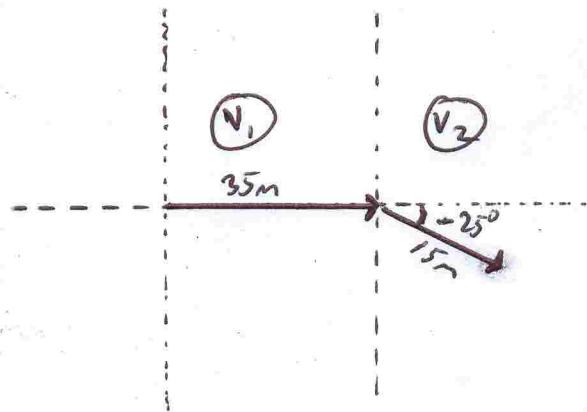


Sol. Set C
pg 94 #1-4

- step 1 Draw diagram
- step 2 Resolve vectors
- step 3 Add x s to find x_{total}
Add y s to find y_{total}
- step 4 solve for new R + new θ

#1

step 1



step 2

$$x = R \cdot \cos \theta \quad y = R \cdot \sin \theta$$

$$V_1 = 35m \quad 0m$$

$$V_2 = 15 \cdot \cos(-25^\circ) \quad 15 \cdot \sin(-25^\circ) \\ = 13.59m \quad = -6.34$$

step 3

$$x_{\text{total}} = 35m + 13.59m = 48.59m$$

$$y_{\text{total}} = 0 + (-6.34) = -6.34m$$

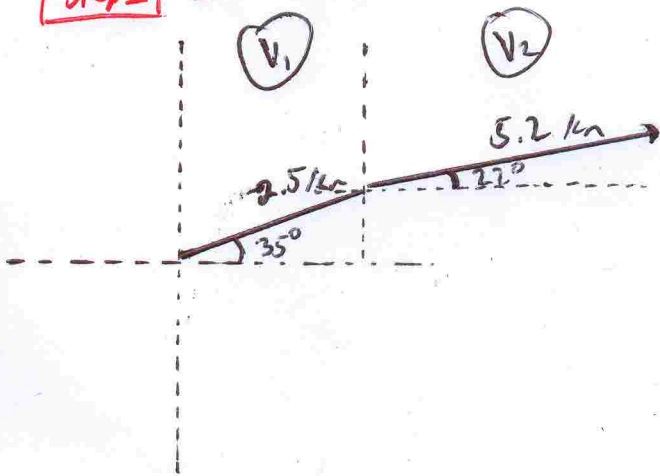
step 4

$$R = \sqrt{x^2 + y^2} = \sqrt{48.59^2 + (-6.34)^2} = 49.00m$$

$$\theta = \tan^{-1} \left(\frac{y}{x} \right)_{\text{adj}}^{\text{opp}} = \tan^{-1} \left(\frac{-6.34}{48.59} \right) = -7.43^\circ$$

$$R = 49m @ -7.43^\circ \text{ S of E}$$

#2

Step 1 Draw**Step 2** Resolve Vectors

$$x = R \cdot \cos \theta \quad y = R \cdot \sin \theta$$

$$V_1 = 2.5 \cos 35^\circ = 2.05$$

$$2.5 \sin 35^\circ = 1.43$$

$$V_2 = 5.2 \cos 22^\circ = 4.82$$

$$5.2 \sin 22^\circ = 1.95$$

Step 3 Add to find X_{Total} Y_{Total}

$$X_{\text{Total}} = 2.05 + 4.82 = 6.87$$

$$Y_{\text{Total}} = 1.43 + 1.95 = 3.38$$

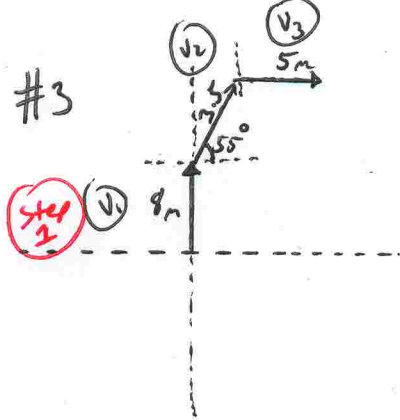
Step 4 new R + θ

$$R = \sqrt{X_{\text{Total}}^2 + Y_{\text{Total}}^2} = \sqrt{6.87^2 + 3.38^2} = 7.66 \text{ km}$$

$$\theta = \tan^{-1}\left(\frac{Y}{X}\right) = \tan^{-1}\left(\frac{3.38}{6.87}\right) = 26.2^\circ$$

$$[R = 7.66 \text{ km } @ 26.2^\circ \text{ N of E}]$$

#3

Step 2 Resolve Vectors

	X	Y	
$V_1 =$	0	8	(down west North)
$V_2 =$	$3.5 \cos(55^\circ)$	$3.5 \sin(55^\circ) =$	
	2.01m	2.87m	
$V_3 =$	5m	0	(down west East)

Step 3 Find X_{total} Y_{total}

$$X_T = 0 + 2.01 + 5m = 7.01$$

$$Y_T = 8 + 2.87 + 0 = 10.87$$

Step 4 Solve for $R + \theta$

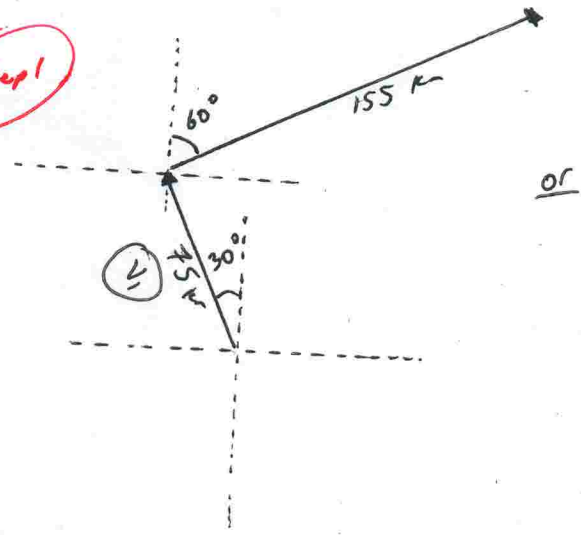
$$R = \sqrt{x_T^2 + y_T^2} = \sqrt{7.01^2 + 10.87^2} = 12.93m$$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right) = \tan^{-1}\left(\frac{10.87}{7.01}\right) = 57.18^\circ$$

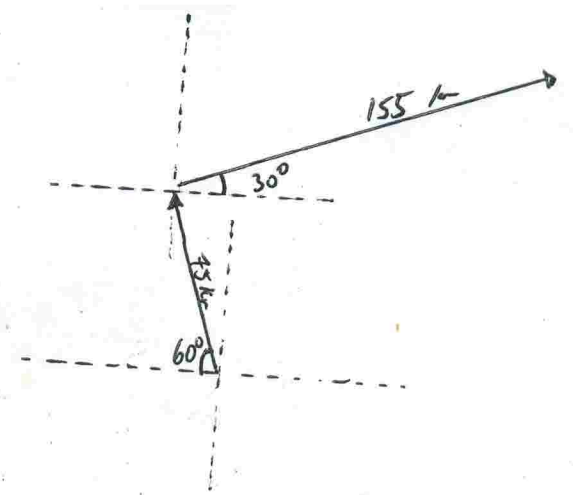
$$[R = 12.93m @ 57.18^\circ \text{ N of E}]$$

#4

Step 1



or



Step 2

	X	Y
V_1	$75 \cos(60^\circ) = 37.5 \text{ km}$	$75 \sin(60^\circ) = 64.95 \text{ km}$
V_2	$155 \cos(30^\circ) = 134.23 \text{ km}$	$155 \sin(30^\circ) = 77.5$
V_{Total}	171.73 km	142.45 km

$$V_1 = 75 \cos(60^\circ) = 37.5 \text{ km} \quad 75 \sin(60^\circ) = 64.95 \text{ km}$$

$$V_2 = 155 \cos(30^\circ) = 134.23 \text{ km} \quad 155 \sin(30^\circ) = 77.5$$

Step 3

X + Y Totals

$$X_{\text{Total}} = 37.5 \text{ km} + 134.23 \text{ km} = 171.73 \text{ km}$$

$$Y_{\text{Total}} = 64.95 \text{ km} + 77.5 = 142.45 \text{ km}$$

Step 4

$$R = \sqrt{x_T^2 + y_T^2} = \sqrt{171.73^2 + 142.45^2} = 223.12 \text{ km}$$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right) = \tan^{-1}\left(\frac{142.45}{171.73}\right) = 39.68^\circ$$

$$[R = 223.12 \text{ km} @ 39.68^\circ \text{ N of E}]$$