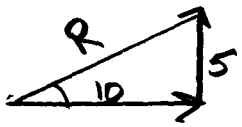
Name _____

Addition of Vector Quantities

Show all of your work, make a drawing, show formulas, show calculations, and Specify directions with both polar and map directions

1. Lisa walks east for 10 km and then north for 5 km. What is Lisa's displacement? What distance did Lisa travel?



$R = \sqrt{5^2+10^2}$

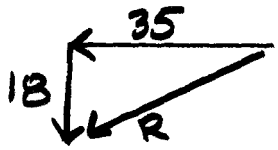
$R = 11.2$

$\theta = \tan^{-1}\left(\frac{5}{10}\right)$

displacement = 11.2 km @ 27° N of E

distance = 15 km

2. Jeremy drives 35 km west and then 18 km south. What is Jeremy's displacement? What distance did Jeremy travel?



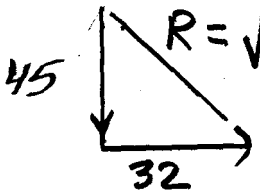
$\theta = \tan^{-1}\left(\frac{18}{35}\right)$

$R = \sqrt{35^2+18^2}$

displacement = 39.4 km @ 27° S of W

distance =

3. Jill is on a plane heading south at 45 m/s and east at 32 m/s. What is the resultant velocity of the plane?

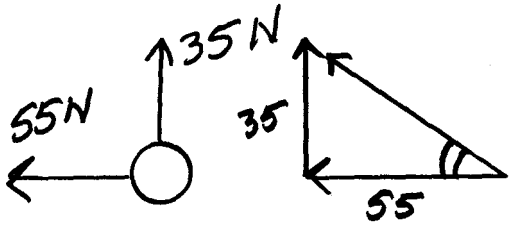


$R = \sqrt{45^2+32^2} = 55.2\ m/s$

$\theta = \tan^{-1}\left(\frac{45}{32}\right)$

resultant velocity = 55.2 m/s @ 55° S of E

4. Eryn and Scott are pulling on a rope which is tied around a tree. If Eryn pulls north with 35 N of force and Scott pulls west with 55 N of force, what is the resultant force on the tree?



$F = \sqrt{35^2+55^2} = 65.2\ N$

$\theta = \tan^{-1}\left(\frac{35}{55}\right) = 32.5°$

resultant force = 65.2 N @ 32.5° N of W

5. While flying west at 120 km/hr, an airplane is blown north at 45 km/hr. Find the resultant velocity of the plane.

$V = \sqrt{45^2+120^2} = 128\ km/hr$

$\theta = \tan^{-1}\left(\frac{45}{120}\right) = 20.6°$

resultant velocity = 128 km/hr @ 20.6° N of W