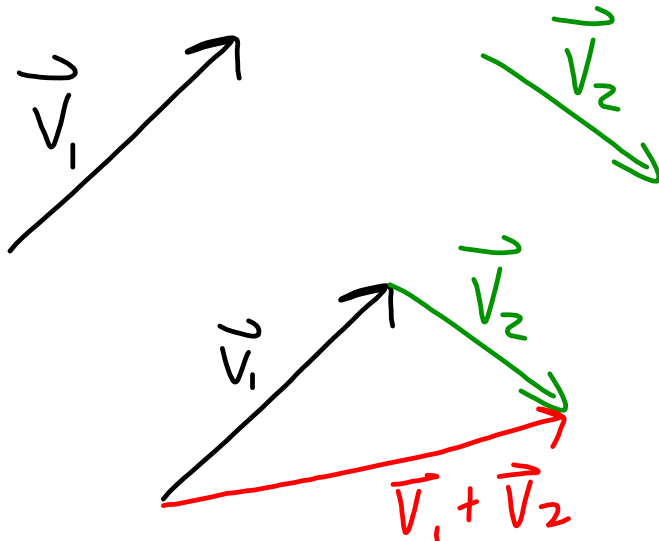


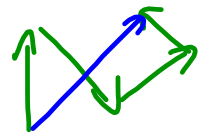
Adding Vectors

Vectors are added "tail-to-tip"



Method 1: Scale Diagram

- pick a scale 1 cm: 10 $\frac{m}{s}$
- use scale to convert
- measure & draw vectors
- measure the length of the resultant vector (& direction)
- convert back using scale

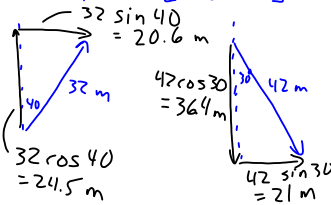
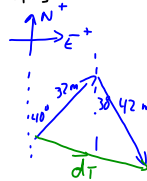


2) Component Method

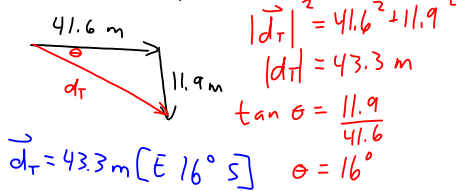
- Resolve each vector into components
- Add all vector components in each individual direction
- recombine the components

Example:

$\vec{d}_1 = 32 \text{ m [N } 40^\circ \text{ E]}$
 $\vec{d}_2 = 42 \text{ m [S } 30^\circ \text{ E]}$



	①	②	Total
N ⁺ -S	24.5 m	-36.4 m	-11.9 m
E ⁺ -W	20.6 m	21 m	41.6 m

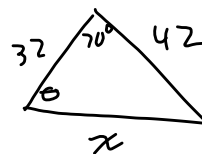
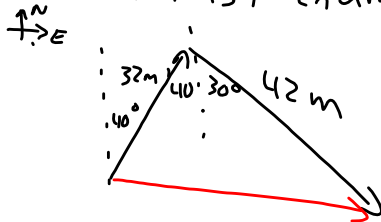


$\vec{d}_T = 43.3 \text{ m [E } 16^\circ \text{ S]}$

3) Trig. Laws

- only works (well) with 2 vectors

As in last example



$$x^2 = 32^2 + 42^2 - 2(32)(42)\cos 70$$

$$= 1024 + 1764 - 919$$

$$= 1869$$

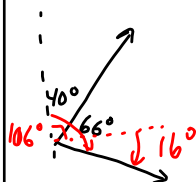
$$x = 43.2 \text{ m}$$

$$\frac{\sin \theta}{42} = \frac{\sin 70}{43.2}$$

$$\sin \theta = \frac{42 \sin 70}{43.2}$$

$$= 0.914$$

$$\theta = 66^\circ \text{ or } 114^\circ$$



$\vec{d}_T = 43.2 \text{ m [E } 16^\circ \text{ S]}$