

Advanced Algebra Chapter 13 Outline

13-1

Day 1: 4, 5, 6, 7, 8, 15, 16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28 (17)

Day 2: 9, 10, 11, 12, 13, 14, 29, 31, 33, 35, 37, 41, 42, 43, 44, 50 (16)

13-2

20, 22, 24, 28, 30, 32, 34, 36, 38, 44, 46, 48, 50, 52, 55, 56, 57, 58, 62, 63 (20)

13-3

18, 20, 22, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 53, 54, 62, 64, 66 (22)

13-4

Day 1: 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 (14)

Day 2: 28, 30, 32, 34, 36, 38, 39, 40, 46, 48, 50 (11)

Wksts on 13-1, 13-2, 13-3, and 13-4

Quiz on 13-1, 13-2, 13-3, and 13-4

13-5

10, 12, 14, 16, 18, 20, 28, 29, 32, 36, 37, 42, 44 (13)

13-6

12, 14, 16, 17, 18, 19, 20, 21, 22, 29, 30, 31, 32, 37, 38, 39, 40, 41, 42, 45, 46, 48, 50 (23)

13-7

16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 45, 46, 53, 54, 58, 60, 62 (20)

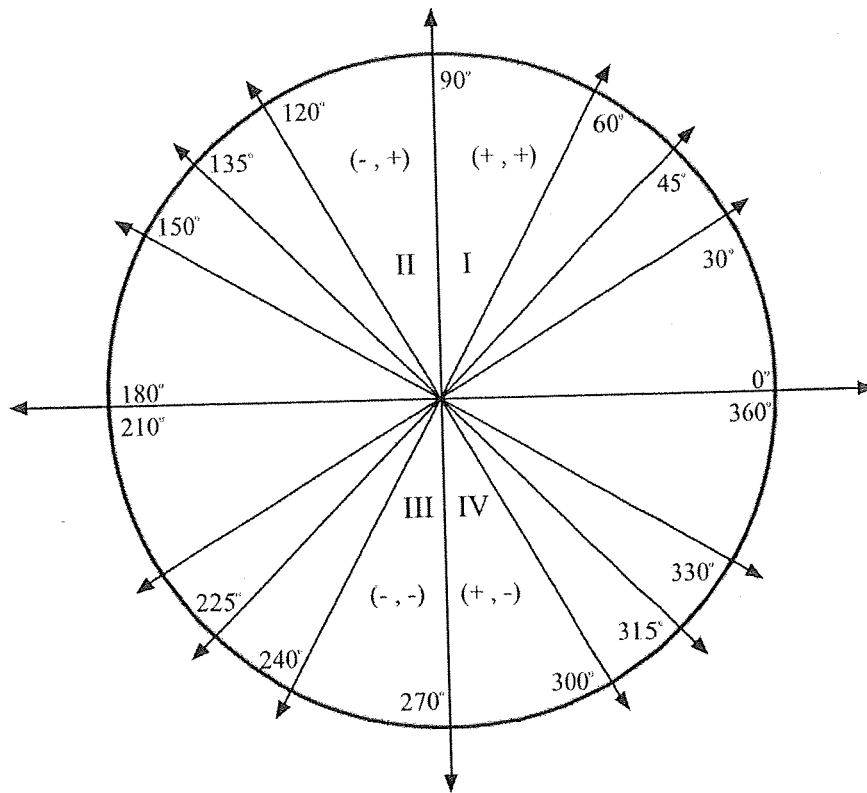
Review

P.753-756 2-50 even, Quiz on 13-5 and 13-6

Review

Page 757, 1-25

Chapter 13 Test



13-1 Right Triangle Trigonometry

Day 1

Objective: Find values of Trig Function for acute angles.
Solve problems involving right triangles.

I. **Trigonometry:** The study of the relationships among the angles and sides of a right triangle.

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

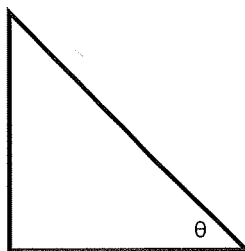
$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

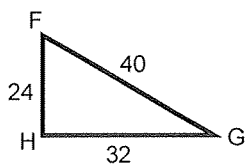
$$\csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\cot \theta = \frac{\text{adj}}{\text{opp}}$$



Ex 1) Find the values of the six trig functions for angle G.

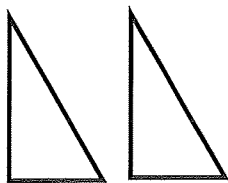


Ex 2) If $\cos A = 2/5$, find the value of $\tan A$.

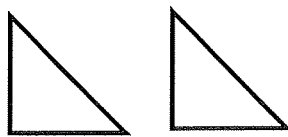
Ex 3) If $\tan A = 5/3$, find the value of $\csc A$.

Special Right Triangles—page 703

30-60-90

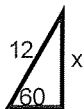


45-45-90

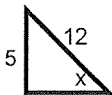


Find x . Round sides to the nearest tenth and angles to the nearest degree.

Ex 4)

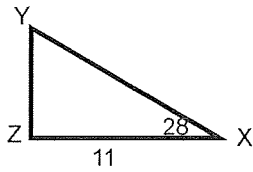


Ex 5)

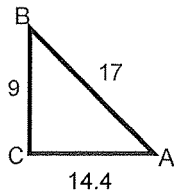


Day 2 on Right Triangle Trigonometry

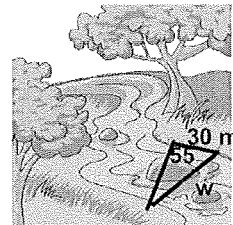
Ex 1) Solve triangle XYZ. Round side lengths to the nearest tenth and angles to the nearest degree.



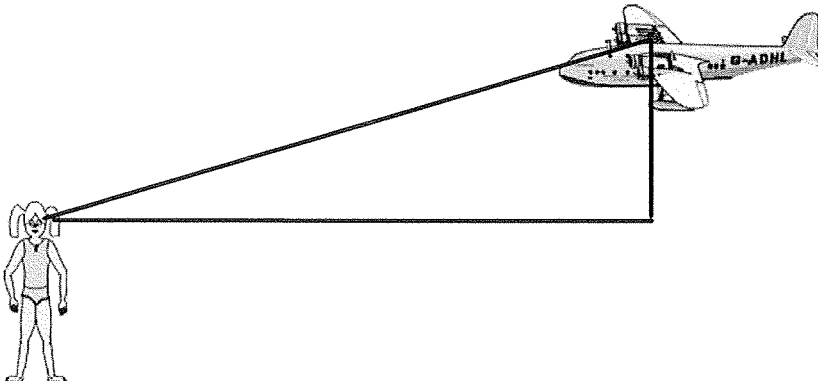
Ex 2) Solve triangle ABC.



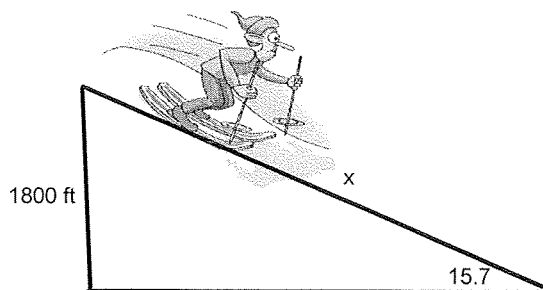
Ex 3) Find the width of a river using the diagram.



Some story problems will talk about an angle of elevation or angle of depression.



Ex 4) **Skating:** A ski run has an angle of elevation of 15.7° and a vertical drop of 1800 feet. Estimate the length of this run.

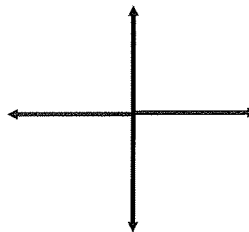


13-2 Angles and Angle Measure

Objective: Change radian measure to degree measure and vice-versa.
Identify Coterminal Angles.

Angle Measurement—

Standard position: an angle with an initial side on the positive x-axis and vertex at the origin.



Positive Angle Measures—Counterclockwise

Negative Angle Measures—Clockwise

360

390

Ex 1) Draw an angle with the given measure in standard position.

a) 210

b) -45

c) 540

Radian Measure—another way to measure angles.

One radian is a ratio of the arc length of a unit circle to its radius.

See page 711.

Conversion:

Radians to Degrees: multiply by $180/\pi$

Degrees to Radians: multiply by $\pi/180$

Ex 2) 30

Ex 3) $\frac{5\pi}{3}$

Ex 4) -45

Ex 5) $\frac{-2\pi}{3}$

Coterminal Angles—when 2 angles in standard form position have the same terminal side.

Ex)

Ex 6) Find 1 positive and 1 negative coterminal angle.

a) 210

b) $\frac{\pi}{3}$

13-3 Trigonometric Functions of General Angles

Objective: Find values of trig functions for general angles.
Use reference angles to find values of trig functions.

Trig functions, angle in standard position

$$r = \sqrt{x^2 + y^2}$$

$$\sin \theta =$$

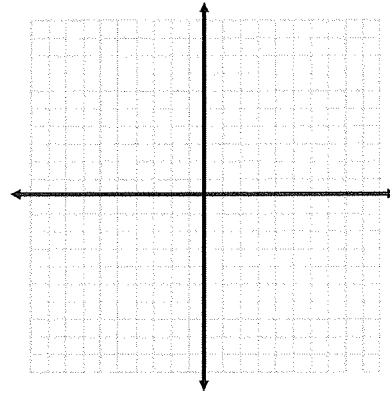
$$\cos \theta =$$

$$\tan \theta =$$

$$\csc \theta =$$

$$\sec \theta =$$

$$\cot \theta =$$



Ex 1) Find the exact values of the 6 trig functions of θ if the terminal side of θ contains the point $(5, -12)$.

Quadrantal Angles—have terminal side on the x- or y-axis.

Reference Angles—acute angle formed by the terminal side of the angle and the x-axis.

Ex 2) Sketch each angle and reference angle.

A) 330

B) $\frac{-5\pi}{6}$

C) 110

Use the reference angle to find a trig value.

Ex 3) $\sin 135$

Ex 4) $\cos 210$

Ex 5) $\cot \frac{7\pi}{3}$

Ex 6) $\csc \theta = -5/3$. Find the exact value of the remaining trig functions.

13-4 Law of Sines

Day 1

Objective: Solve problems by using the law of sines.

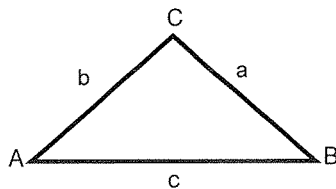
Determine whether a triangle has one, two, or no solutions.

Area of a Triangle:

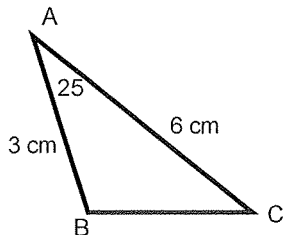
$$A = .5bc \sin A$$

$$A = .5ac \sin B$$

$$A = .5ab \sin C$$

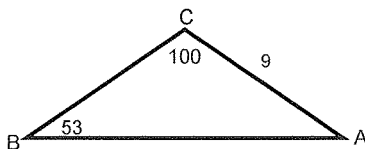


Ex 1) Find the area of triangle ABC to the nearest tenth.

Law of Sines—does not require a right triangle...works for any triangle.

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

Ex 2) Solve Triangle ABC.



Ex 3) Solve triangle ABC.

$$A = 25$$

$$a = 13$$

$$b = 12$$

Rule: If the side opposite the angle given is larger than the other side given, then there is one triangle. If not, then there are 2 or 0 triangles formed.

Day 2 on 13-4

Ex 1) Solve triangle ABC. $A = 25$, $a = 5$, $b = 10$

Determine whether triangle ABC has no solution, one, or two. Then solve if possible.

Ex 2) $A = 118$, $a = 20$, $b = 17$

Ex 3) $A = 39$, $a = 10$, $b = 14$

Ex 4) $A = 50$, $a = 5$, $b = 9$

13-5 Law of Cosines**Objective:**

Solve problems by using the Law of Cosines

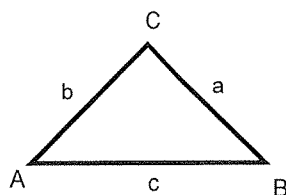
Determine whether a triangle can be solved by first using the law of sines or cosines.

Law of Cosines

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

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

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

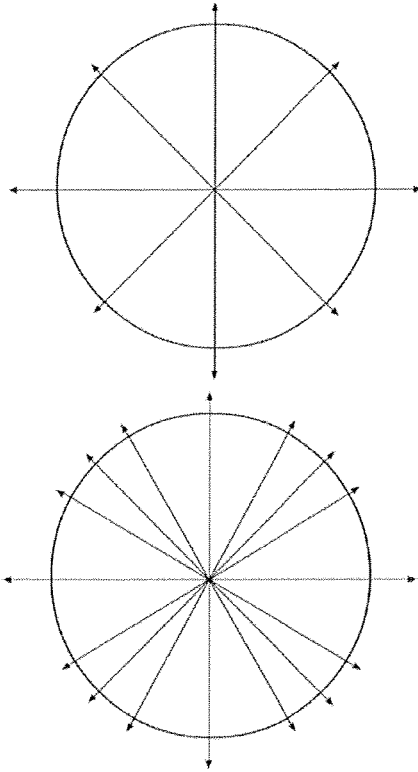
Ex 1) Solve triangle ABC. $C = 73$, $b = 10$, $a = 7$ Ex 2) Solve triangle ABC. $a = 9$, $b = 7$, $c = 12$

Ex 3) A helicopter flies 55 mph from its base at point C to an accident at point B, then 35 miles to the hospital at point A. Angle B equals 42 degrees. How far will the helicopter have to fly to return to its base from the hospital?



13-6 Circular Functions

Unit circle:



Given the point P on the unit circle. Find $\sin \theta$ and $\cos \theta$.

Ex 1) $P\left(\frac{2\sqrt{2}}{3}, -\frac{1}{3}\right)$

Period Function: see page 741

Find the exact value.

Ex 2) $\cos 675$

Ex 3) $\sin \left(-5\frac{\pi}{6} \right)$

Determine the period.

Ex 4) graph $y = \tan x$

Ex 5) graph $y = \sec x$

13-7 Inverse Trig Functions**Objective:**

Solve equations by using inverse trig functions.

Find the values of expressions involving trig functions.

Trig Functions and Their InversesA) Graph $y = \sin x$

B) Discuss inverse and why we limit the domain.

Inverse sin, cos, and tan

$$y = \text{Sin}^{-1} x \text{ or } y = \arcsin x$$

$$y = \text{Cos}^{-1} x \text{ or } y = \arccos x$$

$$y = \text{Tan}^{-1} x \text{ or } y = \arctan x$$

Write each equation in the form of an inverse.

Ex 1) $\sin 30 = (1/2)$

Ex 2) $\cos a = b$

Solve each equation by finding x to the nearest degree.

Ex 3) $\sin x = \frac{\sqrt{3}}{2}$

Ex 4) $x = \text{Arctan } 1$

Find each value. Write angle measures in radians. Round to the nearest hundredth.

Ex 5) $\text{Cos}^{-1} (-.5) =$

Ex 6) $\sin (\sin^{-1} .5) =$

Ex 7) $\sin (2\text{Arcsin } .5) =$