2.2 – TRIGONOMETRIC RATIOS OF ANY ANGLE

In grade 10, we have defined trigonometric ratios for acute angles (between 0o and 90o) in a **right triangle** using SOH CAH TOA.

This year, we will extend the definition to any angle (not necessarily part of a right triangle).

You need to remember that the **sign of a ratio depends on the quadrant** of the terminal arm, and the **numerical value (without the sign) depends only on the reference angle**.

If we remember that the cos and sin values can be found on the unit circle with the coordinates of the points on the circle, and that , then we get:



We remember which ratio is positive with the acronym ASTC:

“All Students Take Calculus”

**Applications: Determining a Ratio** *I suggest to* ***always sketch*** *the situation*

Examples: Finding a Ratio when the reference angles are SPECIAL:

*Use the quadrant and the reference angle*

a) determine :

b) determine :

c) determine the 3 trigonometric ratios for 300o:

Examples: Finding a Ratio when the reference angles are NOT SPECIAL

*You just need to type it in your calculator*

Determine an approximation of to the nearest hundredth:

Note that the sign of the answer makes sense…

Examples: Finding an exact Ratio when we don’t know the angle:

*You will need to use* ***SOH CAH TOA*** *in a right triangle involving the reference angle*

a) P(-8, 15) is on the terminal arm of an angle in standard position.
Determine the exact values of the 3 trigonometric ratios , .

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Note that if you try to find the angle, you won’t get an exact value…

b) An angle is in quadrant III and we know that .
Determine the exact values of

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**Applications: Determining Angles given a Ratio – Solving Equations**

*Determine the quadrant(s) using the sign, and the reference angle using the value,
Then position the reference angle in the possible quadrants to find the angle(s)*

Examples: when the Ratios are SPECIAL

a) Solve for

b) Solve for

c) Solve for

d) Solve for

Examples: when the Ratios are NOT special

a) Solve for

b) Solve for

Hwk: p 96 # 1 – 13, 15, 18, 19, 22, 29.