Chapter 3&4 Review: Trigonometry

Textbook p.116-154, 162-200
Summary: p.128, 153, 174, 199
Practice Questions p.154, 200

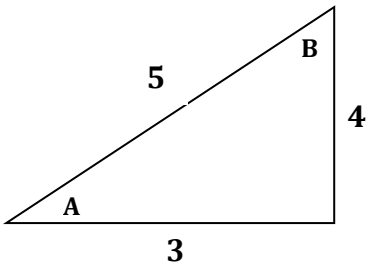
Key Concepts: Basic Trig Rations, Cosine Law, Sine Law, The Ambiguous Case

Basic Trigonometry Ratios
These ratios only apply to _____ _____.

SOH CAH TOA

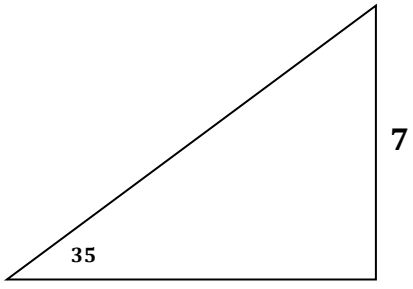
$\sin X = \frac{opposite}{hypotenuse}$ $\cos X = \frac{adjecent}{hypotenuse}$ $\tan X = \frac{opposite}{adjacent}$

Example: Find both angles using sine, cosine and tangent.



To Find Angle A	To Find Angle B

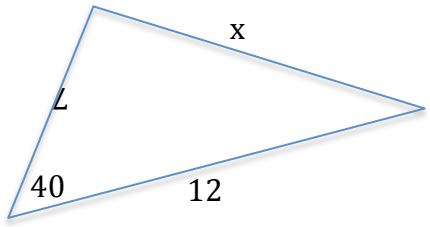
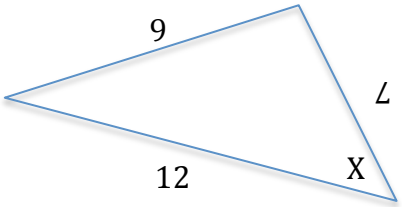
Example #2: Find the hypotenuse



Cosine Law

For non-right triangles where you are given _____ or _____.

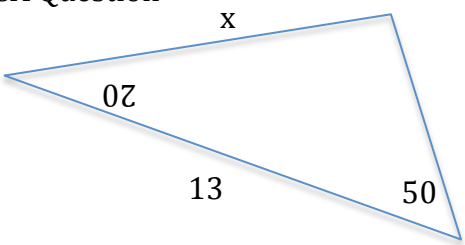
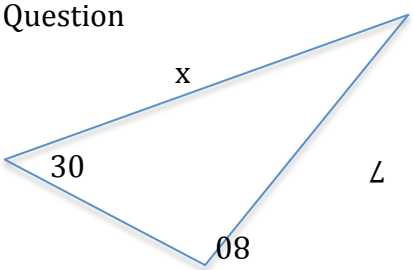
$$a^2 = b^2 + c^2 - 2bc\,cosA$$

Example #1	Example #2
SAS Question  	SSS Question 
Solution	Solution

Sine Law

For non-right triangles where you are given _____ or _____.

$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$$

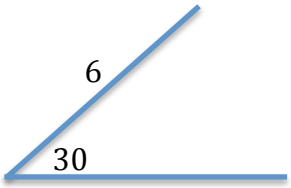
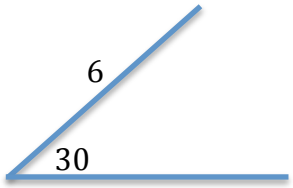
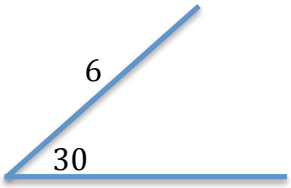
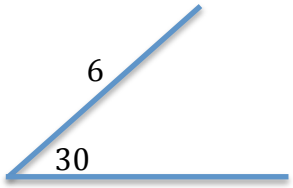
Example #1	Example #2
ASA Question  	AAS Question 
Solution	Solution

The Ambiguous Case of the Sine Law

For triangles where you are given _____, there may be no solutions, one solution or two solutions.

To determine which case you have, compare the second given side to the _____ of the triangle.

Example: One angle is 30, the adjacent side is 6, and the next side is….

Case #1 (no solution)	**Case #2 (one solution - right)**
	
Case #3 (one solution - obtuse)	**Case #4 (two solutions - ambiguous)**
	

Key Example: A landowner says that his property is triangular, with one side 500 m long and another side 350 m long. The opposite angle to the 350 m side measures 20°. Determine the length of the third side, to the nearest metre. Show your work.

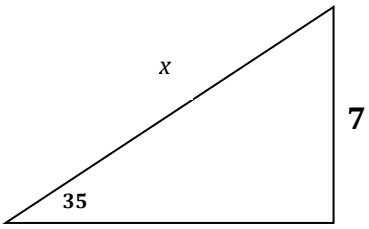
STEP #1

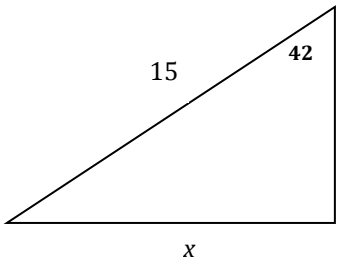
STEP #2

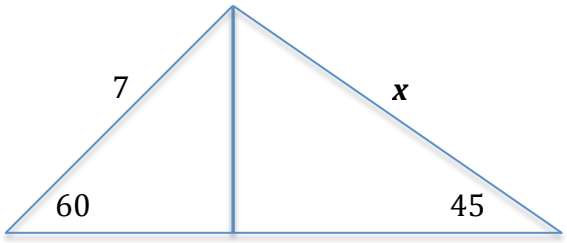
STEP #3

Chapter 3&4 Review: Trigonometry

Practice #1: Find the unknown length or angle for each triangle (x).



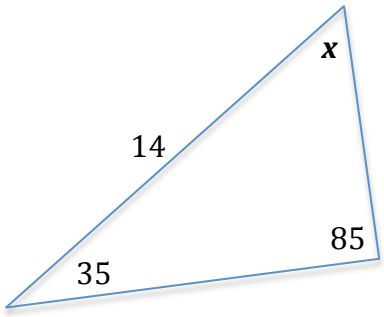


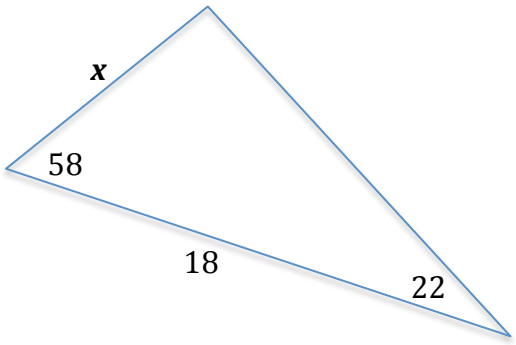


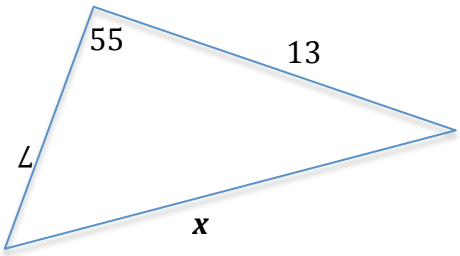
Practice #2: A fireman rests his ladder against a building, making a 57° angle with the ground. The bottom of the ladder is 28 feet from the base of the building. How long is the ladder?

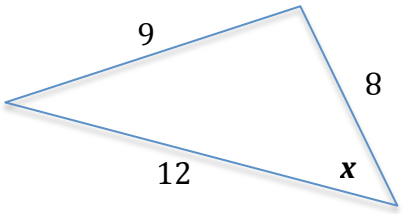
Practice #3: The pilot of an airplane in flight looks down at a point on the ground that is some distance away. The angle of depression is 28°, and the plane's altitude is 1200 meters. What is the distance from the pilot to the point on the ground?

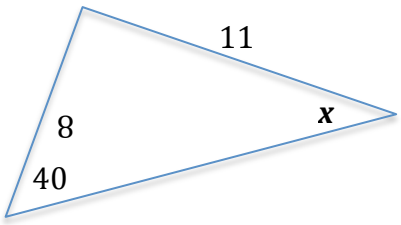
Practice #4: Find the unknown length or angle for each triangle (x).

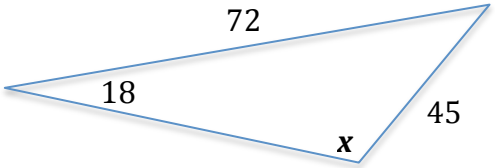












Practice #5: Solve each of the following triangles (ie. draw the triangle and label ALL of the unknown angles and lengths)

a) In a right triangle ΔPQR, the hypotenuse, q, is 12 m long and $\angle P = 25°$. Determine the length of sides p and r to the nearest tenth of a metre.

b) In ΔABC, $\angle A = 65°$, $a = 23.5$ cm, and $\angle C = 71°$. Determine the length of side c to the nearest tenth of a centimetre.

c) In ΔXYZ, $\angle X = 50°$, $\angle Y = 80°$, and $z = 14$ cm,. Determine angle Z, to the nearest tenth of a degree.

Practice #6: For each description below determine if there are zero, one, or two possible triangles.

a. In ΔDEF, d = 5cm, e = 3cm, f = 9cm .

b. In ΔABC, ∠A = 25 ,b = 3m, c =10m .

c. In ΔJKL, ∠J = 55, j =10.4km, k =11.6km.

d. In ΔPQR, ∠P =17, ∠Q =110, r = 26mm.

e. In ΔFUN, ∠F = 75, f = 25cm, n = 47cm.

Practice #7: Write another sine ratio that is equivalent to sin 44°.

Practice #8: Determine two angles between 0° and 180° that have the sine ratio 0.8480

Practice #9: At Science World, there is a giant pendulum on display. The line is 30 feet long, and when the pendulum swings from side to side, the horizontal distance it travels is 8 ft. Determine the angle through which the pendulum swings. Round your answer to the nearest inch.

Practice #10: Two boats leave the dock at the same time. One is going an average of 30 km/h in the direction N30W, and the other is going an average of 24 km/h in the direction N25E. How far apart are the boats after 1.5 hours?

Practice #11: A radio tower is supported by two wires on opposite sides. On the ground, the ends of the wire are 235 m apart. One wire makes a 75° angle with the ground. The other makes a 55° angle with the ground. Draw a diagram of the situation. Then, determine the length of each wire to the nearest metre.

Practice #12: In a parallelogram, two adjacent sides measure 17 cm and 14 cm. The shorter diagonal is 11 cm. Determine, to the nearest degree, the measures of the larger angles in the parallelogram.

Practice #13: A canoeist leaves the dock and paddles toward a buoy 140 m away. After reaching the buoy, she changes directions and paddles another 80 m. From the dock, the angle between the buoy and the canoeist's current position measures 25°. How far is the canoeist from the dock? Give two possible answers. Show your work.

Practice #14: A farmer finishes repairing a fence post and then walks 200 yd through his corn field. He turns and walks another 250 yd east, until he can see the fence post directly southwest of him. He realizes that he left some of his tools at the fence post and heads directly back to it. How far does he need to walk, to the nearest metre?