

Introduction to Trigonometry: Angles & Measurement

Trigonometry Worksheet · Grade 9–11

Name: _____

Date: _____

Learning Objectives

- Identify and define angles in standard position, including initial and terminal sides
- Distinguish between positive and negative angles based on direction of rotation
- Convert between degree measure and radian measure

Problems

1. Trigonometry is defined as a branch of mathematics that shows the relationship between the sides and angles of a triangle. Name THREE types of triangles mentioned in the video.

2. An angle is in standard position when its initial side lies on the positive x-axis. True or False: The initial side of an angle in standard position can be placed on the negative x-axis.

3. A terminal side rotates counterclockwise from the positive x-axis. Is the angle formed positive or negative? Explain your reasoning.

4. Identify the quadrant in which the terminal side of a 230-degree angle (in standard position) lies.

230°

5. A terminal side forms an angle of negative 150 degrees. Describe the direction of rotation and identify the quadrant of the terminal side.

−150°

6. A full rotation of the terminal side around the XY plane equals 360 degrees. Express a full rotation in radians using pi.

360° = ?

Scan to watch



7. Convert 180 degrees to radians. Use the conversion formula: radians equals degrees multiplied by pi over 180.

$$180^\circ \times \frac{\pi}{180}$$

8. Convert 270 degrees to radians. Express your answer as a fraction of pi.

$$270^\circ \times \frac{\pi}{180}$$

9. Two angles share the same terminal side position. One measures positive 230 degrees and the other measures negative 130 degrees. Are these angles coterminal? Verify by checking if their difference is a multiple of 360 degrees.

$$230^\circ - (-130^\circ) = ?$$

10. An angle in standard position has its terminal side in Quadrant II. The reference angle is 40 degrees. Find both the positive angle measure and the corresponding negative angle measure for this terminal side position.

$$\theta_{positive} = 180^\circ - 40^\circ, \quad \theta_{negative} = \theta_{positive} - 360^\circ$$

Scan to watch



Introduction to Trigonometry: Angles & Measurement — Answer Key

Trigonometry Worksheet · Grade 9–11

Answer Key

1. Answer: Right triangle, scalene triangle, acute triangle

- Recall the triangle types discussed in the video introduction.
- The video mentions: right triangles, scalene triangles, and acute triangles.

2. Answer: False

- By definition, an angle in standard position always has its initial side on the positive x-axis.
- It cannot be on the negative x-axis or the y-axis, so the statement is False.

3. Answer: Positive, because counterclockwise rotation produces a positive angle.

- Positive angles are formed when the terminal side rotates counterclockwise (to the left).
- Negative angles are formed when the terminal side rotates clockwise (to the right).
- Since the rotation here is counterclockwise, the angle is positive.

4. Answer: Quadrant III

- Quadrant I: 0° to 90° , Quadrant II: 90° to 180° , Quadrant III: 180° to 270° , Quadrant IV: 270° to 360° .
- Since $180^\circ < 230^\circ < 270^\circ$, the terminal side lies in Quadrant III.

5. Answer: Clockwise rotation; Quadrant III

- Negative angles are formed by clockwise rotation of the terminal side.
- Moving clockwise 150° from the positive x-axis places the terminal side in Quadrant III (between -90° and -180°).
- The terminal side lands in Quadrant III.

6. Answer: 2π radians

- One full revolution equals 360 degrees.
- Using the radian conversion: $360^\circ = 2\pi$ radians.
- This is derived from the circumference of a unit circle equaling 2π .

7. Answer: π radians

- Apply the formula: radians = degrees $\times (\pi/180)$.
- radians = $180 \times (\pi/180) = \pi$.
- Therefore, $180^\circ = \pi$ radians.

8. Answer: $3\pi/2$ radians

- Apply the formula: radians = degrees $\times (\pi/180)$.
- radians = $270 \times (\pi/180) = 270\pi/180$.
- Simplify $270/180$ by dividing numerator and denominator by 90: $3/2$.
- Therefore, $270^\circ = (3\pi/2)$ radians.

Scan to watch



9. Answer: Not coterminal; difference is 360° , but -130° ends in Quadrant III at a different position than 230° . Re-check: -130° is in Q III at 230° equivalent — they ARE coterminal.

- Coterminal angles differ by a multiple of 360° .
 - Compute the difference: $230^\circ - (-130^\circ) = 230^\circ + 130^\circ = 360^\circ$.
 - Since 360° is exactly one full rotation (a multiple of 360°), the angles ARE coterminal.
 - Both terminal sides point to the same position in the XY plane.
-

10. Answer: Positive: 140° ; Negative: -220°

- A reference angle of 40° in Quadrant II means the terminal side is 40° away from the 180° axis.
 - Positive angle = $180^\circ - 40^\circ = 140^\circ$.
 - To find the negative coterminal angle, subtract 360° : $140^\circ - 360^\circ = -220^\circ$.
 - Verify: rotating clockwise 220° from the positive x-axis lands in Quadrant II at the same position.
-

