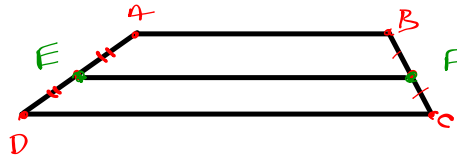


$$\vec{EF} = \frac{1}{2} (\vec{AB} + \vec{DC})$$



Statements

L.S.

$$\vec{EF}$$

$$\vec{EA} + \vec{AB} + \vec{BF}$$

$$\frac{1}{2}\vec{AD} + \frac{1}{2}\vec{AD} + \vec{EA} + \vec{BF}$$

$$\frac{1}{2}\vec{AD} + \frac{1}{2}(\vec{AD} + 2\vec{EA} + 2\vec{BF})$$

$$\frac{1}{2}\vec{AD} + \frac{1}{2}(\vec{DC})$$

$$\frac{1}{2}(\vec{AB} + \vec{DC})$$

R.S.

\square

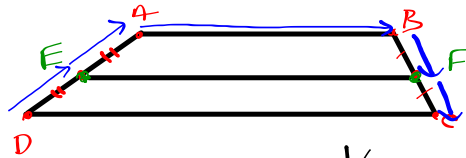
$$\frac{1}{\frac{1}{2}}$$

$$\frac{1}{1} \times \frac{2}{1}$$

Just

Check.

$$1 = \frac{1}{2} + \frac{1}{2}$$

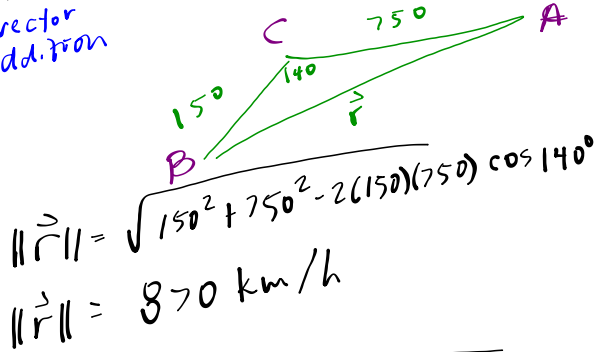


factored out a $\frac{1}{2}$

Unit 5: Word Questions

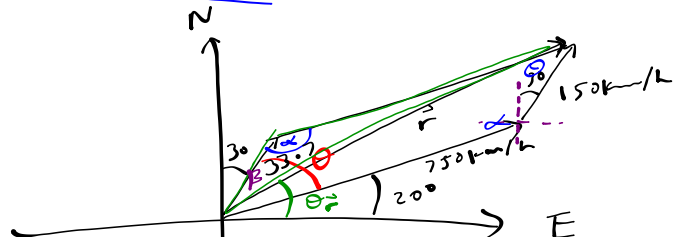
A plane is traveling
at 750 km/h E 20° N.
The wind is blowing
150 km/h N 30° E.
What's the plane's
resulting velocity?

↳ vector
addition



$\frac{\sin B}{750} = \frac{\sin^{-1}(\frac{150}{870} \sin 140^\circ)}{870}$

$B = 33.7^\circ$



$\alpha = \frac{360 - \theta - \theta}{2}$
 $\theta = 90^\circ - 30^\circ - 20^\circ$
 $\theta = 40^\circ$
 $\alpha = 180 - \theta$
 $\alpha = 180 - 40 = 140^\circ$

$\theta_r = 90^\circ - 30 - 33.7$

The plane has a
resulting velocity
of 870 km/h
26.4°

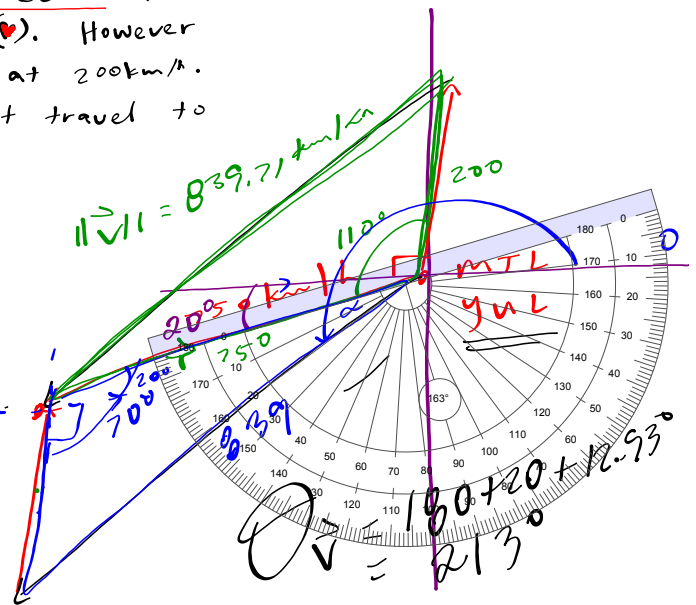
On a day without wind, a pilot would have to travel 750 km/h, W20°S to reach Toronto from Montréal (♥). However there's a southerly wind blowing at 200 km/h. What velocity should the pilot travel to reach their destination.

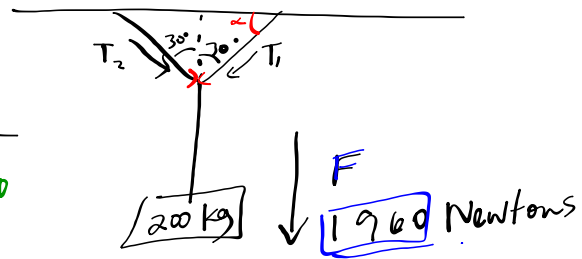
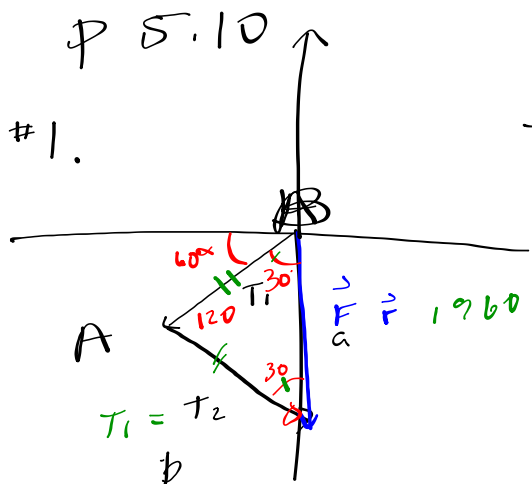
$$\frac{\sin 70^\circ}{839} = \frac{\sin \alpha}{200}$$

$$\sin^{-1}\left(\frac{200 \sin 70^\circ}{839.71}\right) = \alpha$$

$$\alpha = 12.93^\circ$$

Y/Z
T-O
wind N





$$\frac{b}{\sin 30} = \frac{1960}{\sin 120}$$

$$b = \frac{1960 \cdot \sin 30}{\sin 120}$$

$$b = 1131.6 \text{ Newtons}$$

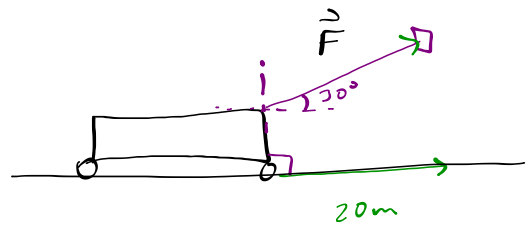
equilibrium:
 the tension vectors
 together can support
 the force

Work (Jules) can be defined

by : $W = \vec{F} \cdot \vec{s}$

\vec{F} = force (N)

\vec{s} = displacement (m)

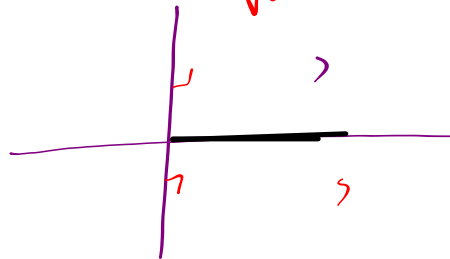


You pull a wagon
 with a force of 75N 30° .
 As a result, the wagon
 is displaced 20m E.
 What's the work done
 on the wagon?

$\vec{F} \cdot \vec{s} = \|\vec{F}\| \|\vec{s}\| \cos \theta$

angle in
 between.
 at
 same
 starting
 point.

$W = 1299 \text{ Jules}$



If Youser runs at a velocity of 5 km/h, 30° for 2 hrs, and then he runs 4 km/h, 15° for 1.5 hrs, how far is he from his starting point?

* units must be the same when adding vectors!

