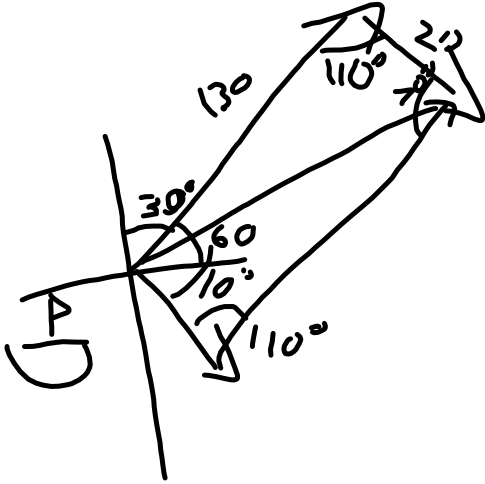


5.10.2 Student Presentations

Group Members: Cole, Dylan

A boat is sailing at a speed of 130 km/h N30°E. There is a 20 km/h current E10°S. Determine the resultant velocity of the boat.



$$R = \sqrt{130^2 + 20^2 - 2(130)(20)\cos 110^\circ}$$

$$R = 138.125 \text{ km/h}$$

$$\frac{\sin 110^\circ}{138.125} = \frac{\sin A}{130}$$

$$= N 27.82^\circ E$$

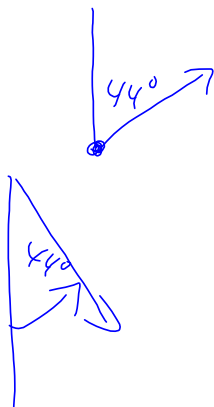
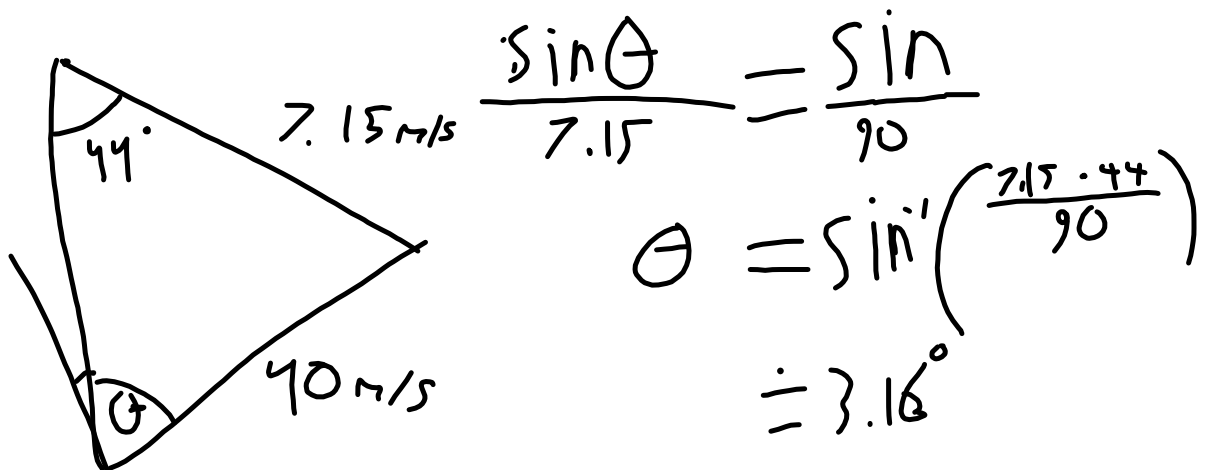
$$* (N 37.82^\circ E)$$

5.10.2 Student Presentations

Group Members: Logan, Alex, Andy, Josh H.

Andy is trying to hit Josh during their paintball game.

Josh is standing directly north of Andy and he is 38 meters away across an open football field. The paintball from Andy's gun has a projectile speed of 90 m/s. If there is a wind blowing with a speed of 7.15 m/s at an angle of N44°W, \hat{E} determine the required angle that Andy needs to aim in order to hit Josh.



5.10.2 Student Presentations

Group Members: Nick, Abu, Mark, Josh D.

Nick and Mark decided to go mudding in the old Ford.

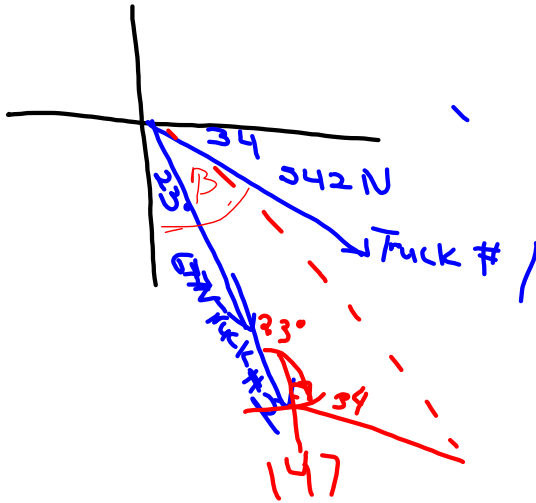
They end up getting stuck in the mud, because it's a Ford.

Mark calls Abu and Josh to bring their big heavy duty lifted mud trucks to pull Nick and Mark out of the mud.

Abu's truck pulls with a force of 542 N, at an angle of [E34°S].

Josh pulls in with his Duramax and pulls with a 677 N force on a bearing of 157°.

Determine the resultant force on Nick's truck.



$$\begin{aligned}
 |\vec{R}| &= \sqrt{b^2 + c^2 - 2bc \cos A} \\
 &= \sqrt{542^2 + 677^2 - 2(542)(677)(\cos 157^\circ)} \\
 &= 1169.430 \text{ N}
 \end{aligned}$$

$$\frac{\sin \beta}{542} = \frac{\sin 147^\circ}{1169.430}$$

$$\begin{aligned}
 \beta &= \sin^{-1} \left(\frac{542 \sin 147^\circ}{1169.430} \right) \\
 \beta &= 14.62^\circ
 \end{aligned}$$

$$\begin{aligned}
 \theta &= 23 + \beta \\
 &= 23 + 14.62 \\
 &= 37.62^\circ
 \end{aligned}$$

1169.430 N Total Force

at angle of [S 37.62° E]