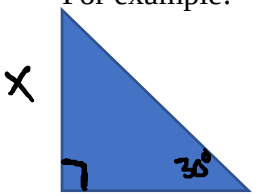
This formula is used to find a missing side in a right angle triangle. For example:



$A^2 + B^2 = C^2$
$8^2 + 10^2 = C^2$
$64 + 100 = C^2$
$164 = C^2$
$\sqrt{164} = \sqrt{C^2}$
12.8 cm = C

Using SOH CAH TOA

This method is used to find either a missing side or a missing angle from a right angle triangle.
For example:

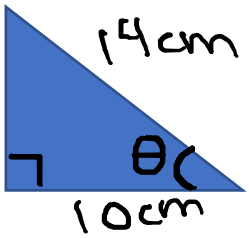


TOA = Opposite & adjacent

$\tan(30^\circ) = \frac{x}{10}$

$(\tan(30^\circ))(10) = x$

$10.2\text{cm} = x$



CAH = Adjacent & hypotenuse

$\cos(\theta) = \left(\frac{10}{14}\right)$

$\theta = \cos^{-1}\left(\frac{10}{14}\right)$

$\theta = 44.1^\circ$

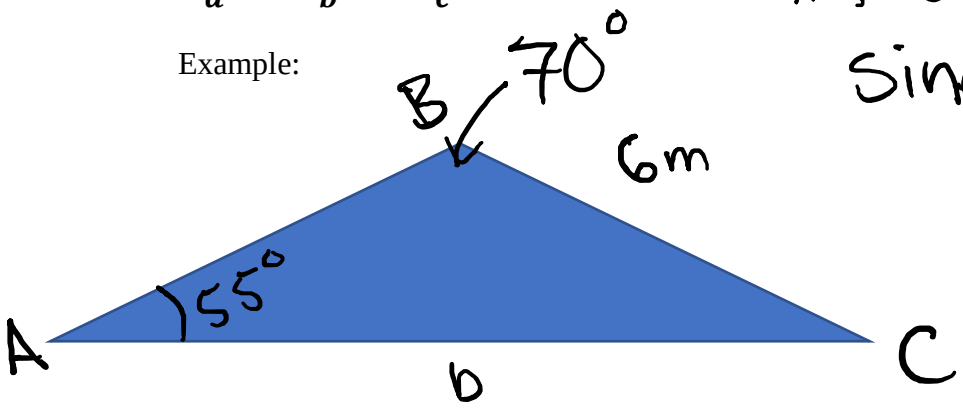
Using the sine law

The sine law is used to relate the sides of a non-right angle triangle to the sine of the opposite angles. With this formula, you ca find a missing angle or side.

$$\frac{SinA}{a} = \frac{SinB}{b} = \frac{SinC}{c}$$

*find 'b' using the Sine law formula

Example:



$$\frac{SinA}{a} = \frac{SinB}{b} = \frac{SinC}{c}$$

$$\frac{Sin55}{6} = \frac{Sin70}{b}$$

$$(Sin55)(b) = (Sin70)(6)$$

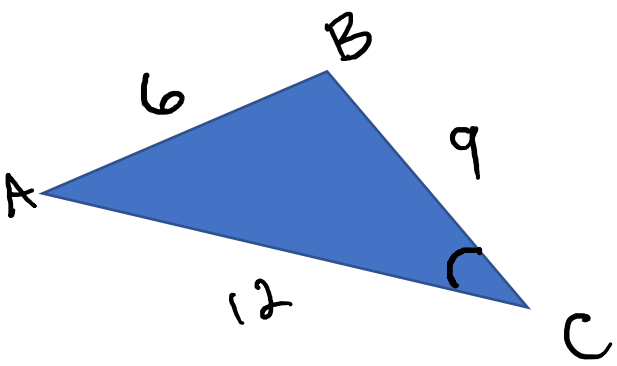
$$\frac{Sin55b}{Sin55} = \frac{(Sin70)(6)}{Sin55}$$

$$b = 6.88m$$

Using the cosine law

The cosine law is used to find a missing side of a triangle and a missing angle when the sides are known.

$$C^2 = a^2 + b^2 - 2abCosC$$



* find angle 'C' using the cosine law formula.

$C^2 = a^2 + b^2 - 2abCosC$

$6^2 = 9^2 + 12^2 - 2(9)(12)CosC$

$36 = 81 + 144 - (216)CosC$

$36 = 225 - 216CosC$

$216CosC = 225 - 36$

$216CosC = 189$

$\frac{216CosC}{216} = \frac{189}{216}$

$CosC = \frac{189}{216}$

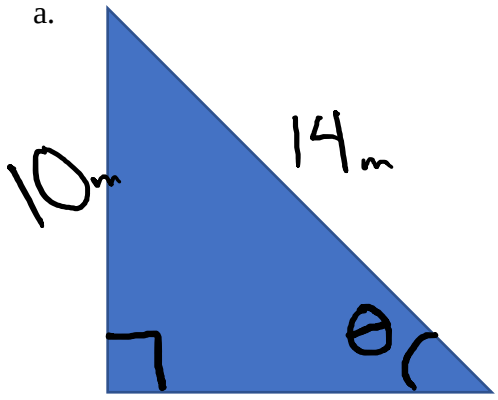
$C = Cos^{-1}(189/216)$

C = 28.9° (or ~29°)

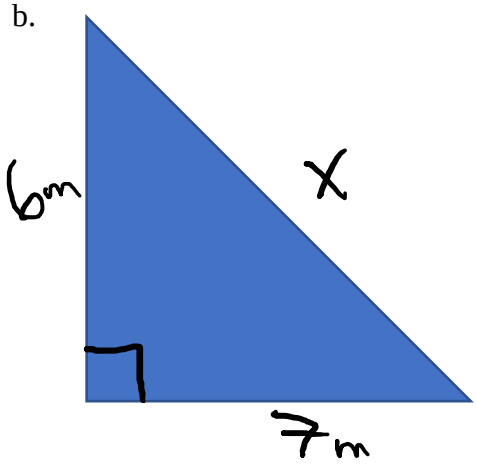
Practice questions:

1. Find the missing sides or angles for the following right angle triangles:

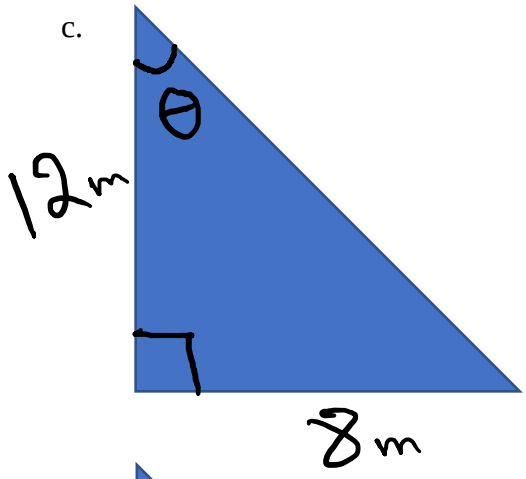
a.



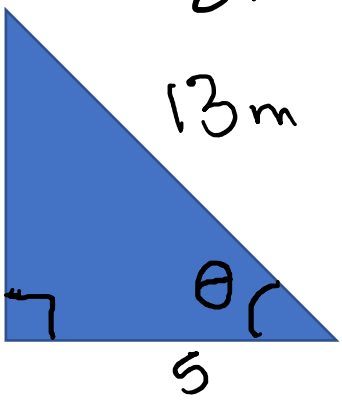
b.



c.



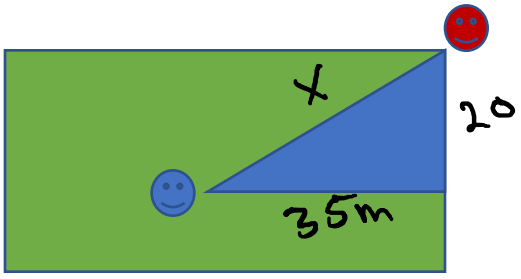
d.



2. Extend your knowledge. Solve the following word problems relating to right angle triangles:
    a. Fred was standing 12m away from a house where his friend was looking out of a window. The window is 10m above the ground, and Fred is 1m tall. What is the angle at which Fred is looking at his friend? Draw a diagram to show the problem

    b. A golf player hits a ball 135m. He estimates that the angle of elevation of the ball was around 45°. What was the maximum height of the ball before it landed? Draw a diagram to illustrate this problem.

    c. Anya and Winnie are standing in a field playing frisbee. Anya is standing 35m away from the edge of the field, and Winnie is standing in the upper right corner of the field, which is 20m upwards. Anya is wondering what the most efficient way to get to Winnie is without walking to the edge of the field and upwards.. She is thinking of walking diagonally but needs to do the math to see if it would be most efficient.

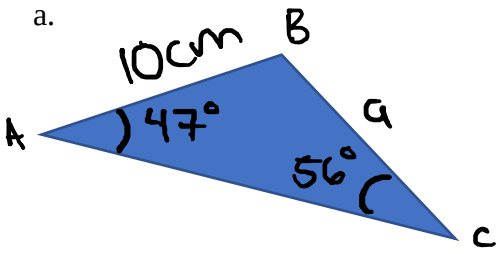


Practice using the sine law:

$$\frac{SinA}{a} = \frac{SinB}{b} = \frac{SinC}{c}$$

1. Find the missing sides or angles using the sine law

a.



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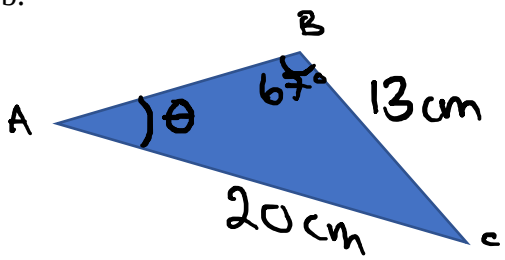

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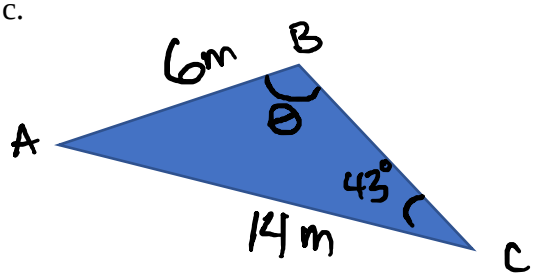

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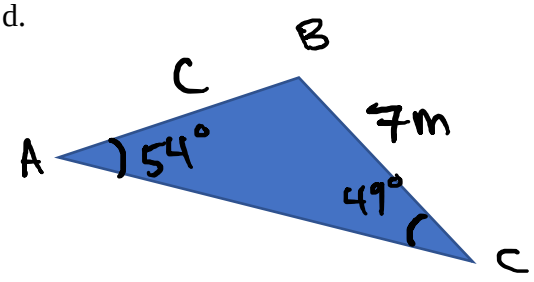
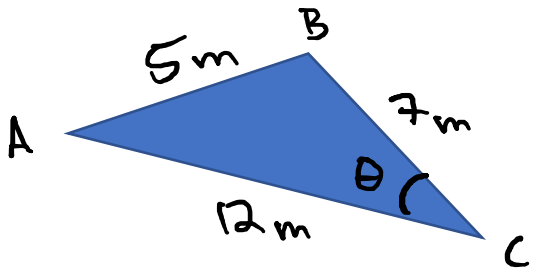


Practice using the cosine law:

$$C^2 = a^2 + b^2 - 2abCosC$$

1. Find the missing sides or angles using the cosine law:

a.



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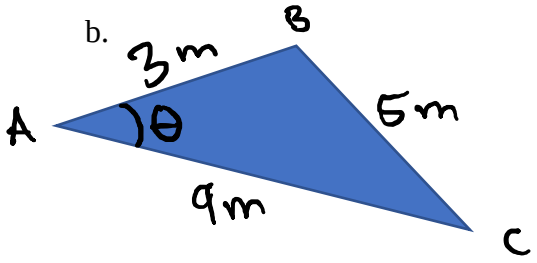

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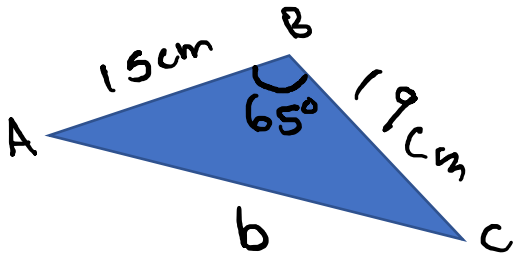

d.