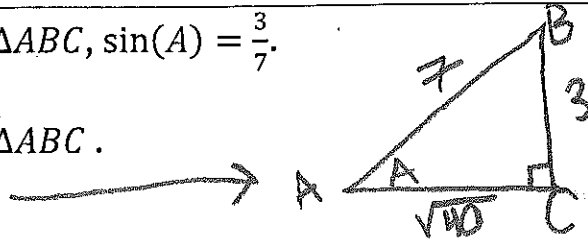


Quiz 3.2 – Trigonometry

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

a) Draw and label $\triangle ABC$.



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

$AC = \sqrt{40}$

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

$a^2 + b^2 = c^2$

$AC^2 + 3^2 = 7^2$

$49 - 9 = 40$

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

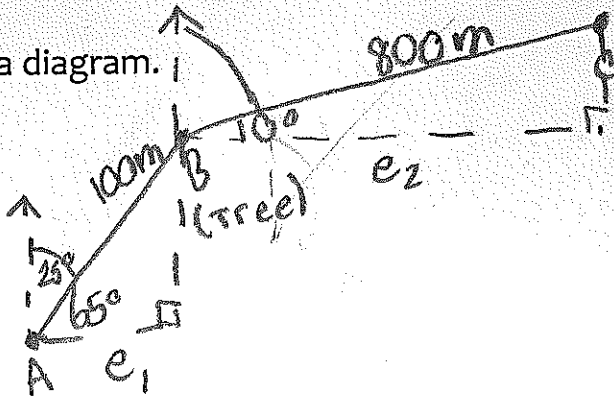
$\sin(A) = \frac{3}{7}$

$\sin^{-1}(\frac{3}{7}) = 25.38$

$\angle A = \sin^{-1}(\frac{3}{7})^\circ$ or 25.38°

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.

$east = e_1 + e_2$

$e_1 + e_2 = \cos(65) \cdot 100 + \cos(10) \cdot 800$

$\cos(65) = \frac{e_1}{100}$

$\cos(10) = \frac{e_2}{800}$

$e = 830.11m$ (answer)

$e_1 = \cos(65) \cdot 100$ or $42.26m$

$e_2 = \cos(10) \cdot 800$ or $787.85m$

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

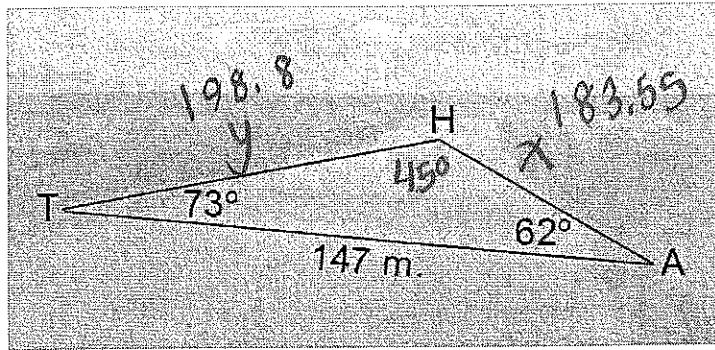


$180 + 80 =$

260°

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 is 73° .



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

$x > y$ - Teddy is closer

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

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

$$x = 198.8 \text{ m}$$

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

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

$$y = 183.55 \text{ m}$$

- b) Approximately, how many meters are they closer?

$$198.8 - 183.55 = 15.25$$

approx = 15.25 m closer

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

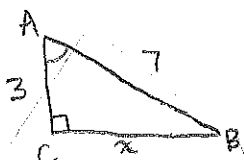
$$\frac{1}{2} \cdot 198.8 \cdot 147 \cdot \sin(73) = a$$

$$a = 13,973.33 \text{ m}^2$$

Quiz 3.2 – Trigonometry

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

a) Draw and label $\triangle ABC$.



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

$$\tan(A) = \frac{x}{3}$$

$$3^2 + x^2 = 7^2 \quad x = \sqrt{40}$$

$$9 + x^2 = 49$$

$$x^2 = 40$$

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

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

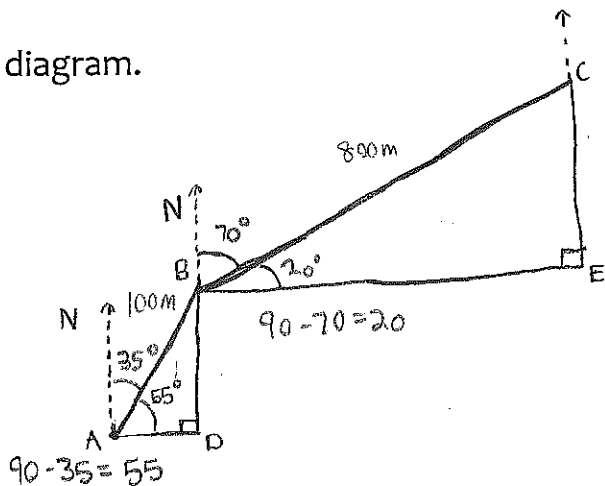
$$\cos^{-1}(\cos(A)) = \left(\frac{3}{7}\right) \cdot \cos^{-1}$$

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

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

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.



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

for $\triangle ABD$ the distance north is \overline{BD}

for $\triangle BCE$ the distance north is \overline{CE}

$$100 \cdot \sin(55^\circ) = \frac{\overline{BD}}{100} \cdot 100$$

$$800 \cdot \sin(20^\circ) = \frac{\overline{CE}}{800} \cdot 800$$

$$100 \cdot \sin(55^\circ) = \overline{BD}$$

$$800 \cdot \sin(20^\circ) = \overline{CE}$$

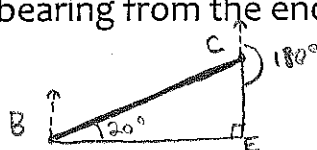
$$\overline{BD} \approx 82 \text{ m}$$

$$\overline{BD} = \overline{CE} = \text{distance traveled North}$$

$$82 + 274 = \boxed{356 \text{ m}}$$

$$\overline{CE} \approx 274 \text{ m}$$

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



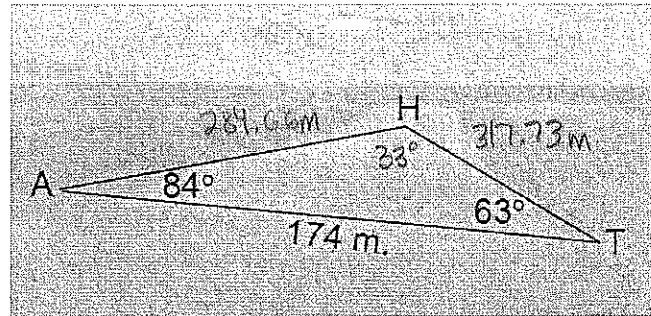
$$180 - (20 + 90) = 70^\circ$$

$$\angle BCE = 70^\circ$$

The Bearing from End point (C) to the Tree (B)
is $180 + 70 = \boxed{250^\circ}$

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 63° .



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

$$\frac{\sin(63)}{AH} = \frac{\sin(33)}{174}$$

$$\frac{\sin(84)}{HT} = \frac{\sin(33)}{174}$$

$\angle H = 180 - (63 + 84) = 33^\circ$
 angle opposite side
 AT is 33°

$$\frac{174 \cdot \sin(63)}{\sin(33)} = \frac{AH \cdot \sin(33)}{\sin(33)}$$

$$\frac{174 \cdot \sin(84)}{\sin(33)} = \frac{HT \cdot \sin(33)}{\sin(33)}$$

$$AH = \frac{174 \cdot \sin(63)}{\sin(33)} \approx 284.66 \text{ m}$$

$$HT = \frac{174 \cdot \sin(84)}{\sin(33)} \approx 317.73 \text{ m}$$

Alvin is closer

b) Approximately, how many meters are they closer?

$$317.73 - 284.66 = 33.07$$

about 33 m

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

The included angle of side HT and side AT is $\angle HTA$

$$A = \frac{1}{2} \cdot a \cdot b \cdot \sin(c)$$

$$\text{Area} = \frac{1}{2} \cdot \overline{AT} \cdot \overline{HT} \cdot \sin(\text{their included angle})$$

$$\text{Area} = \frac{1}{2} \cdot 174 \cdot 317.73 \cdot \sin(63^\circ)$$

$$\text{Area} = \frac{1}{2} \cdot 49,259.314$$

$$\text{Area} = 24,629.657 \text{ m}^2$$

Area $\approx 24,630 \text{ m}^2$