**Grade 11 Review – Trigonometry**

The relationship between the coordinates of a point on the end of terminal arm, the length of this terminal arm and the angle in standard position can be expressed by three trigonometric functions as shown below; note that r2 = x2 + y2

**y**

**Terminal Arm**

**Angle in**

**Standard**

 **Position**

**Angle in Standard Position**

**P(x**, **y)**

**Terminal Arm**

**Related**

**Angle (RA)**

**Related**

**Angle (RA)**

θ

**x**

**  **

**Example 1**

Determine the three trigonometric ratios of a terminal arm that extends to the point (-2, 5).

The “CAST Rule” is used to determine the sign (+ or -) when evaluating a trigonometric ratio.

**Example 2**

Determine the sign of each trigonometric expression below; do not evaluate.

a) sin(210o) b) cos(-92o) c) tan (4800)

**S**

**A**

**T**

**C**

When an angle is calculated using an inverse trigonometric function, there are an infinite number of solutions; a calculator will only give you one of these solutions. You need to do further analysis using knowledge of the CAST Rule and related angles to find other solutions.

**Example 3**

Solve the following trigonometric equations given

a) sinθ = 0.8 b) cosθ = -0.3 c) tanθ = 0.5

**Example 4**

For the previous example, find four other solutions (co-terminal angles) for sinθ = 0.8 outside of the limits .

The trigonometric measure for special angles (30o, 45o, and 60o) can be determined by memorizing the following two triangles:

**2**

**60o**

**45o**

**30o**

**45o**

**Example 5**

Determine the exact value of each trigonometric expression.

a) sin(60o) b) cos(450) c) tan(30o)

The trigonometric ratio of any non-acute angle can by determined by evaluating the ratio of its related angle then changing the resulting sign to a negative if required as per the CAST rule.

**Example 6**

Determine the value of each trigonometric expression; be exact if possible.

a) sin(1350) b) cos(510o) c) tan(-120o)

Each primary trigonometric function has a corresponding reciprocal function as follows.

**  **

**Example 7**

Evaluate each expression.

a) **** b) ****

**Example 8**

Solve each equation given

a) **** b) ****

**Practice**

1. Determine the three trigonometric ratios for a terminal arm that extends to the point (5, -12) and determine the angle in standard position.

2. Determine the sign of each trigonometric ratio using the CAST rule.

a) sin(800o) b) cos(-120o) c) tan(1200)

3. Solve the following trigonometric equations given

a) sinθ = -0.5 b) cosθ = 0.3 c) tanθ = 1.2

4. Determine 2 co-terminal angles (one position and one negative) for the angle 125o.

5. Determine the exact value of each trigonometric expression.

a) sin(300o) b) tan(420o)

6. Evaluate each expression.

a)  b) sec(-5850)

7. Solve each equation;

a)  b) 

8. Use the formulas SYR CXR TXY to verify/prove the following identities:

 a)  b) 

9. Use your understanding of the CAST rule and related angles to explain why the following is true:

 

**Solutions**

1.a) sinθ = -12/13, cosθ = 5/13, tanθ = -12/5, θ = 292.6o, 2.a) positive, b) negative, c) negative

3.a) θ = 210o or 330o b) θ = 72.5o or 287.5o c) 50.2o or 130.20 4. 485o or -235o

5. , b) , 6. a) b) , 7. a) No solution, b) θ = 45o or 225o

8. Change , etc… then replace y2 + x2 with r2.

9. Same related angle (and values for x and r) by rotating clockwise or anticlockwise from the initial arm.