Homework: Proportions and Pythagorean Theorem booklet

Note: Right Angle Trigonometry

Recall naming sides in a right angled triangle depends on the location of the angle. For example, name the sides of each of the following triangles using adjacent (A), opposite (O) or hypotenuse (H).

We use SOH CAH TOA to help us remember how to use trigonometry to solve right angled triangles.

$$\sin x = \frac{\text{Opposite}}{\text{Hypotenuse}} \quad \cos x = \frac{\text{Adjacent}}{\text{Hypotenuse}} \quad \tan x = \frac{\text{Opposite}}{\text{Adjacent}}$$

For example, solve each of the following triangles for the unknown side or angle.

a)\[\cos x = \frac{A}{H} \quad \cos 53 = \frac{5}{x} \quad x \cos 53 = 5 \quad x = \frac{5}{\cos 53} \quad x = 8.3mm\]
Sometimes word problems are used to describe scenarios that need a picture that is represented by a right angle triangle. Important words needed include angle of inclination and angle of depression as represented in the diagrams below.

*Note that both of these angles are measured from the horizontal. It is important to find a way to remember how they are constructed. Incline means upwards while depression tends to mean downward as in a depressing mood.

c) A man needs a ladder in order to get his cat from a tree. The ladder is only 6m but he thinks the cat is 8m high in the tree. He knows he must have an angle of inclination of at least 75 degrees in order for the ladder to be safe. Can he reach the cat?

Step 1: Draw a picture.

Step 2: Identify ratio needed.

Step 3: Solve problem.

\[ \sin x = \frac{O}{H} \]

\[ \sin 75 = \frac{x}{6} \]

\[ 6 \sin 75 = x \]

\[ 5.8m = x \]

The ladder reaches 5.8 m up the tree. 8 – 5.8 = 2.2 m meaning he probably cannot reach the cat.

◆ **homework:** FCM 12 p. 8 # 4 - 7, 9, 10, 12, 16