***Pre-Calculus: Chapter 2***

***Trigonometry***

**2.1 – Angles In Standard Position**

Standard Position – when an angle is formed by two rays. The starting leg (always on the x axis) is the initial arm. The leg that creates the angle is the terminal arm. The vertex of the angle must be at the origin or the Cartesian plane.

Cartesian Planes - are all 90 degrees.

Page 75 – go through #1, 2, 3ac

Reference angle – an acute angle whose vertex is at the origin. The angle is always towards the x-axis.

Exact values – These answers involve radicals. Never use your calculator to get an exact value.

Ex. Find the missing sides.

X y 3 y

3 x

CAST rule – shows where sin, cos, tan are positive and negative.

Examples:

1. Sketch each angle in standard position. State the quadrant in which the terminal arm lies. State the reference angle.
   1. 150 b. 60 c. 240 d) 300
2. Find the EXACT values of the following
   1. 150 b. 60 c. 240 d) 300
3. Determine the angle in standard position when an angle of 60 is reflected.
   1. In the y-axis
   2. In the x-axis
   3. In the y-axis and then in the x-axis
4. Write the exact value for all angles between 0˚- 360˚ with the given reference angle:
   1. 30˚ b. 45
5. Determine the measure of three other angles in standard positions that have a reference angle of:
   1. 42° b. 80°

2.2 – Trigonometric Rations of Any Angle

Sin = opp/hyp Cos = adj/hyp Tan = opp/adj

Sin = y/r Cos = x/r Tan = y/x

Syr Cxr Tyx

Review CAST rule.

Examples:

1. The point P(-5,-12) lies on the terminal arm of an angle in standard position. Determine the exact trig ratios for sin, cos and tan.
2. The coordinates of a point P on the terminal arm of each angle are shown. Write the exact trigonometric rations for sin, cos and tan.

(-3,-2)

1. Determine the exact value of sin240 and cos300
2. Suppose Ѳ is an angle in standard position with terminal arm in quadrant III, and tan = 1/5. Determine the exact values of sin and cos.

1. For each description, in which quadrant does the terminal arm of the angle lie?
   1. Cos <0 and tan < 0
   2. Tan >0 and sin > 0
2. Solve sin =
3. Determine the measure of the angle to the nearest degree, give sin = -0.8090. Where 0 ≤ Ѳ <360.

2.3 – The Sine law

You must be given at least one side and its opposite angle.

Sine Law:

If needed, you can find the last angle by subtracting 180 from the 2 given agles.

Examples:

1. Read Example 1 page 102. Determine the distance from Pudluk’s Friend’s cabin to the store.
2. In ΔLMN, <L = 64, l = 25.2 cm and m = 16.5 cm. Determine the measure of <N, to the nearest degree.

***Ambiguous Case Flowchart***

Examples:

1. In ΔABC, <A = 39, a = 14cm and b = 10 cm. Determine the measures of the other side and angles. Express your answers to the nearest unit.
2. Given Δ ABC, a = 20, b= 15, < B = 30
   1. – The Cosine Law

When you are given at least 2 sides.

c2 = a2 + b2 – 2abcosC (c and <C come opposite of each other)

Examples:

1. Nina wants to find the distance between two points, A and B, on opposite sides of a pond. She locates a point C that is 35.5 m from A and 48.8 m from B. If the angle at C is 54, determine the distance AB, to the nearest tenth of a meter.
2. A triangular brace has side lengths 14m, 18m, and 22 m. Determine the measure of the angle opposite the 18m side, to the nearest degree.
3. In ABC, a = 9, b = 7 and <C = 33.6. Sketch a diagram and determine the length of the unknown side and the measures of the unknown angles, to the nearest tenth.