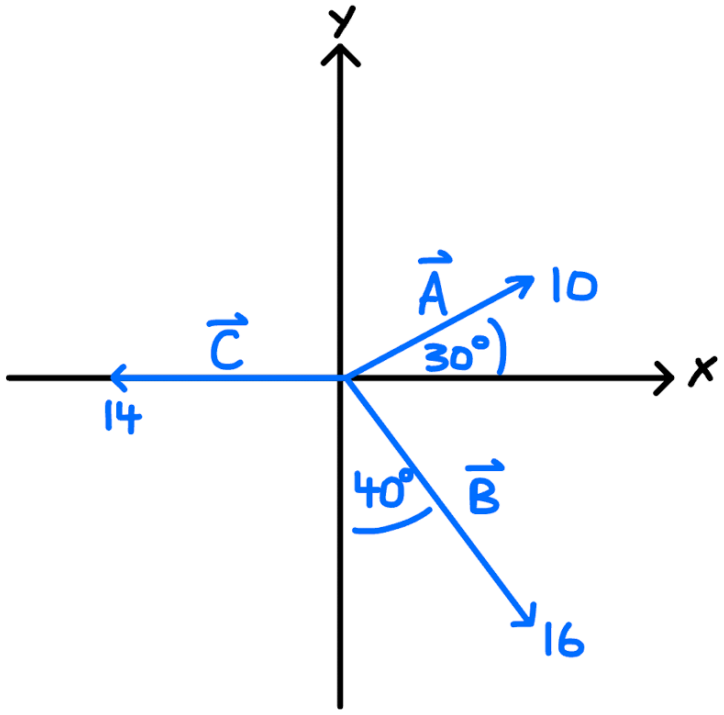
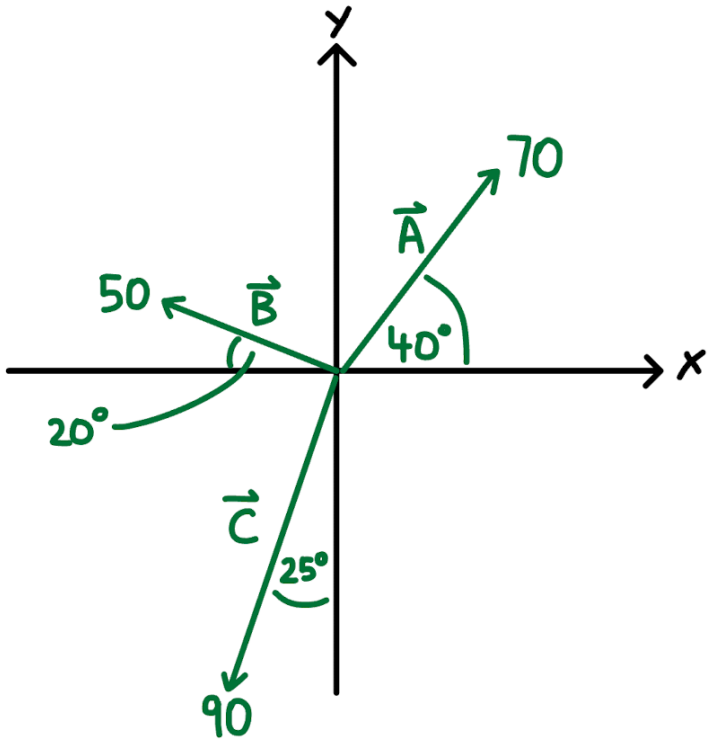
Determine $\overrightarrow{A} + B + \overrightarrow{C} = \overrightarrow{R}$



Determine $\overrightarrow{A} + B + \overrightarrow{C} = \overrightarrow{R}$



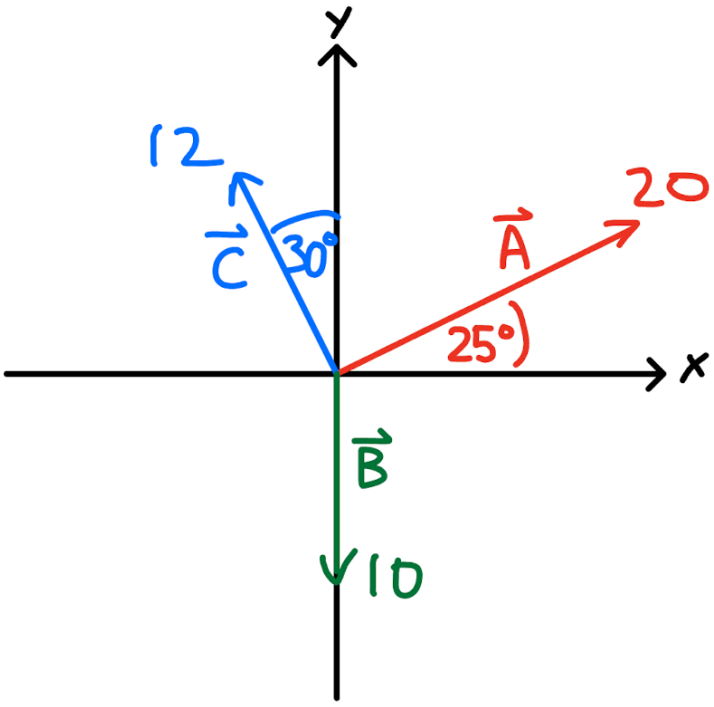
Determine

a) $\overrightarrow{A} + \overrightarrow{B}$

b) $\overrightarrow{A} - \overrightarrow{B}$

c) $\overrightarrow{A} + \overrightarrow{C}$

d) $\overrightarrow{A} + \overrightarrow{B} + \overrightarrow{C}$

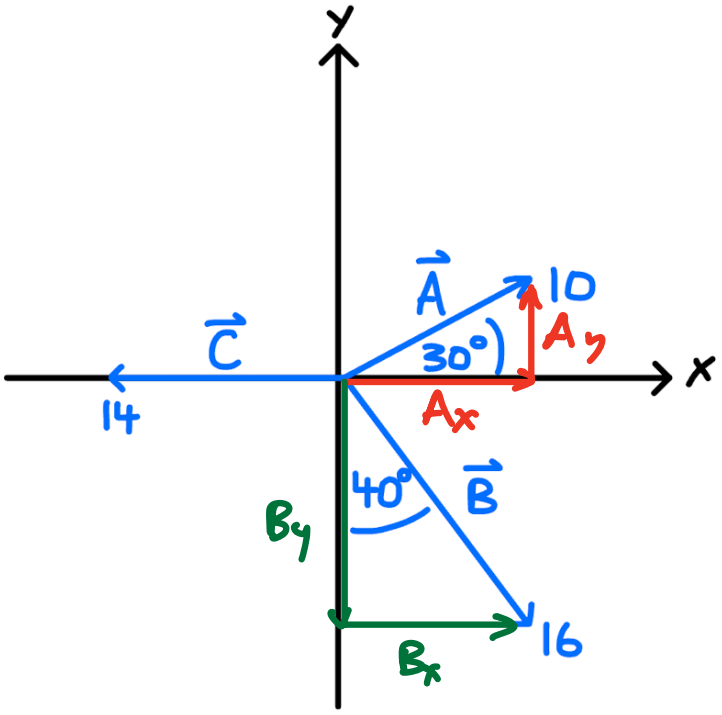


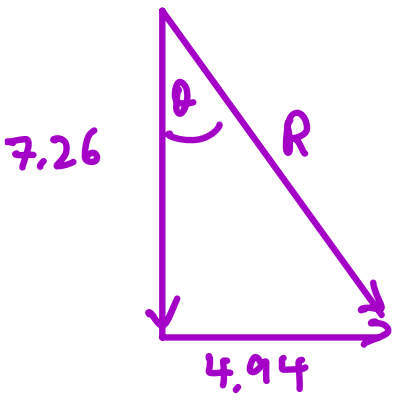
A plane has an air speed of 880 km/h and aims 40º west of south. Wind blows from the west at 80 km/h. What is the groundspeed of the plane? Direction?

A plane can travel at 700 km/h in still air. A 100 km/h wind blows 30º north of east. What direction should the plane aim to reach a destination directly to the east?

Determine $\vec{A} + B + \vec{C} = \vec{R}$

x	y
$A_x = +10\cos 30^\circ$	$A_y = +10\sin 30^\circ$
$= +8.66$	$= +5$
$B_x = +16\sin 40^\circ$	$B_y = -16\cos 40^\circ$
$= +10.3$	$= -12.3$
$C_x = -14$	$C_y = 0$
$R_x = +4.94$	$R_y = -7.26$





$$R = \sqrt{(4.94)^2 + (7.26)^2}$$

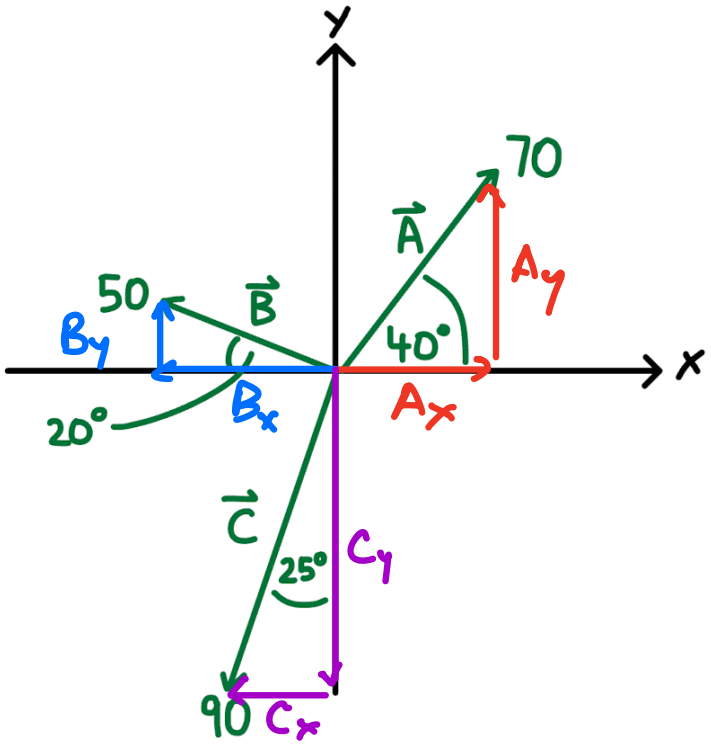
$$= 8.78$$

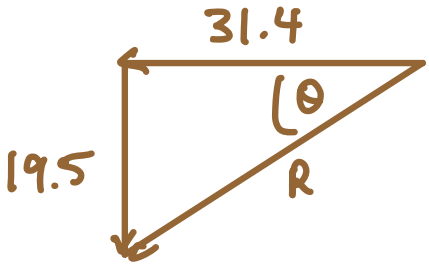
$$\theta = \tan^{-1}\left(\frac{4.94}{7.26}\right) = 34.3^\circ$$

8.78	34.3°	E	of	S

Determine $\vec{A} + B + \vec{C} = \vec{R}$

x	y
$A_x = +70\cos 40^\circ$	$A_y = +70\sin 40^\circ$
$= +53.6$	$= +45.0$
$B_x = -50\cos 20^\circ$	$B_y = +50\sin 20^\circ$
$= -47.0$	$= +17.1$
$C_x = -90\sin 25^\circ$	$C_y = -90\cos 25^\circ$
$= -38.0$	$= -81.6$
$R_x = -31.4$	$R_y = -19.5$





$$R = \sqrt{(31.4)^2 + (19.5)^2}$$

$$= 36.9$$

$$\theta = \tan^{-1}\left(\frac{19.5}{31.4}\right) = 31.8^\circ$$

36.9	31.8° S of W

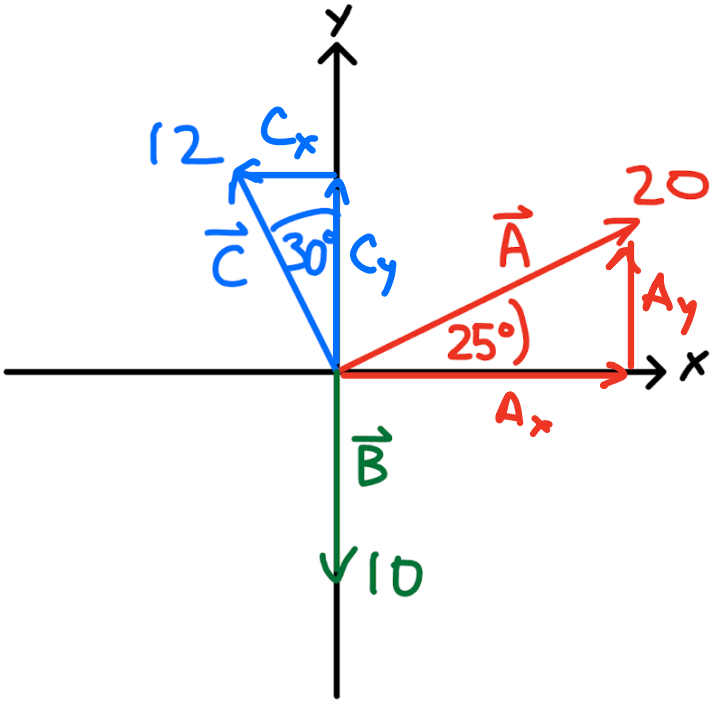
Determine

a) $\vec{A} + \vec{B}$

b) $\vec{A} - \vec{B}$

c) $\vec{A} + \vec{C}$

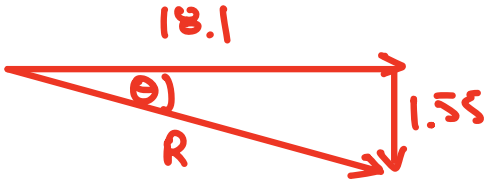
d) $\vec{A} + \vec{B} + \vec{C}$



x	y
$A_x = +20\cos 25$ $= +18.1$	$A_y = +20\sin 25°$ $= +8.45$
$B_x = 0$	$B_y = -10$
$C_x = -12\sin 30°$ $= -6$	$C_y = +12\cos 30°$ $= +10.4$

a) $R_x = A_x + B_x = +18.1$

$R_y = A_y + B_y = -1.55$



$R = \sqrt{(18.1)^2 + (1.55)^2}$

$= 18.2$

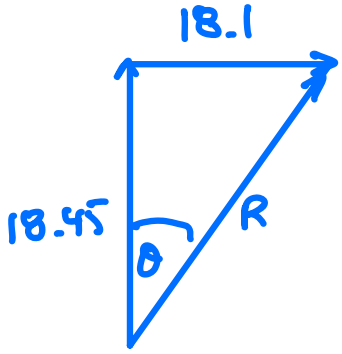
$\theta = \tan^{-1}\left(\frac{1.55}{18.1}\right)$

$= 4.88°$

18.2 4.88° S of E

b) $R_x = A_x - B_x = +18.1$

$R_y = A_y - B_y = +18.45$



$R = \sqrt{(18.1)^2 + (18.45)^2}$

$= 25.9$

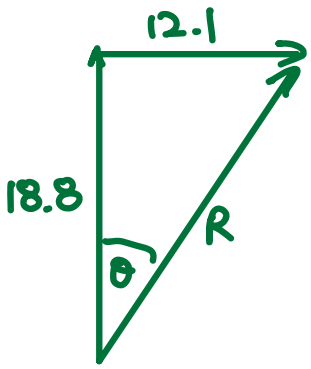
$\theta = \tan^{-1}\left(\frac{18.1}{18.45}\right)$

$= 44.5°$

25.9 44.5° E of N

c) $R_x = A_x + C_x = +12.1$

$R_y = A_y + C_y = +18.8$



$R = \sqrt{(12.1)^2 + (18.8)^2}$

$= 22.4$

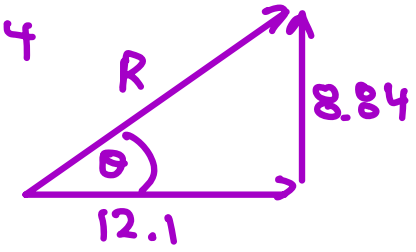
$\theta = \tan^{-1}\left(\frac{12.1}{18.8}\right)$

$= 32.8^\circ$

22.4	32.8° E of N

d) $R_x = A_x + B_x + C_x = +12.1$

$R_y = A_y + B_y + C_y = +8.84$



$R = \sqrt{(12.1)^2 + (8.84)^2}$

$= 15.0$

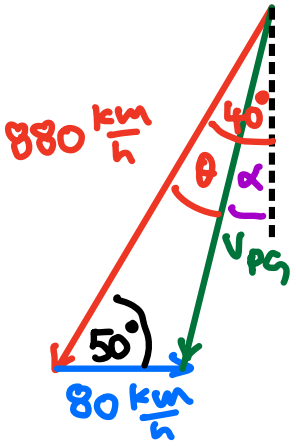
$\theta = \tan^{-1}\left(\frac{8.84}{12.1}\right)$

$= 36.1^\circ$

15.0	36.1° N of E

A plane has an air speed of 880 km/h and aims 40° west of south. Wind blows from the west at 80 km/h. What is the groundspeed of the plane? Direction?

$\vec{v}_{PA} + \vec{v}_{AG} = \vec{v}_{PG}$



$v_{PG}^2 = (880)^2 + (80)^2 - 2(880)(80)\cos 50°$

$v_{PG} = 831 \frac{km}{h}$

$\frac{\sin\theta}{80} = \frac{\sin 50°}{831}$

$\theta = \sin^{-1}\left(\frac{80}{831}\sin 50°\right) = 4.23°$

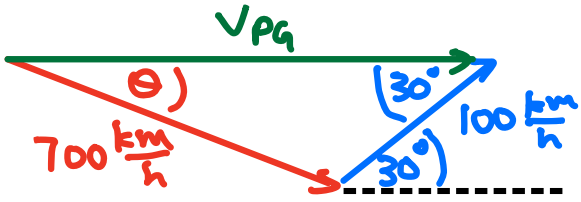
$\alpha = 40° - \theta$

$= 40° - 4.23° = 35.8°$

831 km/h 35.8° W of S

A plane can travel at 700 km/h in still air. A 100 km/h wind blows 30° north of east. What direction should the plane aim to reach a destination directly to the east?

$\vec{v}_{PA} + \vec{v}_{AG} = \vec{v}_{PG}$



$\frac{\sin\theta}{100} = \frac{\sin 30°}{700}$

$\theta = \sin^{-1}\left(\frac{100}{700}\sin 30°\right)$

$= 4.10°$

4.10° S of E