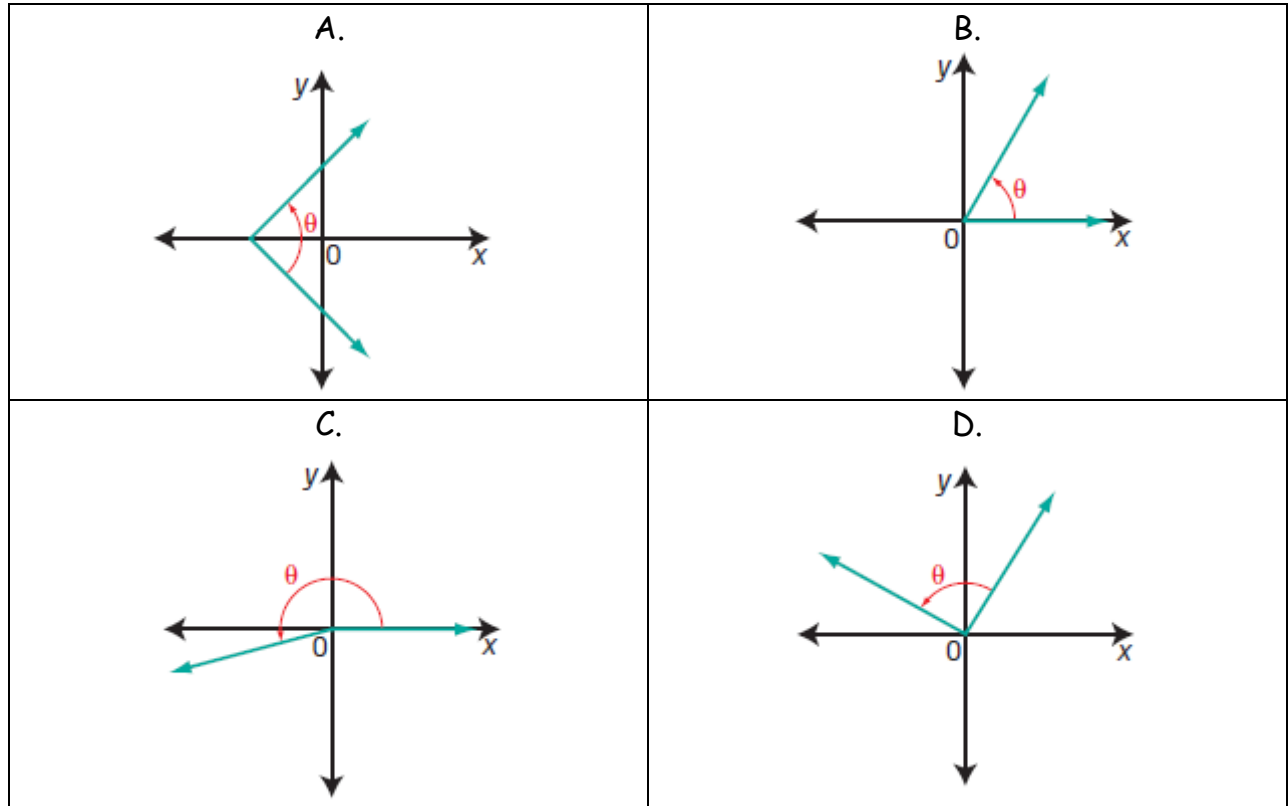


Angles in Standard Position and Reference Angles Practice

Use the information below to answer the first question.

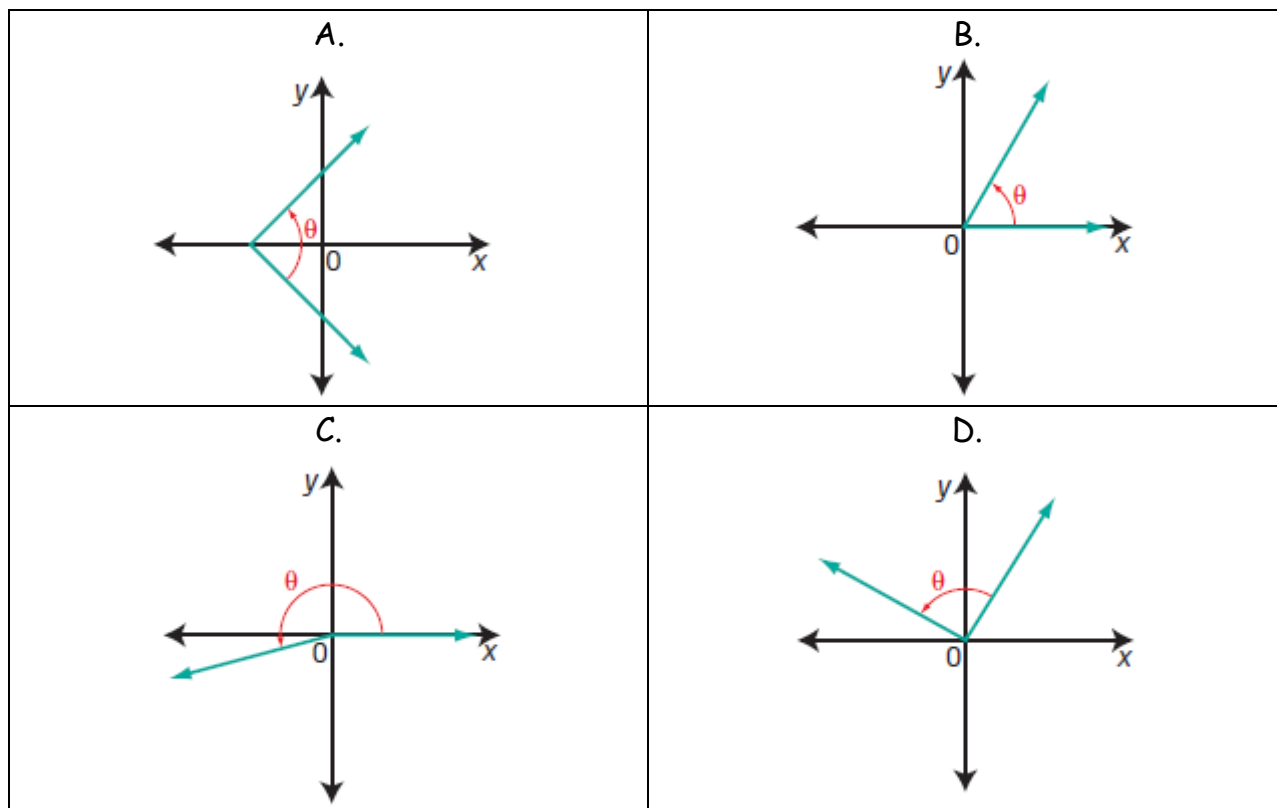


1. The two angles correctly drawn in standard position are  
A) A and B      B) C and D      C) A and D      D) B and C
  
2. If angle  $\theta = 265^\circ$  and is drawn in standard position, which statement below is true?  
A) The terminal arm lies in quadrant 2.  
B) The terminal arm lies in quadrant 4.  
C) The reference angle is  $5^\circ$ .  
D) The reference angle is  $85^\circ$ .

3. Which statement below is false?
- A) In quadrant one, the reference angle is the same as the rotation angle.
  - B) The reference angle for an angle of  $107^\circ$  drawn in standard position is  $73^\circ$ .
  - C) To determine a reference angle in quadrant 4, add  $180^\circ$  to the rotation angle.
  - D) The reference angle is always positive and acute.
4. When a  $60^\circ$  angle is reflected in the x-axis, the angle in standard position is \_\_\_\_\_.
5. Sketch an angle of  $205^\circ$  in standard position. State the quadrant in which the terminal arm lies. Determine the reference angle.
6. Why is the reference angle so important?

## Angles in Standard Position and Reference Angles Practice Solutions

Use the information below to answer the first question.



1. The two angles correctly drawn in standard position are

A) A and B

B) C and D

C) A and D

D) B and C

### Solution

The correct answer is D. Both diagrams B and C show an initial arm on the positive x-axis and a terminal arm having an endpoint of the origin.

Diagram A does not have the endpoints of the two rays as the origin and the initial arm is not on the positive x-axis.

Diagram D does have the endpoints of the two rays as the origin, but the initial arm is not on the positive x-axis.

2. If angle  $\theta = 265^\circ$  and is drawn in standard position, which statement below is true?
- A) The terminal arm lies in quadrant 2.
  - B) The terminal arm lies in quadrant 4.
  - C) The reference angle is  $5^\circ$ .
  - D) The reference angle is  $85^\circ$ .

**Solution**

The terminal arm lies in quadrant 3. Therefore A and B are false.

The reference angle is  $265^\circ - 180^\circ$ , which is  $85^\circ$ .

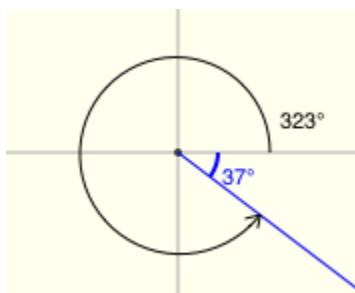
The correct answer is D.

3. Which statement below is false?
- A) In quadrant one, the reference angle is the same as the rotation angle.
  - B) The reference angle for an angle of  $107^\circ$  drawn in standard position is  $73^\circ$ .
  - C) To determine a reference angle in quadrant 4, add  $180^\circ$  to the rotation angle.
  - D) The reference angle is always positive and acute.

**Solution**

To determine the rotation angle in quadrant 4, subtract the rotation angle from  $360^\circ$ .

For example,



Given a rotation angle of  $323^\circ$ , to find the reference angle, we would:

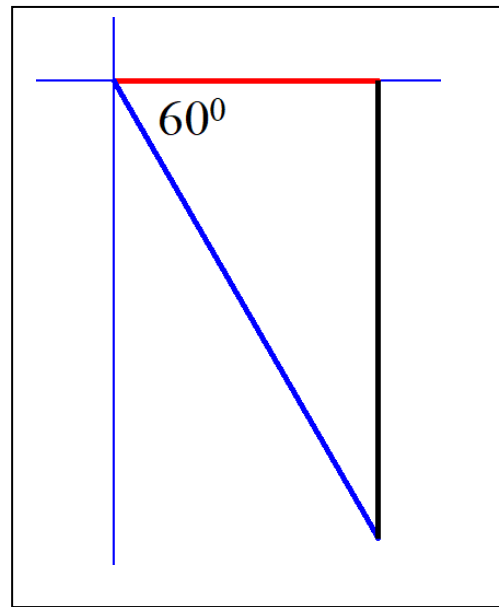
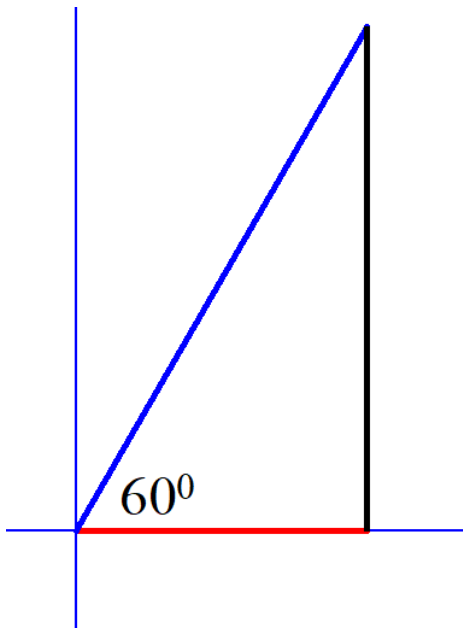
$360^\circ - 323^\circ$ , to get the reference angle of  $37^\circ$

The correct answer is C.

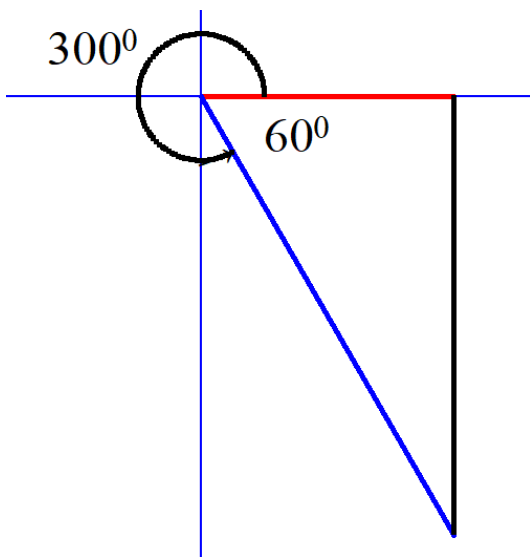
4. When a  $60^\circ$  angle is reflected in the x-axis, the angle in standard position is  $300^\circ$ .

Solution

Given the original  $60^\circ$  angle below left, a reflection in the x-axis would look like the diagram below right:

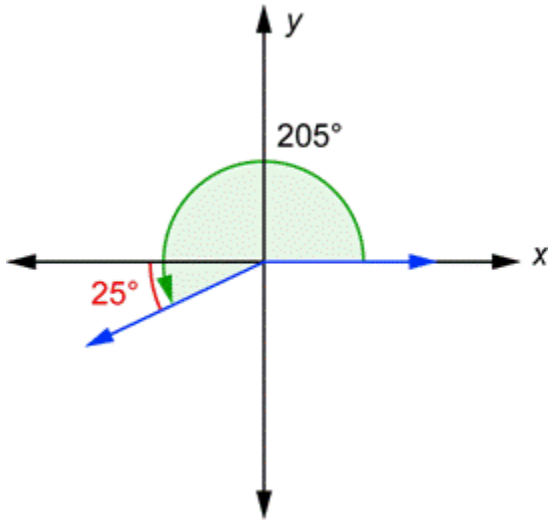


The angle in standard position in quadrant four is  $360^\circ - 60^\circ$ , or  $300^\circ$ .



5. Sketch an angle of  $205^\circ$  in standard position. State the quadrant in which the terminal arm lies. Determine the reference angle.

Solution



The terminal arm lies in quadrant 3. The reference angle is  $205^\circ - 180^\circ$ , or  $25^\circ$ .

6. Why is the reference angle so important?

Solution

For our purposes here, trigonometry is essentially the relationship between an angle and the ratio of sides in a triangle. Reference angles allows us to calculate trigonometric ratios.