

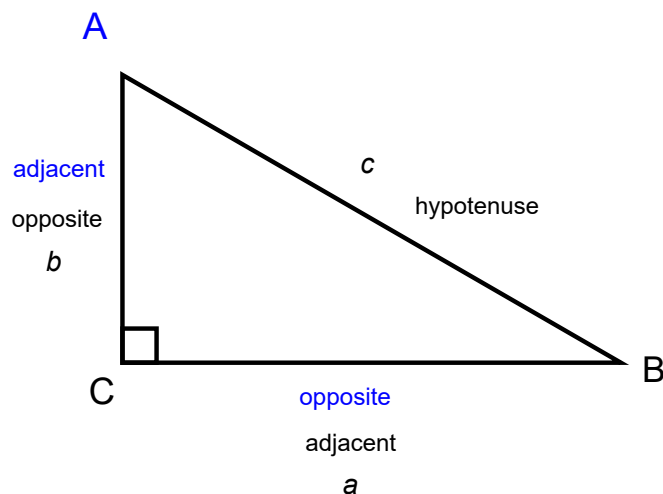
Learning Goals:

- I will remember what SOH CAH TOA stands for
- I will determine trigonometric ratios using a calculator
- I will find the length of a side using trigonometric ratios
- I will find the measure of an angle using trigonometric ratios

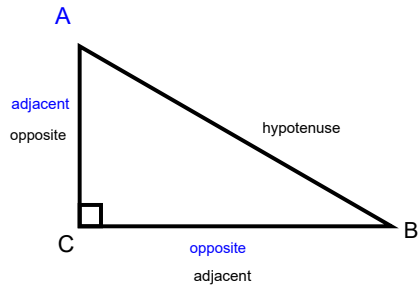
Unit 1

Lesson 1: Reviewing Trigonometric Ratios

Trigonometric ratios can be used to find a missing angle or side in a right angled triangle.



Use the acronym **SOH CAH TOA** to help you remember the trigonometric ratios.



$$\sin A = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{BC}{AB}$$

$$\sin B = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{AC}{AB}$$

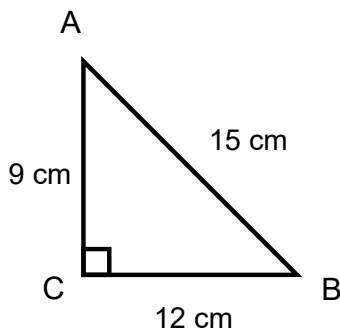
$$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{AC}{AB}$$

$$\cos B = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{BC}{AB}$$

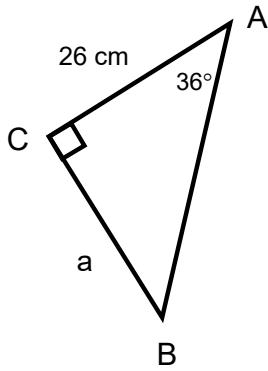
$$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{BC}{AC}$$

$$\tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{AC}{BC}$$

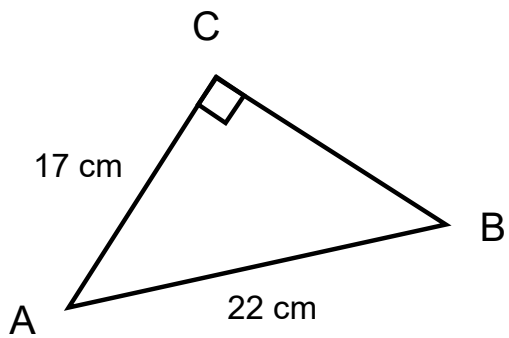
ex. 1 Write the trigonometric ratios for $\sin A$, $\cos A$, $\tan A$.



ex. 3 Find the length of side a. Round your answer to one decimal place.



ex. 4 Find the measure of angle A to the nearest tenth of a degree.



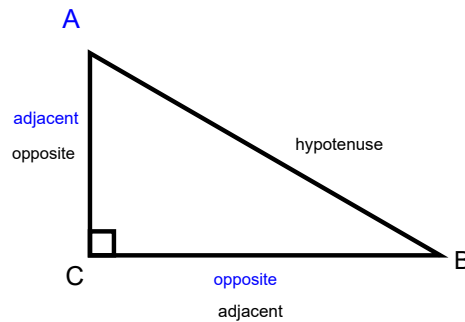
Homework:

- page 3-4 in workbook
- study for review quiz tomorrow

**DO NOT WRITE IN THE
WORKBOOKS**

REMEMBER...

Use the acronym **SOH CAH TOA** to help you remember the trigonometric ratios.



$$\sin A = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{BC}{AB} \quad \sin B = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{AC}{AB}$$

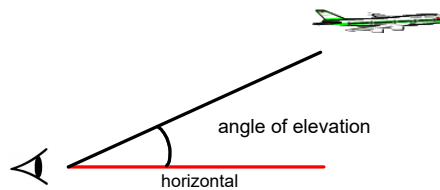
$$\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{AC}{AB} \quad \cos B = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{BC}{AB}$$

$$\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{BC}{AC} \quad \tan B = \frac{\text{opposite}}{\text{adjacent}} = \frac{AC}{BC}$$

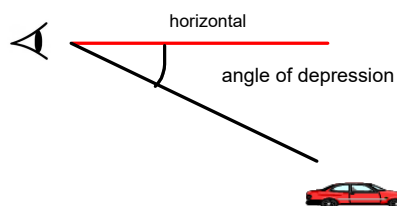
Lesson 2: Solving Problems Using Trigonometric Functions

Terms to know:

angle of elevation (inclination): the angle between the horizontal and the upward line of sight.



angle of depression: the angle between the horizontal and the downward line of sight.



Homework:

- pg 6-7 # 1,2,4,5,7,8 in the workbook
- check your answers

1.1 Revisit the Primary Trigonometric Ratios, pages 2-4

1. a) 0.8660 b) 0.7071 c) 0.5774
2. a) 28.3° b) 43.2° c) 72.7°
3. $\angle B = 70^\circ$, $a = 11$ m, $c = 33$ m
4. $\angle A = 58^\circ$, $\angle B = 32^\circ$, $c = 35.5$ cm
5. a) $\angle B = 63^\circ$, $BC = 45.4$ m, $AC = 89.1$ m
b) $\angle A = 16.1^\circ$, $\angle B = 73.9^\circ$, $AT = 34.6$ cm
6. $AD = 32.4$ cm
7. $x = 8.1$ m, $y = 6.3$ m

To solve a trigonometric problem follow these steps:

1. Determine what needs to be calculated (angle or side)
2. Draw a diagram with labels
3. Write an equation using a trigonometric ratio
4. Solve for the unknown
5. Write a concluding sentence

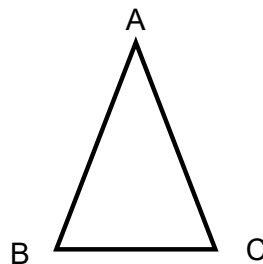
ex.1 The maximum height of a roof is 7 ft and the distance from the midpoint of the base of the roof to the outer wall is 12 ft. Calculate the roof's angle of inclination. Round your answer to the nearest degree.

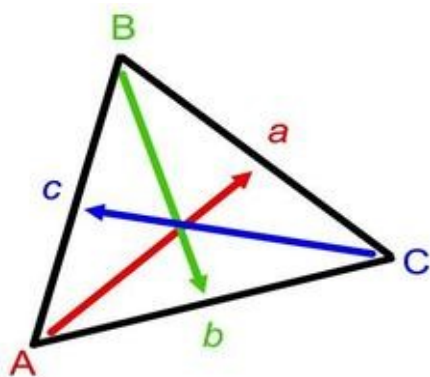
ex. 2 From the top of the Niagara Escarpment, Jon see a car below at an angle of depression of 40 degrees. Jon is approximately 100 m above the car. How far is the car from the base of the escarpment? Round your answer to the nearest meter.



1.3 The Sine Law

- an acute triangle , ABC , can be solved using the sine law if we know:
 - two angles and one side
 - an angle and two sides (if one of the sides is opposite the given angle)





Sine Law

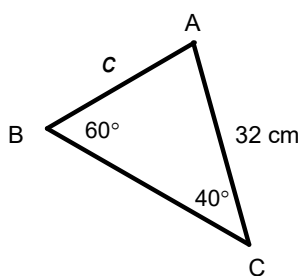
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

or

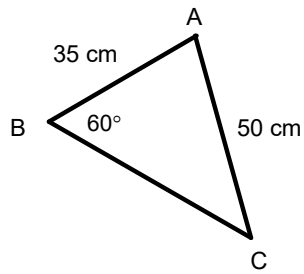
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Even though there are 3 different terms (a , b , and c) in the Sine Law, we only ever use two at once (see the first example below)

ex. 1 Find the measure of side c to the nearest centimeter.



ex. 2 Find the measure of angle C to the nearest tenth of a degree.



ex. 3 Two ships are located 15 nautical miles apart. Alpha's angle to the entrance to the port is 55° with respect to Beta. Beta's angle to the entrance to the port is 45° with respect to Alpha. Which ship is closer to the port entrance? How far is the ship from the port? Round your answer to the nearest tenth.

Homework:

- pg 9-10 #1-6
- check your answers

1.2 Solve Problems Using Trigonometric Ratios, pages 5–7

Practise

1. 2065 m
2. 2.6°
3. 35°
4. 576 m
5. 28 m
6. 44 m
7. 11.3 km
8. 17.8 m

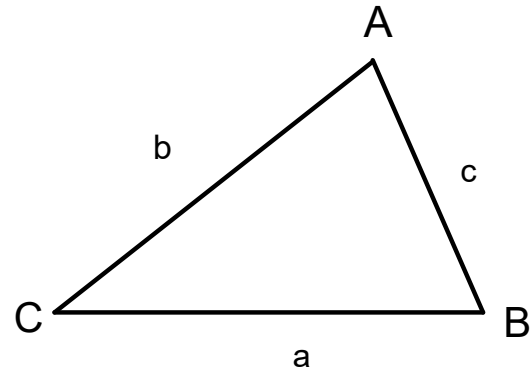
1.4 The Cosine Law

- We use the cosine law to find the length of a side given **two sides and an angle**

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$



- The cosine law can also be used to find the measure of an unknown angle, given **three sides**.

$$+ c^2 - 2bc \cos A$$

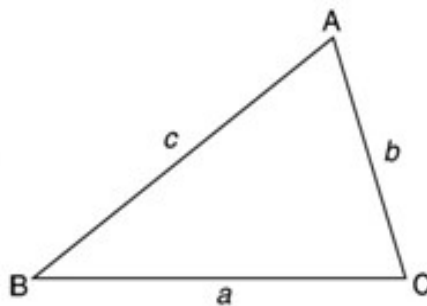
$$+ c^2 - 2ac \cos B$$

$$+ b^2 - 2ab \cos C$$

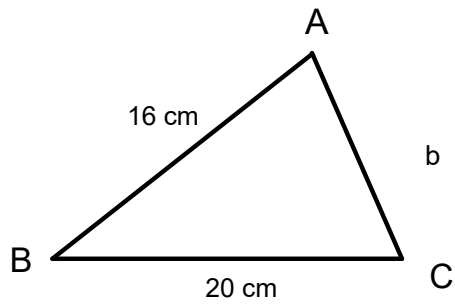
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

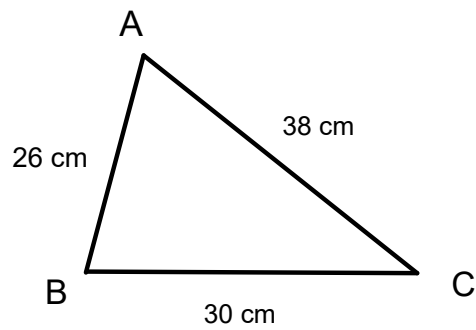
$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$



ex. 1 Find the length of side b to the nearest tenth of a centimeter.



ex.2 Find the measure of angle A to the nearest degree.



Homework:

- pg 12-13 #1,2,3,4,8
- check your homework

1.3 The Sine Law, pages 8–10

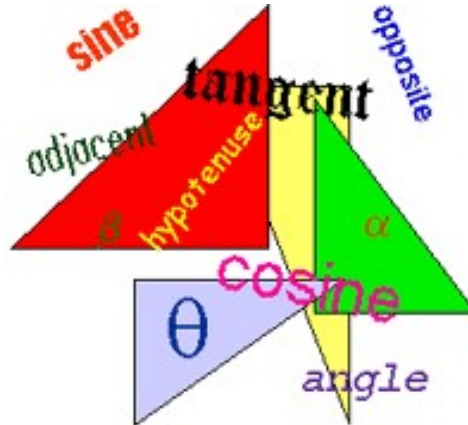
Practise

1. a) 25.9 cm b) 28.9 m c) 24.7 cm
2. a) $\angle Y = 76^\circ$, $\angle Z = 59^\circ$, $z = 10$ cm
 b) $\angle C = 35^\circ$, $b = 10$ mm, $c = 6$ mm
3. 8 ft
4. 18 ft and 29 ft
5. a) 13.1 m b) 14.4 m
6. 83 in.

1.5 Making Decisions Using Trigonometry

Learning Goal:

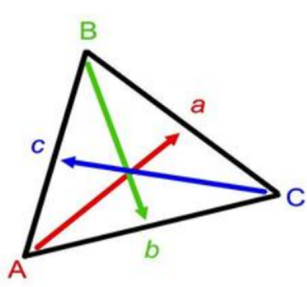
- I will know when to use the trigonometric tools (primary trigonometric ratios, sine law, cosine law)



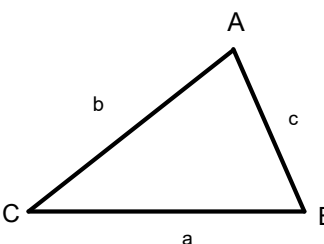
Unit 1: Trigonometry Review

Formula	Triangle	Use
<p>SOH CAH TOA</p> $\sin A = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{BC}{AB}$ $\cos A = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{AC}{AB}$ $\tan A = \frac{\text{opposite}}{\text{adjacent}} = \frac{BC}{AC}$		To find an unknown angle or side of a right angle triangle

Unit 1: Trigonometry Review

Formula	Triangle	Use
<p style="text-align: center;">Sine Law (angle)</p> $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ <p style="text-align: center;">or</p> $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ <p style="text-align: center;">(side)</p>		<p>To find an angle or side in an acute triangle if we know:</p> <ul style="list-style-type: none"> - 2 angles, 1 side - 1 angle, 2 sides (if one side is opposite the given angle)

Unit 1: Trigonometry Review

Formula	Triangle	Use
<p style="text-align: center;">Cosine Law:</p> $a^2 = b^2 + c^2 - 2bc \cos A$ $b^2 = a^2 + c^2 - 2ac \cos B$ $c^2 = a^2 + b^2 - 2ab \cos C$ $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$ $\cos B = \frac{a^2 + c^2 - b^2}{2ac}$ $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$		<p>To find an angle or side if we know:</p> <ul style="list-style-type: none"> - 2 sides, 1 angle - 3 sides



In groups of 2-3 you will answer one of the following questions on page 15-16 and you will present your answer to the class

Choose a recorder, a presenter and a time manager.
Every member of the group must contribute to the solution.

