NAME_____DATE_____PER_____

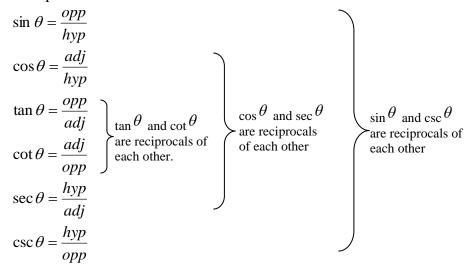## 1) DEFINITIONS:

    a) **Angle**: Two rays with a common endpoint.

    b) **Angle in Standard Position**: Angle with initial side on the positive side of the x-axis, vertex at the origin, terminal side rotates clockwise (negative angle) or counterclockwise (positive angle).

    c) **Coterminal Angles**: Angles in standard position sharing their terminal sides.

    d) **Quadrantal Angle**: Angle in standard position with its terminal side lying on the x or y axis. (Multiples of 90).

    e) **Reference Angle**: Acute, positive, and formed by the terminal side of an angle in standard position and the x-axis.

## 2) ANGLE MEASUREMENT CONVERSION:

    a) **Degree, min., sec. to decimal:** Divide seconds by 60, add to minutes, divide new amount by 60.

    b) **Decimals to degree, min., sec:** Multiply decimal by 60. The whole number part of the answer is the minutes. Multiply the remainder decimal by 60 and round to the nearest whole number. The last part is the seconds.

## 3) RIGHT TRIANGLE TRIGONOMETRY (SOHCAHTOA): The first three are the main ratios, the last three are the reciprocal ratios. Follow the brackets:

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

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

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

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

$\tan\theta$ and $\cot\theta$ are reciprocals of each other.

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

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

$\cos\theta$ and $\sec\theta$ are reciprocals of each other

$\sin\theta$ and $\csc\theta$ are reciprocals of each other

The reciprocal ratios can also be defined as follows: $\csc\theta = \dfrac{1}{\sin\theta}$ and $\sin\theta = \dfrac{1}{\csc\theta}$ , and so on.

## 4) TRIGONOMETRIC VALUES OF SPECIAL ANGLES:

| $\theta$ | $\sin\theta$ | $\cos\theta$ | $\tan\theta$ |
|---|---|---|---|
| 30° | | | |
| 60° | | | |
| 45° | | | |

### MEMORIZE THIS TABLE!!!!

## 5) CO-FUNCTIONS:

The prefix "co" in front of cosine, cotangent and cosecant, refers to the term "complementary". Recall that two angles are complementary if their sum $= 90°$.

The following functions are co-functions:
- sine and cosine
- tangent and cotangent
- secant and cosecant

Notice the only difference in their names is the prefix **"co".**

If two functions are co-functions, and the angles are complementary, then they are equivalent. Ex: $\sin 30° = \cos 60°$. Can you find other examples?

## 6) THE UNIT CIRCLE: Draw and mark 1)the unit circle, and 2) and angle in standard position in quadrant I with terminal side passing through (x,y).
Based on your drawings:
- In the unit circle x =          and y = .
- If the circle is not the unit circle, x =          and y =
- Know how to find the values of all six trigonometric functions for quadrantal angles.

## 7) SIGNS OF TRIGONOMETRIC FUNCTIONS IN EACH QUADRANT:

|      | $\sin\theta$ | $\cos\theta$ | $\tan\theta$ | $\cot\theta$ | $\sec\theta$ | $\csc\theta$ |
|------|------|------|------|------|------|------|
| QI   |      |      |      |      |      |      |
| QII  |      |      |      |      |      |      |
| QIII |      |      |      |      |      |      |
| QIV  |      |      |      |      |      |      |

## 8) SOLVING TRIANGLES: Find the missing angle(s) and/or side(s) measurements.
- If the triangle is a right triangle then use the right triangle ratios. (SOHCAHTOA)
- If the triangle is not a right triangle then use the Law of Sines or Law of Cosines.

## 9) LAW OF SINES: (ASA or AAS. If SSA → ambiguous case)

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

## 10) LAW OF COSINES: (SSS or SAS. If SSS, begin by finding the largest angle).

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

## 11) AREA OF TRIANGLES:

**Trigonometric Definition:** Area of a triangle $= \dfrac{1}{2}$ (length of a side)(length of a side)(sine of the included angle).

- $A = \dfrac{1}{2}bc\sin A$    or    $A = \dfrac{1}{2}ab\sin C$    or    $A = \dfrac{1}{2}ac\sin B$

- **Hero's Formula:** $A = \sqrt{s(s-a)(s-b)(s-c)}$    $s = \dfrac{P}{2}$