

Chapter 9 Review

The main topic

Trig ratios. Plain and simple. That's what this chapter was all about: learning to use the trigonometric functions in real-life applications.

The point? You gotta know these! They ***MUST*** be memorized. You will use them throughout your high school and college career.

SOH-CAH-TOA

- SOH: Sine – Opposite over Hypotenuse
- CAH: Cosine – Adjacent over Hypotenuse
- TOA: Tangent – Opposite over Adjacent

These three trig functions represent the ratio of sides. Given an angle, we can use our calculator to find the sine (or cosine or tangent) of that angle. The number we get is the ratio of the respective sides. For instance, $\sin 30 = .5$ right? Well, what is .5? It is a ratio, a fraction: $\frac{1}{2}$. It is the *special* ratio of the length of the side opposite the angle divided by the length of the adjacent side. In other words, the opposite and adjacent sides have the ratio of 1:2.

So if we know an acute angle measure in a right triangle, using the trig functions we can determine the ratios of any of the sides.

...and don't forget

The inverse trig functions (\sin^{-1} , \cos^{-1} , and \tan^{-1}) basically work backwards. They give us the angle that goes with a trig ratio.

So if we know the lengths of the sides, using the inverse trig functions we can determine the measure of the angle associated with those sides.

Basic problem solving steps

1. See: Draw it
2. Ask: "what do we know?"
3. Ask: "what do we need?"
4. Ask: "which of my tools will help me here?"

Trig ratios applied

We have learned that the trig functions are valuable additions to our tool chest:

- Grade of road, track, etc.
- Angles of elevation and depression
- Vectors
- Area of regular polygons

In each of these problem areas, we realized we could construct a right triangle (draw it). We then figure out what we know. Do we have angles and/or sides? Which ones? This with what we want to find will tell us which of our trig functions to use.

Chapter 9 Review

Grade

- Slope of the surface.
- Slope is rise (change in y) over run (change in x).
- Can be expressed as a fraction.
- Can be expressed as a % which is parts of 100.

Angles of elevation and depression

- Measured from a horizontal line through the view point.
- **FROM** the view point up/down **TO** the viewed object.
- Parallel reference (horizontal) lines with the line-of-sight (transversal) create alternate-interior-angles.

Vectors

- Any quantity with direction and magnitude.
 - Course and speed of airplane, ship, etc.
 - Forces acting on a body.
 - Travel directions
- Described by:
 - Ordered pair $\langle x, y \rangle$ which is coordinate of head
 - Compass direction: x° north of east (for example)
- Add vectors:
 - Add ordered pair coordinates.
 - Tail-to-head
 - Sum is called the *resultant vector*.

Area of regular polys

- $A = \frac{1}{2}ap$
- Know poly parts: center angle, radius, apothem, side.
- Draw right triangle with sides: radius, apothem and $\frac{1}{2}$ poly side.
- Use center angle to determine triangle angle ($\frac{1}{2}$ center angle).
- Use appropriate trig function to find missing parts.

Area of triangles given SAS

- If given 2 sides b, c and included angle A then $Area = \frac{1}{2}bc(\sin A)$

Homework Assignment

p. 508 #1-16, 18-24, 26-29