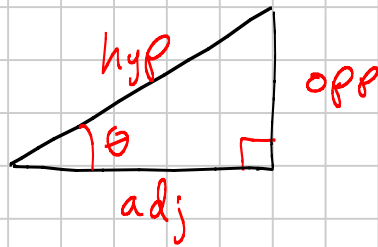


Math 10 Chp 3.1

Note Title

2017-03-25

The Tangent Ratio - Pythagorean Theorem is great for solving many right triangle problem if given 2 side lengths. From the inquiry, we see that we can use similar triangles ratios if given one side length and one angle. So, to figure out any right triangle, we need the following table:



The ratios can be remembered with the following mnemonic:

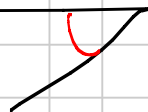
So, we don't need tables. You can just use your calculator to get the values. If you don't get the following values, change the calculator to DEG mode instead of RAD mode.

$$\sin 30^\circ =$$

$$\cos 30^\circ =$$

$$\tan 30^\circ =$$

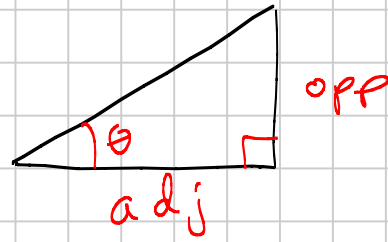
Definition: Angle of Elevation/Depression (aka inclination/declination) - is always measured from the horizon.



Very few problems measure angle from the vertical.

The 3 basic problems:

does not mean to the power of "-1". It means inverse.



Solve the θ
given opp & adj

$$\begin{aligned} \text{opp} &= 3 \\ \text{adj} &= 5 \end{aligned}$$

Solve the opp
given θ & adj

$$\begin{aligned} \theta &= 30^\circ \\ \text{adj} &= 5 \end{aligned}$$

Solve the adj
given θ & opp

$$\begin{aligned} \theta &= 30^\circ \\ \text{opp} &= 3 \end{aligned}$$

eg) Most commercial jets use a 3.5° approach slope to land at airports; this will give a smooth landing. A Westjet 737 is arriving at YVR. It is 4 km from the runway and 400m above the runway. Is this going to be a smooth landing? If not, what height should the plane be at?

Make a drawing:



eg) Bill has an old grain silo. All of his measurement markings have worn out. Fortunately he did trigonometry in high school. His silo is 30 ft high and the diameter is 18 ft. He climbs to the top and measures the angle down to the grain on the far side as 20° . How high is the amount of grain in the silo?



eg) Jill was walking along a river. She wants to know how wide is the river. Fortunately she has a clinometer that measures the angle of elevation. She spot a mature cedar tree across the river. She knows the average height of a mature cedar is 50 ft. The angle of elevation to the top of the cedar is 40° . How wide is the river?



Assigned Work: pp. 107 - 113: 1 - 5, 7, 8, 10, 12

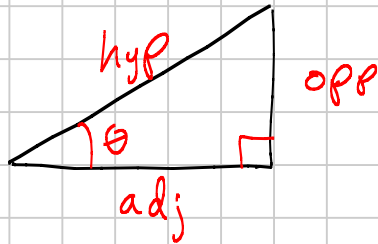
Challenge: 14, 15, 20

Math 10 Chp 3.2

Note Title

2017-03-25

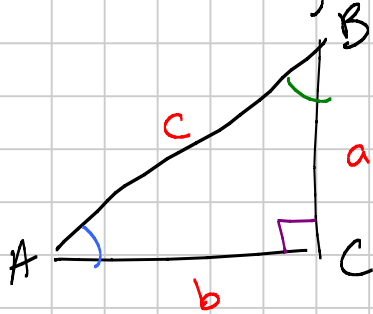
The Sine and Cosine Ratios - using the legs of a triangle is great for solving some problems, but it would be convenient to solve problems involving the hypotenuse. Sine and cosine are here to save the day!



The ratios can be remembered with the following mnemonic:

SOH CAH TOA
 $\sin \theta = \text{opp/hyp}$
 $\cos \theta = \text{adj/hyp}$
 $\tan \theta = \text{opp/adj}$

Labelling Triangles:



\angle - means angle - upper case
- means side - lower case
opposite same upper case letter

The 3 basic problems:

(using sine)

does not mean to the power of "-1". It means inverse.



Solve the θ
given opp & hyp

$$\text{opp} = 3$$
$$\text{hyp} = 6$$

Solve the opp
given θ & hyp

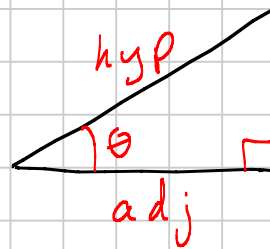
$$\text{hyp} = 6$$
$$\theta = 30^\circ$$

Solve the hyp
given θ & opp

$$\text{opp} = 3$$
$$\theta = 30^\circ$$

The 3 basic problems:
(using cosine)

does not mean to the power of "-1". It means inverse.



Solve the θ
given adj & hyp

$$\begin{aligned} \text{adj} &= 5 \\ \text{hyp} &= 6 \end{aligned}$$

Solve the adj
given θ & hyp

$$\begin{aligned} \text{hyp} &= 6 \\ \theta &= 34^\circ \end{aligned}$$

Solve the hyp
given θ & adj

$$\begin{aligned} \text{adj} &= 5 \\ \theta &= 34^\circ \end{aligned}$$

Now that you see the solutions, you must recognize what problem you have so that you can use the correct solution. Drawing a diagram is the best way to see this.

eg) I want to set up a wind turbine at my farm. To get the most power, it must be mounted on a tower at least 60 ft tall. Guy wires must be attached to anchors on the ground 30 ft from the tower. The wires must be attached at 40° , 51° , and 59° . How long is each wire?



eg) On Grouse Mountain, the top of "The Cut" is at 1100 m altitude; the bottom is at 900 m. The average angle of the run is 11.3° . How long is the run?



eg) Jenn & Arnold are standing at different spots looking at the top of a Douglas Fir in Cathedral Grove on Vancouver Island. Jenn has an angle of elevation of 58° to one of the tallest trees there; Arnold has 72° . Jenn has a laser distance measure and finds that she is 88.2 m from the top of the tree. Assume both are measuring from a height of 1.5 m. How tall is the tree and how far are each of them from the tree?



Assigned Work: pp. 120-124: 1-5, 8, 9, 13

Challenge: 14, 15, 16

Math 10 Chp 3.3

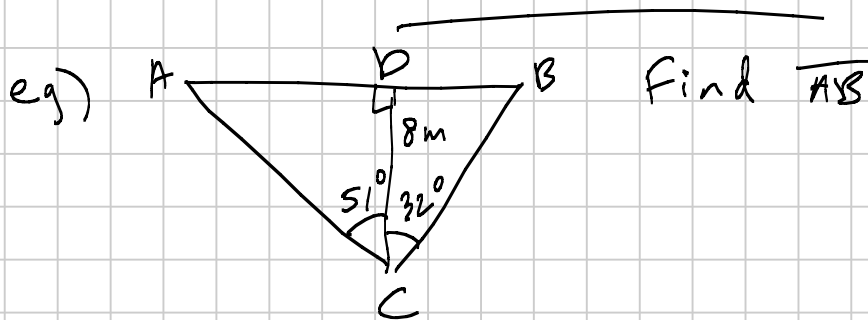
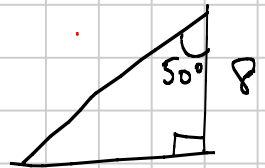
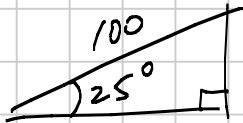
Note Title

2017-04-03

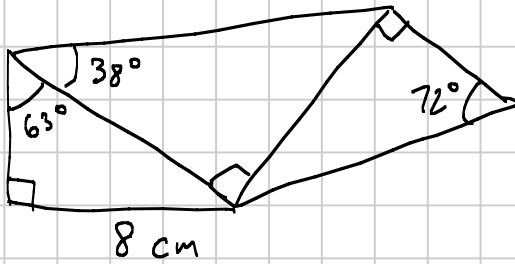
Solving Right Triangles - again, we want to draw diagrams, and label sides and angles so we know which trig ratio to use!

The goal is to solve all sides and angles. Use complementary angle property to speed up finding solutions, i.e.

Other angle measuring devices are transit, alidade, theodolite, and sextant.



eg) Solve all angles and lengths. There are different solutions!



eg) An architect wants to build a roof with angles of elevation of 30° and 50° such that they meet at the peak. The total width is 20m. Determine the measurements for the roof truss.

Assigned Work: pp. 131 - 135: 1-4, 6, 7, 10, 11

Challenge: 12, 13, 14, 15