

Trigonometry

$$\sin \theta = \frac{y \text{ (opp.)}}{r \text{ (hyp.)}} \quad \cos \theta = \frac{x \text{ (adj.)}}{r \text{ (hyp.)}} \quad \tan \theta = \frac{y \text{ (opp.)}}{x \text{ (adj.)}}$$

Use Pythagoras to find the 3 trigonometric ratios when given a point.

$$x^2 + y^2 = r^2$$

When solving for an angle:

- **Determine the reference angle (θ_r)**
- **Use the CAST rule to decide which quadrants contain the terminal arm**
- **Use the reference angle to calculate the angles:**
 - **QI** ($\theta = \theta_r$)
 - **QII** ($\theta = 180^\circ - \theta_r$)
 - **QIII** ($\theta = 180^\circ + \theta_r$)
 - **QIV** ($\theta = 360^\circ - \theta_r$)

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

- **Ambiguous Case**
 - **Two solutions**
 - **One solution (90°)**
 - **No solution (Error)**

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

Know your Unit Circle!!

1. $P(12, -3)$ is a point on the terminal arm of angle θ . Find the primary trigonometric ratios for angle θ .

2. Solve: $\tan \theta = -\frac{4}{3}, 0^\circ \leq \theta \leq 360^\circ$

3. Solve: $\sin \theta = -\frac{\sqrt{3}}{2}, 0^\circ \leq \theta \leq 360^\circ$

4. Use your unit circle to find the exact value of the following:

a) $\cos 225^\circ$

c) $\tan 330^\circ$

b) $\sin 120^\circ$

d) $\sin 180^\circ$

5. Determine the angles in standard position for each quadrant that have a reference angle of 35° .

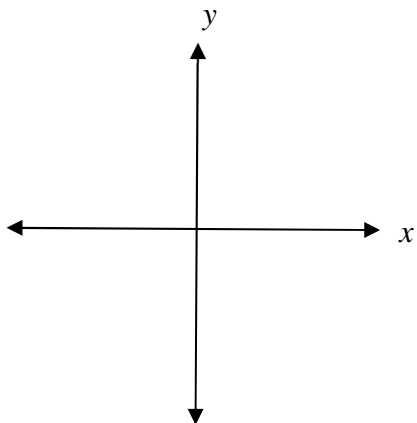
6. In $\triangle ABC$, $c = 10$ cm, $\angle C = 52^\circ$, and $\angle B = 60^\circ$. Find side b .

7. In $\triangle ABC$, $c = 10$ cm, $b = 9$ cm, and $a = 8$ cm. Find $\angle C$.

8. In $\triangle ABC$, $\angle A = 60^\circ$, $a = 11$, $b = 12$. Solve for $\angle B$.

9. Draw the following angles in standard position.

a) 135°



b) -305°

