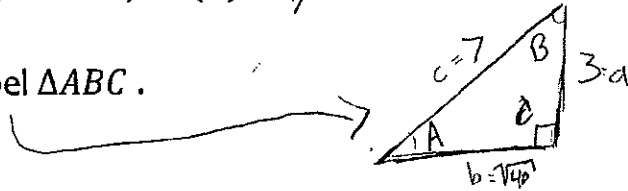
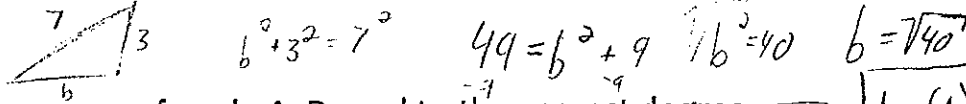


1. In right triangle ΔABC , $\sin(A) = \frac{3}{7}$.

a) Draw and label ΔABC .



b) Determine the exact value of $\tan(A)$.



c) Solve for the measure of angle A. Round to the nearest degree.

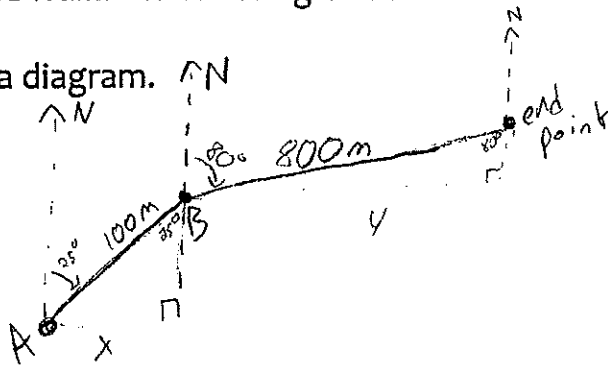
$$\tan(A) = \frac{3}{\sqrt{40}} \quad \angle A = \tan^{-1}\left(\frac{3}{\sqrt{40}}\right) \Rightarrow \angle A \approx 25^\circ$$

$$\tan(A) = \frac{3}{\sqrt{40}}$$

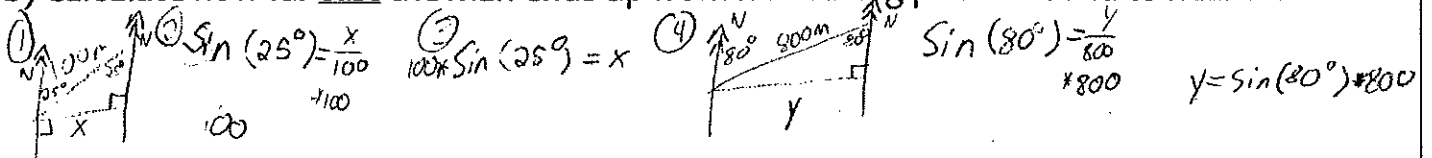
exact value of $\tan(A)$

2. A man walks on a bearing of 25° for 100 meters and rests under a tree. Then he walks on a bearing of 80° for 800 more meters.

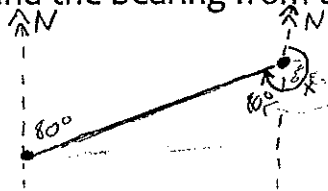
a) Draw a diagram.



b) Calculate how far east the man ends up from his starting point. Round to nearest meter.



c) Find the bearing from the end point to the tree.



we know opposite interior for parallel lines and that the other part is 180 since it is a straight line

$$x = 80^\circ + 180^\circ$$

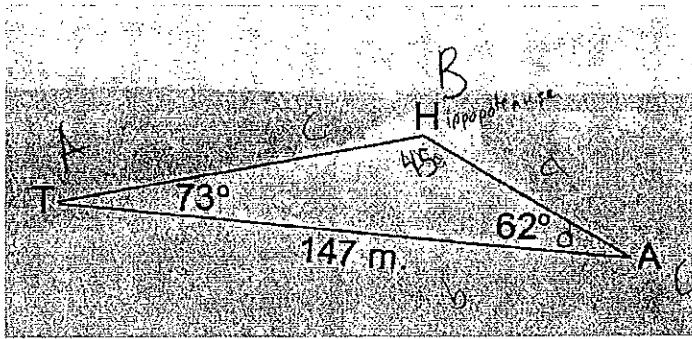
$$x = 260^\circ$$

The bearing is 260°

How far east = $x + y \Rightarrow [\sin(25^\circ) * 100] + [\sin(80^\circ) * 800] =$ How far east so... The man is about 830m east

3. While rafting down a river, Alvin and Teddy are attacked by a wild hippopotenuse! They abandon their raft and head to opposite sides of the river.

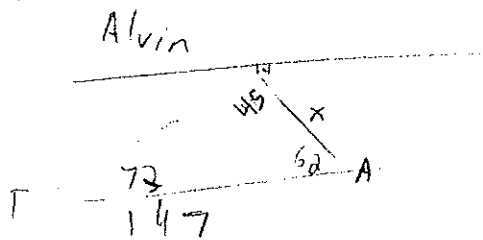
Luckily, they had their laser equipment in the boat. The width of the river between them is 147 meters. They determine the angle Alvin sees the hippopotenuse at is 62° , while the angle that Teddy sees the hippopotenuse 73° .



Go with picture

$$180 - 73 - 62 = 45$$

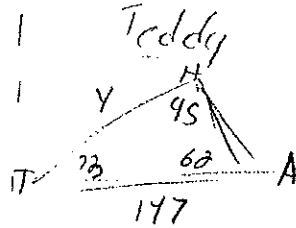
a) Who is closer to the hippopotenuse, Alvin or Teddy?



$$\frac{x}{\sin(73)} = \frac{147}{\sin(45)}$$

$$x = \frac{147}{\sin(45)} * \sin(73)$$

$$x \approx 148.805$$



$$\frac{y}{\sin(62)} = \frac{147}{\sin(45)}$$

$$y = \frac{147}{\sin(45)} * \sin(62)$$

$$y \approx 183.56$$

Alvin is closer to the hippopotenuse

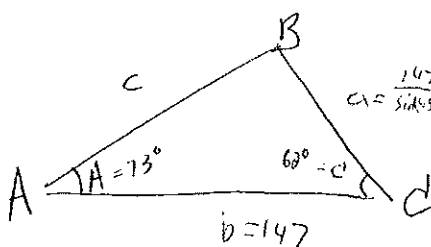
b) Approximately, how many meters are they closer?

$$\left[\frac{147}{\sin(45)} * \sin(73) \right] - \left[\frac{147}{\sin(45)} * \sin(62) \right] \approx 15.245$$

Alvin is about 15 meters closer

c) Find the area of ΔHAT .

$$Area = \frac{1}{2} * ab * \sin(C)$$



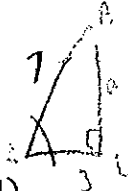
$$\frac{1}{2} * \left[\frac{147}{\sin(45)} * \sin(73) \right] * 147 * \sin(62) = Area$$

$$Area \approx 12901.82 m^2$$

Quiz 3.2 – Trigonometry

1. In right triangle ABC , $\cos(A) = \frac{3}{7}$.

a) Draw and label ΔABC .



b) Determine the exact value of $\tan(A)$.

$$\tan(A) = \frac{a}{b}$$

$$a = 7^2 - 3^2$$

$$a = \sqrt{40}$$

$$\tan(A) = \frac{\sqrt{40}}{3}$$

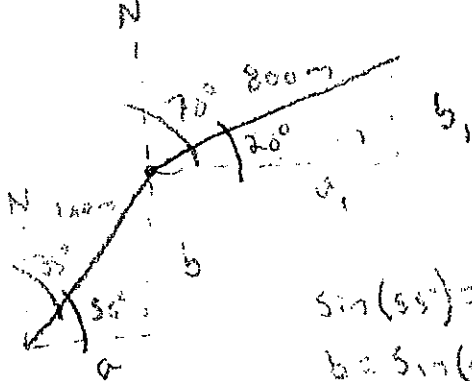
c) Solve for the measure of angle A. Round to the nearest degree.

$$\cos^{-1}\left(\frac{3}{7}\right) = \angle A$$

$$\angle A \approx 65^\circ$$

2. A man walks on a bearing of 35° for 100 meters and rests under a tree. Then he walks on a bearing of 70° for 800 more meters.

a) Draw a diagram.



$$\sin(55^\circ) = \frac{b}{100}$$

$$b = \sin(55^\circ) \cdot 100 \text{ m}$$

$$\sin(20^\circ) = \frac{b_1}{800}$$

$$b_1 = \sin(20^\circ) \cdot 800$$

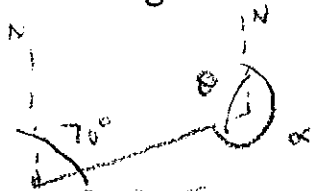
b) Calculate how far north the man ends up from his starting point. Round to nearest meter.

$b + b_1 = \text{how far north he walked}$

$$(\sin(55^\circ) \cdot 100) + (\sin(20^\circ) \cdot 800)$$

$$\approx 356 \text{ m}$$

c) Find the bearing from the end point to the tree.



$$70 + \theta = 180$$

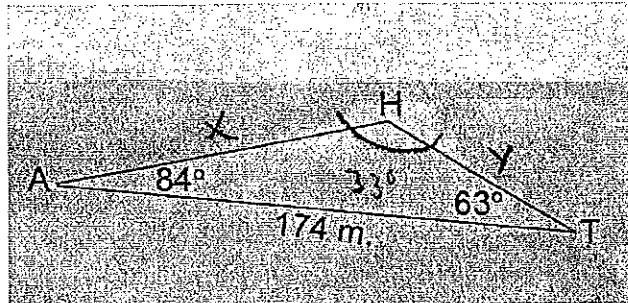
$$\theta = 110^\circ$$

$$\alpha = 360 - \theta$$

$$\alpha = 250^\circ$$

3. While rafting down a river, Alvin and Teddy are attacked by a wild hippopotenuse! They abandon their raft and head to opposite sides of the river.

Luckily, they had their laser equipment in the boat. The width of the river between them is 174 meters. They determine the angle Alvin sees the hippopotenuse at is 84° , while the angle that Teddy sees the hippopotenuse is 63° .



a) Who is closer to the hippopotenuse, Alvin or Teddy?

$$\frac{\sin(33^\circ)}{174} = \frac{\sin(63^\circ)}{x} = \frac{\sin(84^\circ)}{y}$$

$$x \approx 284.66 \text{ m}$$

$$y \approx 317.73 \text{ m}$$

$$\frac{\sin(33^\circ) \cdot x}{\sin(33^\circ)} = \frac{174 \cdot \sin(63^\circ)}{\sin(33^\circ)}$$

$$x = \frac{174 \cdot \sin(63^\circ)}{\sin(33^\circ)}$$

$$\frac{\sin(33^\circ) \cdot y}{\sin(33^\circ)} = \frac{174 \cdot \sin(84^\circ)}{\sin(33^\circ)}$$

$$y = \frac{174 \cdot \sin(84^\circ)}{\sin(33^\circ)}$$

Alvin is closer

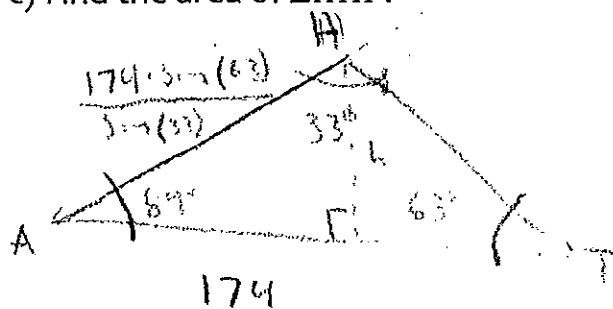
b) Approximately, how many meters are they closer?

$$y - x = \text{difference}$$

$$317.73 - 284.66$$

$$\approx 33.07 \text{ m}$$

c) Find the area of $\triangle HAT$.



$$x = \frac{174 \cdot \sin(63^\circ)}{\sin(33^\circ)}$$

$$\sin(84^\circ) = \frac{h}{x}$$

$$\sin(84^\circ) \cdot x = h$$

$$h = \frac{174 \cdot \sin(63^\circ)}{\sin(33^\circ)} \cdot \sin(84^\circ)$$

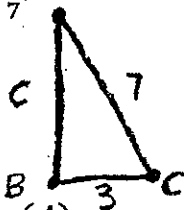
$$a = \frac{h \cdot 174}{2}$$

$$a \approx 24629.5 \text{ m}^2$$

Quiz 3.2 – Trigonometry

1. In right triangle $\triangle ABC$, $\sin(A) = \frac{3}{7}$.

a) Draw and label $\triangle ABC$.



b) Determine the exact value of $\tan(A)$.

$$7^2 = 3^2 + c^2 \quad 49 - 9 = c^2 \quad \sqrt{40} = 2\sqrt{10}$$

$$\tan(A) = \frac{\text{Opp}}{\text{adj}} = \frac{3}{2\sqrt{10}}$$

c) Solve for the measure of angle A. Round to the nearest degree.

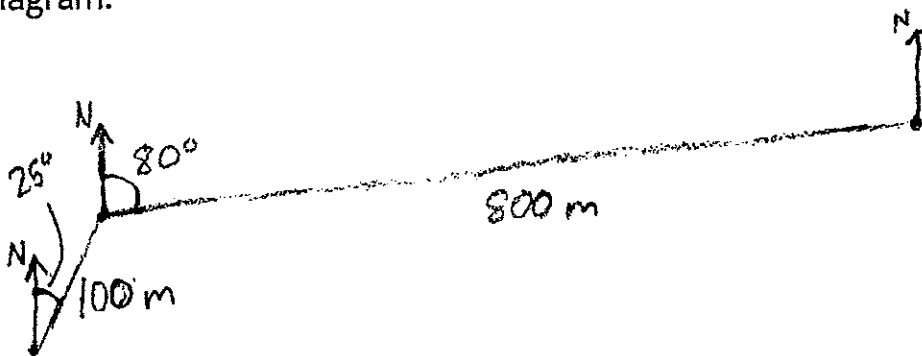
$$\sin(A) = \frac{3}{7}$$

$$\sin^{-1}\left(\frac{3}{7}\right) = 25.37693353$$

$$25.37693353 \approx 25^\circ$$

2. A man walks on a bearing of 25° for 100 meters and rests under a tree. Then he walks on a bearing of 80° for 800 more meters.

a) Draw a diagram.



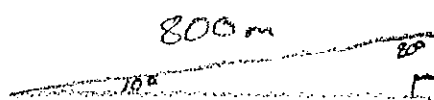
b) Calculate how far east the man ends up from his starting point. Round to nearest meter.



$$\sin(25) = \frac{x}{100}$$

$$\sin(25) \cdot 100 = x$$

$$\sin(25) \cdot 100 = 42.26182617 \text{ m}$$



$$\sin(80) = \frac{y}{800}$$

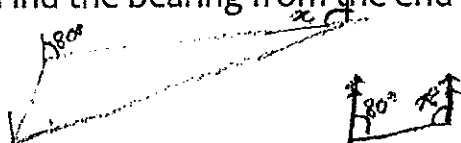
$$\sin(80) \cdot 800 = y$$

$$42.26182617 + 787.8462024 = 830.1080286$$

$$830.1080286 \approx 830 \text{ m}$$

He traveled 830m east

c) Find the bearing from the end point to the tree.



$$80 + x = 180$$

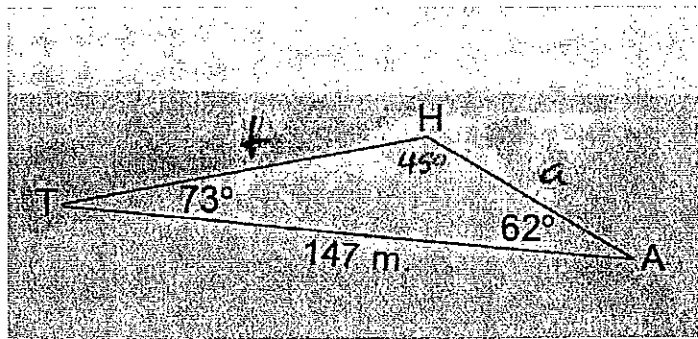
$$x = 100$$

$$360 - 100 = 260$$

It's a 260 degree bearing

3. While rafting down a river, Alvin and Teddy are attacked by a wild hippopotenuse! They abandon their raft and head to opposite sides of the river.

Luckily, they had their laser equipment in the boat. The width of the river between them is 147 meters. They determine the angle Alvin sees the hippopotenuse at is 68° , while the angle that Teddy sees the hippopotenuse 73° .



a) Who is closer to the hippopotenuse, Alvin or Teddy?

$$73 + 62 = 135 \quad 180 - 135 = 45^\circ$$

$$\frac{\sin(45)}{147} = \frac{\sin(73)}{a} = \frac{\sin(62)}{t}$$

Trevor is closer

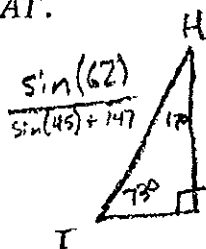
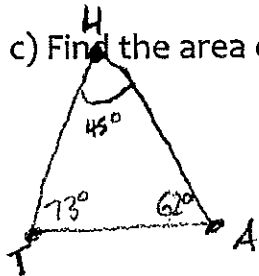
$$\frac{\sin(73)}{\sin(45) \div 147} \approx 198.8 = a \quad \frac{\sin(62)}{\sin(45) \div 147} \approx 183.56 = t$$

b) Approximately, how many meters are they closer?

$$198.8 - 183.56 = 15.24$$

Trevor is about 15.24 meters closer

c) Find the area of ΔHAT .



$$\sin(73) \cdot \left(\frac{\sin(62)}{\sin(45) \div 147} \right) = 175.53494$$

$$175.53494 \cdot 147 = 25,803.63618$$

$$25,803.63618 \div 2 = 12,901.81809$$

$$\text{Area of } \Delta HAT = 12,901.81809 \text{ m}^2$$