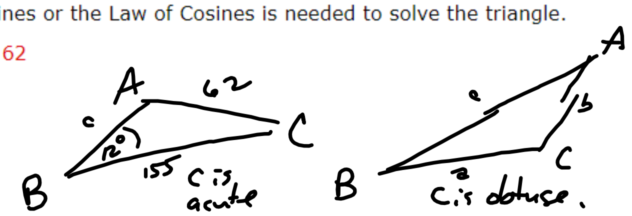
11. 0/7 points

Determine whether the Law of Sines or the Law of Cosines is needed to solve the triangle.

$B = 12°$, $a = 155$, $b = 62$

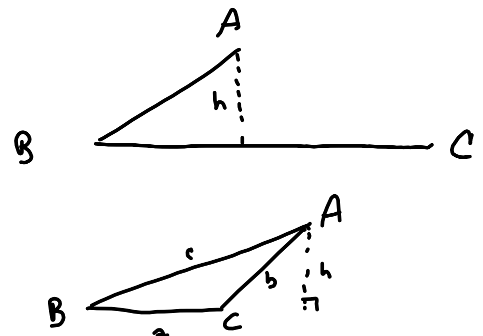
- ○ Law of Sines
- ○ Law of Cosines



Solve (if possible) the triangle. If two solutions exist, find both. Round your answers to two decimal
exist, enter the solution set with the smaller A-value first. If a triangle is not possible, enter IMPOSS
corresponding answer blank.)

A_1 =	✗	31.32 °	A_2 =	✗	148.68 °
C_1 =	✗	136.68 °	C_2 =	✗	19.32 °
c_1 =	✗	204.58	c_2 =	✗	98.65

Check :



$$\frac{\sin B}{b} = \frac{\sin A}{a}$$

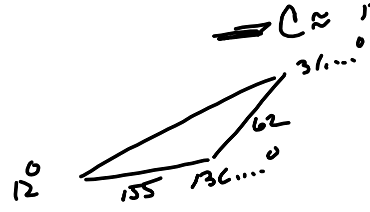
$$\frac{a \sin B}{b} = \sin A$$

$$\frac{155 \cdot \sin 12°}{62} \approx .519779227 \approx \sin A$$

$$\Rightarrow A \approx 31.3174436$$

$$\Rightarrow C \approx 136.6825563$$

```
           .519779227
sin⁻¹(Ans
          31.31744365
Ans+12
          43.31744365
Ans-180
         -136.6825563
```



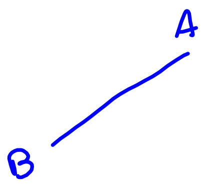
```
Ans-180
    -136.6825563
-Ans
     136.6825563
62sin(Ans)/sin(1
2)
     204.5795168
```

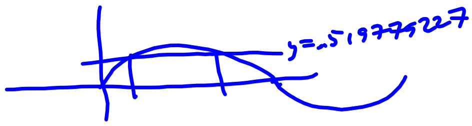
$$\frac{c}{\sin C} = \frac{62}{\sin 12^\circ}$$

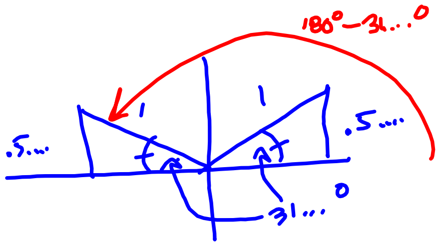
$$c = \frac{62\sin C}{\sin 12^\circ} \approx \frac{62 * \sin(136.6825563)}{\sin(12^\circ)}$$

$$\approx \boxed{204.5795168 \approx c}$$

Angle A is acute







$\sin A \approx .519779227$

The "other A" is the 2nd solution to $\sin A = .517\ldots$

$\boxed{\begin{array}{l} \Rightarrow A \approx 148.6825574^\circ \\ C \approx 19.3174426^\circ \end{array}}$ A is obtuse.

$\dfrac{c}{\sin(19.3\ldots^\circ)} = \dfrac{b}{\sin B} \Rightarrow$

$c = \dfrac{62 \sin(19.3\ldots^\circ)}{\sin(12^\circ)} \approx \boxed{98.64623431 \approx c}$

```
     204.5795168
180-31.3174426
     148.6825574
Ans+12
     160.6825574
Ans-180
     -19.3174426
```

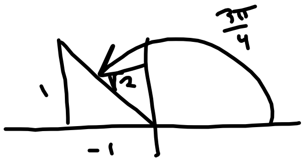
```
Ans-180
     -19.3174426
-Ans
      19.3174426
62sin(Ans)/sin(1
2)
     98.64623431
```

14. 0/1 points

Find $\mathbf{u} \cdot \mathbf{v}$, where θ is the angle between $\mathbf{u}$ and $\mathbf{v}$.

$$\|\mathbf{u}\| = 4, \ \|\mathbf{v}\| = 16, \ \theta = \frac{3\pi}{4}$$

$-32\sqrt{2}$



$$\cos\theta = \frac{\bar{u}\cdot\bar{v}}{\|\bar{u}\|\|\bar{v}\|} = \frac{\bar{u}\cdot\bar{v}}{\|\bar{u}\|\|\bar{v}\|}$$

$$\longrightarrow \bar{u}\cdot\bar{v} = \|\bar{u}\|\|\bar{v}\| \cos\theta$$

$$= (4)(16)\cos\left(\frac{3\pi}{4}\right)$$

$$= 64\left(-\frac{1}{\sqrt{2}}\right)\left(\frac{\sqrt{2}}{\sqrt{2}}\right)$$

$$= 64\left(\frac{-\sqrt{2}}{2}\right) = \boxed{-32\sqrt{2}}$$

15. 0/2 points

Find the projection of **u** onto **v**.

$\mathbf{u} = \langle 2, 2 \rangle$

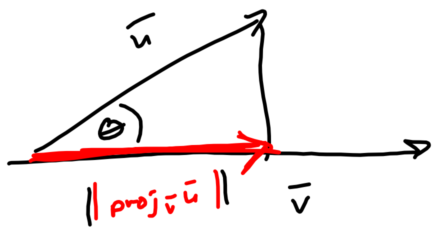
$\mathbf{v} = \langle 6, 1 \rangle$

$\text{proj}_{\mathbf{v}}\mathbf{u} =$ $\left\langle \frac{84}{37}, \frac{14}{37} \right\rangle$

$$\text{proj}_{\bar{v}}\bar{u} = \frac{\bar{u}\cdot\bar{v}}{\|\bar{v}\|^2}\bar{v} = \frac{\langle 2,2\rangle \cdot \langle 6,1\rangle}{\|\langle 6,1\rangle\|^2} \cdot \langle 6,1\rangle$$

$$= \frac{12+2}{6^2+1^2}\langle 6,1\rangle = \frac{14}{37}\langle 6,1\rangle$$

$$= \boxed{\left\langle \frac{84}{37}, \frac{14}{37} \right\rangle = \text{proj}_{\bar{v}}\bar{u}}$$



=

$$\frac{\|\text{proj}_{\bar{v}}\bar{u}\|}{\|\bar{u}\|} = \cos\theta = \frac{\bar{u}\cdot\bar{v}}{\|\bar{u}\|\|\bar{v}\|}$$

$$\|\text{proj}_{\bar{v}}\bar{u}\| = \frac{\bar{u}\cdot\bar{v}}{\|\bar{v}\|}$$

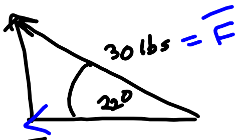
$$\therefore \text{proj}_{\bar{v}}\bar{u} = \|\text{proj}_{\bar{v}}\bar{u}\| \cdot \frac{\bar{v}}{\|\bar{v}\|} = \frac{\bar{u}\cdot\bar{v}}{\|\bar{v}\|^2}\bar{v}$$

16. 0/1 points LarTrig10 3.4.082. [3883334]

A ski patroller pulls a rescue toboggan across a flat snow surface by exerting a constant force of 30 pounds on a handle that makes a 22° angle with the horizontal (see figure). Determine the work done in pulling the toboggan 130 feet. (Round your answer to one decimal place.)

[ ] ✖ 3616.0 ft-lb

Vertical $\vec{F_y} = \vec{w}$



$\vec{v} = \vec{F_x}$ horizontal

work = F·D.
We need to find the horizontal component of the force

$\text{WORK} = \vec{F_x} \cdot D = \vec{F_x} \cdot 130\text{ft.}$

$\vec{F_x} = 30\cos(22°) \approx$

$\frac{F_x}{30} = \cos(22°)$

I'm abusing notation. Not being totally unambiguous about F_x being a vector or just a magnitude

```
30cos(22)
          27.81551564
Ans*130
          3616.017033
```

≈ 3616 ft-lbs

By rights $\vec{F_x} = \langle -3616, 0 \rangle$ because I drew it pulling left