# Practice Quiz #9

**FREE RESPONSE**

FRQ 1: During a hike, Jeff and John start at their campsite, point *A*, in the picture to the right and head in a direction that is 30° west of south to a waterfall located at point *B*, which is a 6 mile hike. They then hike to an old Indian Burial ground, located at point *C*, before returning to their campsite which is 8 miles from the burial ground.

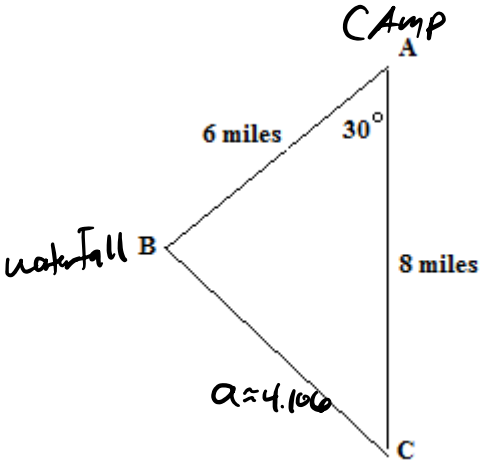
a. Using the given information, how many square miles did Jeff and John hike that day? Show your work.

$A = \frac{1}{2}bc\sin(m\angle A)$

+1 $= \frac{1}{2}(8)(6)\sin(30°)$

$= 24\sin(30°)$

+1 $A = 12 \text{ miles}^2$




b. How far did the two young men hike in all? Use the Law of Cosines to help find your answer.

$a^2 = b^2 + c^2 - 2bc\cos(m\angle A)$

+1 $a^2 = (8)^2 + (6)^2 - 2(8)(6)\cos(30°)$

$a = \pm\sqrt{8^2 + 6^2 - 2(8)(6)\cos(30°)}$

+1 $a \approx 4.106$ miles

$P = 6 + 8 + 4.106$

$P = 18.106$

+1 The two men hiked 18.106 miles.

c. Upon leaving the waterfall, how many degrees did the two turn from their original path to get to the Indian Burial ground? Use the Law of Sines to find your answer.

(1)

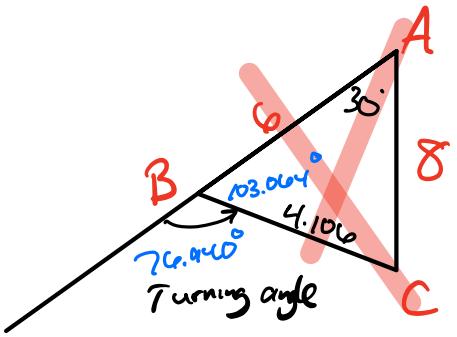
$\frac{\sin(30°)}{4.106} = \frac{\sin(C)}{6}$ +1 +1

$6\sin(30°) = 4.106\sin(m\angle C)$

$\frac{6\sin(30°)}{4.106} = \sin(m\angle C)$

$\sin^{-1}\left(\frac{8\sin(30°)}{4.106}\right) = m\angle C$

$46.940° \approx m\angle C$ +1




(2)

$m\angle B + 46.940 + 30 = 180$

$m\angle B = 103.064°$

(3)

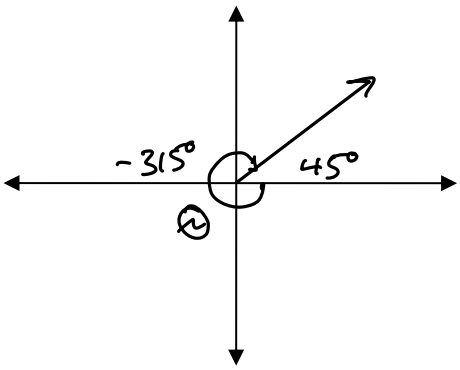
Turning angle + 103.064° = 180

turning angle = 76.940°

+1 The two men turned 76.940° from their original path.

FRQ 2: Angle θ measures -315° and angle β measures $\frac{13\pi}{4}$. Answer the following questions about θ and β.

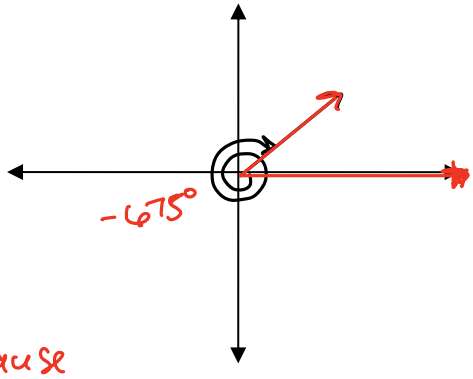
a. Draw the angle θ in standard position using degrees.




b. Identify a negative angle, in degree measure, that is co-terminal with angle θ. Draw this angle and explain why it is co-terminal with θ.

Coterminal : $-315° - 360°$

$: -675°$



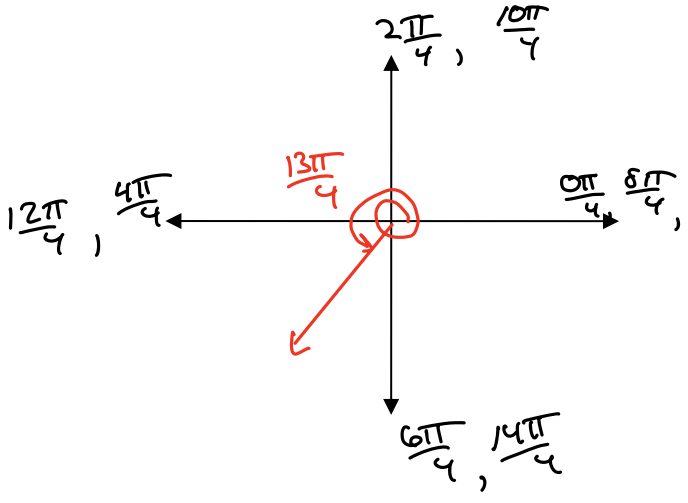

$-675°$ and $-315°$ are coterminal because they are a complete revolution apart.

c. Express θ in radian measure. Show your work when converting between degree and radian measures and leave all radian measures in lowest terms and in terms of π.

$\theta = -315° \cdot \frac{\pi}{180°} = -\frac{7\pi}{4}$

d. Draw the angle β in standard position using radians.

$\beta = \frac{13\pi}{4}$




e. In radian measure, find one positive and one negative angle that are co-terminal with angle β.

$2\pi$

Coterminal: $\frac{13\pi}{4} - \frac{8\pi}{4} = \frac{5\pi}{4}$

Coterminal: $\frac{5\pi}{4} - \frac{8\pi}{4} = -\frac{3\pi}{4}$

$2\pi$

**f.** Express the angle β in degree measure.

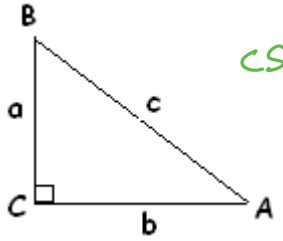
$\beta = \frac{13\pi}{4} \cdot \frac{180^\circ}{\pi} = 585^\circ$

## MULTIPLE CHOICE

1. Which of the following pairs of trigonometric ratios is/are equal?

   I. sin *A* and cos *B* T
   II. tan *A* and cot *B* T
   III. csc *A* and sec *B* T

   A. I only
   B. II only
   C. I and II only
   D. III only
   E. I, II, III only



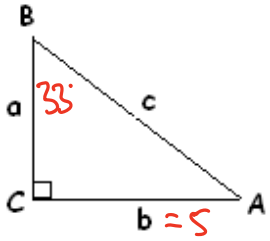

$\sin A = \frac{a}{c}$ ✓ $\cos B = \frac{a}{c}$

$\tan A = \frac{a}{b}$ ✓ $\cot B = \frac{a}{b}$

$\csc A = \frac{c}{a}$ ✓ $\sec B = \frac{c}{a}$

2. If $m\angle B = 33°$ and side $b = 5$. What is the length of side $a$?

   A. 2.723
   B. 5.962
   C. 3.247
   D. 7.699
   E. 9.180



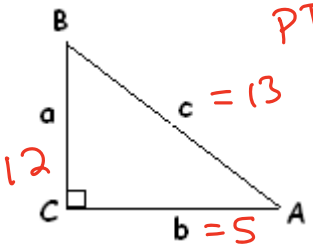

$\tan(33°) = \frac{5}{a}$

$a = \frac{5}{\tan(33°)}$

$a \approx 7.699$

3. The value of $a = 12$ and $b = 5$, what is the value of sec *B*?

   A. $\frac{12}{5}$
   B. $\frac{5}{13}$
   C. $\frac{13}{5}$
   D. $\frac{5}{12}$
   E. $\frac{13}{12}$




PT (5-12-13)

$\sec B = \frac{\text{hyp}}{\text{adj leg}} = \frac{13}{12}$

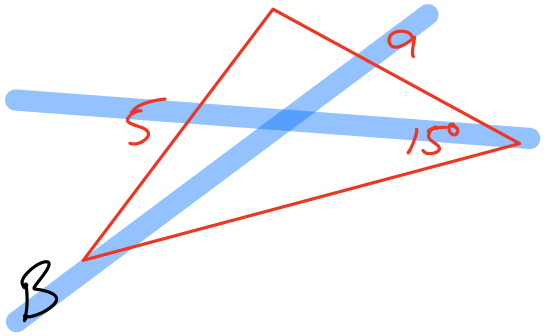
4. In an oblique triangle, two sides measure 5 cm and 9 cm and the angle across from the side that is 5 cm in length measures 15°. To the nearest whole degree, what are the measures of the other two angles?

A. 33° and 132°
B. 123° and 42°
C. ~~142° and 23°~~
D. 28° and 137°
E. No such triangle exists as described

$$\frac{\sin(15^\circ)}{5} = \frac{\sin B}{9}$$

$$\sin^{-1}\left(\frac{9\cdot\sin(15^\circ)}{5}\right) = B$$

$$28 \approx B$$



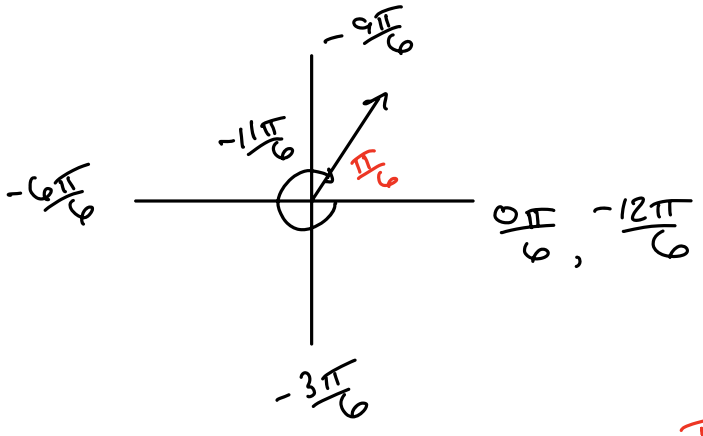

$$x + 28^\circ + 15^\circ = 180^\circ$$

$$x = 137^\circ$$

5. An angle measures $-\frac{11\pi}{6}$ radians. Which of the following statements is/are true?

I. The angle terminates in Quadrant II. False
II. In degrees, the reference angle for the given angle is 30°. True
III. The angle $\frac{5\pi}{6}$ is co-terminal with the given angle. False

A. I only B. II only C. II and III only D. I and III only E. I, II and III only




$$\frac{\pi}{6}\cdot\frac{180^\circ}{\pi} = 30^\circ$$

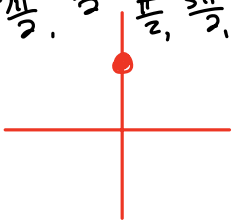
6. The terminal side of an angle lies on the positive $y$ – axis. Which of the following angles could be the measure of the angle described?

I. $-\frac{9\pi}{2}$ ✗

II. $\frac{5\pi}{2}$ ✓

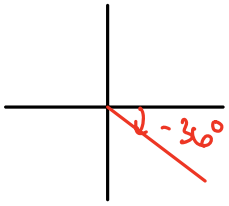
III. $\frac{9\pi}{2}$ ✓

$-\frac{3\pi}{2}, -\frac{7\pi}{2}, -\frac{11\pi}{2}, \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}$



A. II and III B. I and III C. I and II D. II only E. I only

7. The angle −756° terminates in which quadrant?




A. I
B. II
C. III
D. IV
E. The angle terminates on an axis, not in a quadrant.

$-756^\circ + 720^\circ = -36^\circ$