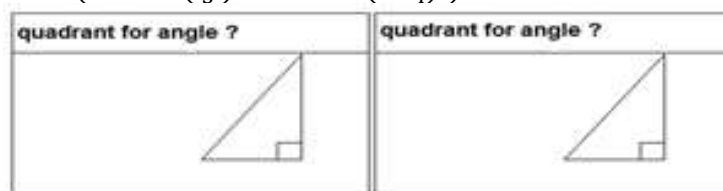


Any question asking for an exact answer will be marked wrong and receive no credit if there are decimal approximations in any step in the problem. Specific formulas are to be used in each of the problems. Any other attempt to work these problems without use of these formulas from the sections we have covered or correct deviations of those formulas will not receive any credit. DO NOT USE MATERIAL THAT IS OUTSIDE THE SECTIONS COVERED.

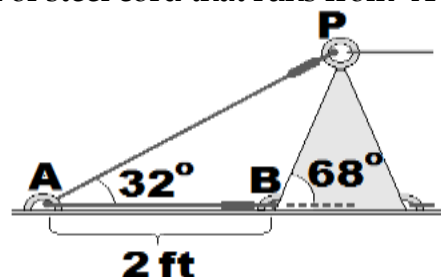
- (1) Find the exact value of $\tan(75^\circ)$ by using the **addition** or **subtraction** formulas.

- (2) Find the exact value of the expression.

$$\sin\left(\cos^{-1}\left(\frac{\sqrt{6}}{3}\right) + \tan^{-1}\left(-\frac{3}{4}\right)\right)$$



- (3) **Road Cone.** The highway department has decided to try a new type of road cone. It has a islet at the top to attach a steel cord to run through all road cones in the barricade. The last road cone in the barricade is to be anchored to the road at an angle of 32° with the horizontal. The side of the road cone makes an angle of 68° with the horizontal. If the distance between the anchor and the base of the cone is 2 feet then **approximate** (to two decimal places) the length of steel cord that runs from A to P.

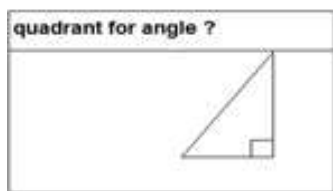


- (4) Use half-angle formulas to find the exact value of $\sin(157.5^\circ)$. (Don't just write down a number)

- (5) Solve and find all exact solutions of the equation in the interval $[0, 2\pi)$.
 $\cos(2\beta) - \sin(\beta) = 0$

(6) Find the **exact value** of the expression

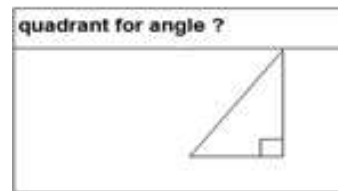
$$\cos\left(2\sin^{-1}\left(-\frac{3}{4}\right)\right) \text{ (Don't just write down a number)}$$



(7) Find the **exact value** of $\tan\left(\frac{\theta}{2}\right)$ for the given

$$\text{conditions. } \cos(\theta) = \frac{\sqrt{5}}{3}; \quad 0^\circ < \theta < 90^\circ$$

(Don't just write down a number)

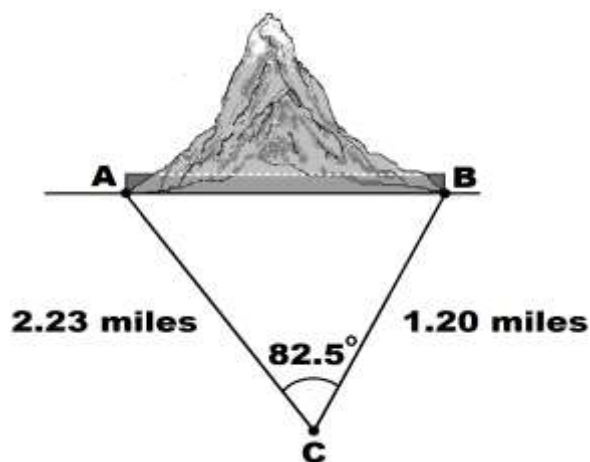


(8) Solve $\triangle ABC$ by using the **Law of Sines** if given that $c = 8$, $\alpha = 40^\circ$, $\gamma = 70^\circ$

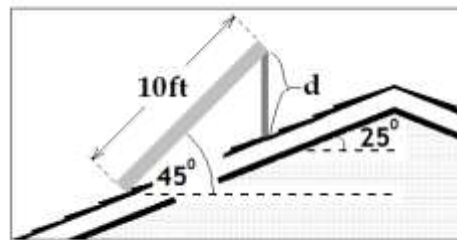
[Triangle is not drawn to scale. Use for labeling only]



(9) **Length of Tunnel.** A tunnel is to be built under a mountain. To estimate the length of the tunnel a surveyor, located a point C, makes the following measurements based on two other points labeled A and B. as shown below. Use the surveyor's data to **approximate** (to two decimal places) the length of the tunnel. [Remember to set up a trigonometric equation. Then through a logical series of steps, solve the equation]



- (10) **Installing Solar Panel.** Shown in the figure is a 10 ft. wide solar panel that is to be attached to the roof. The roof makes an angle of 25° with the horizontal and the solar panel makes an angle of 45° with the horizontal. **Approximate** (to two decimal places) the length d of the brace that is needed to install the solar panel. [Remember to set up an equation, and then solve that equation]



- (11) **Solve** the by **using** the **addition** or **subtraction** formulas to **find exact** solutions in the interval $[0, 2\pi)$.

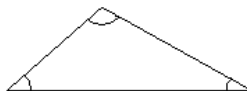
$$\sin(3t) \cos(2t) = -\frac{\sqrt{3}}{2} + \sin(2t) \cos(3t)$$

- (12) **Verify** the identity.

$$\frac{\sin^2(2u)}{\sin^2(u)} = 4 - 4 \sin^2(u)$$

- (13) **Solve** $\triangle ABC$ by using the **Law of Cosines** if given that $a = 20$, $b = 25$, $c = 22$

[Triangle is not drawn to scale. Use for labeling only]



(1) Solve and find exact solutions of the equation in the interval $[0, 2\pi)$. (2) Find the exact values of the expression if possible.

$$\sin^{-1} \left(\sin \left(\frac{5\pi}{4} \right) \right)$$

(4) What did you like best about the class?**What** did you like least about the class?