

1. $98 \cdot \cos(45^\circ) = 69.3 \text{ km west}$

$$98 \cdot \sin(45^\circ) = 69.3 \text{ km south}$$

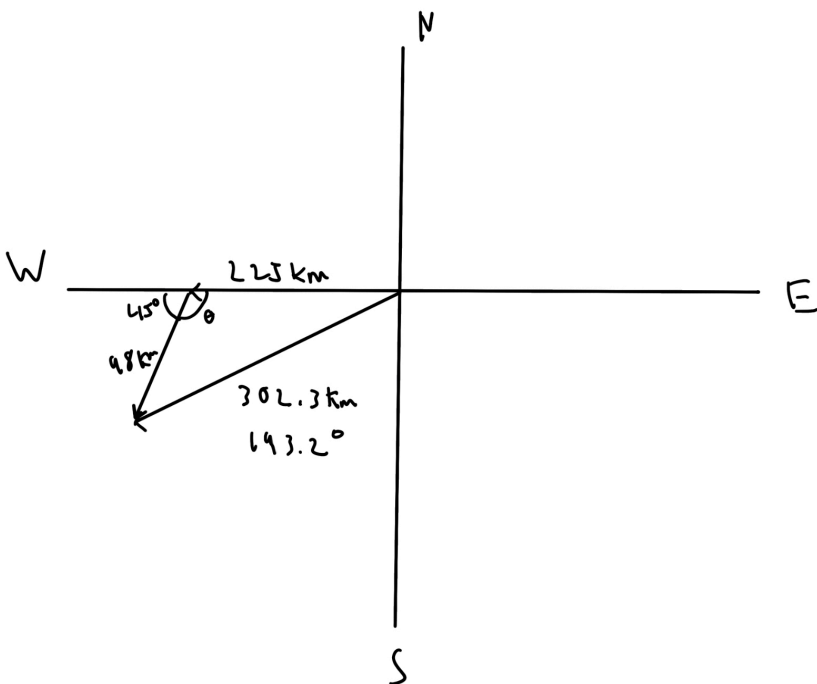
$$\text{West displacement} = 225 \text{ km} + 69.3 \text{ km} = 294.3 \text{ km west}$$

$$\text{South displacement} = 69.3 \text{ km south}$$

$$\sqrt{294.3^2 + 69.3^2} = \boxed{302.3 \text{ km}} \text{ magnitude}$$

$$\theta = \arctan(69.3/294.3) + 190^\circ = \boxed{193.2^\circ} \text{ direction}$$

(From east)



3. $\text{magnitude} = \sqrt{9.8^2 + (-6.4)^2} = \boxed{11.7 \text{ units}}$

$\text{Direction} = \arctan(-6.4/9.8) = \boxed{-33.1^\circ}$

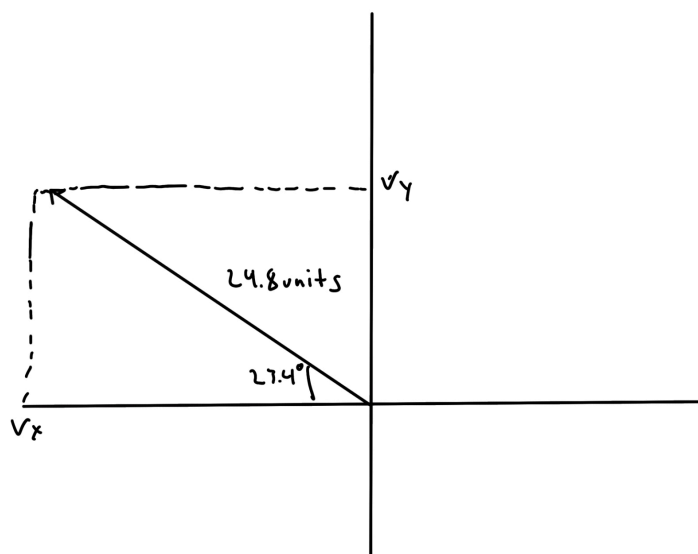
5.

$V_x = 24.8 \cos(203.4^\circ) = \boxed{-22.8 \text{ units}}$

$V_y = 24.8 \sin(203.4^\circ) = \boxed{9.85 \text{ units}}$

$\text{magnitude} = \sqrt{(-22.8)^2 + 9.85^2} = \boxed{24.8 \text{ units}}$

$\text{Direction} = \arctan(9.85/-22.8) = \boxed{-23.4}$



7. (a) $6.8 + (-5.5) = \boxed{1.3 \text{ units}}$ pos x

(b) $6.8 - (-5.5) = \boxed{12.3 \text{ units}}$ pos x

(c) $-5.5 - 6.8 = \boxed{-12.3 \text{ units}}$ neg x

9. $A = 44 \cos(28^\circ) = 38.85$, $44 \sin(28^\circ) = 20.66$
 $B = -26.5 \cos(56^\circ) = -14.82$, $26.5 \sin(56^\circ) = 21.97$
 $C = 31 \cos(270^\circ) = 0$, $31 \sin(270^\circ) = -31$

(a) $38.85 + (-14.82) = \boxed{24}$

$20.66 + 21.97 + (-31) = \boxed{11.6}$

(b) $\sqrt{(24.03)^2 + (11.63)^2} = \boxed{26.7}$ $\theta = \tan^{-1}\left(\frac{11.63}{24.03}\right) = \boxed{25.8^\circ}$

11.

$A - C = 38.85 - 0 = 38.85$, $20.66 - (-31) = 51.66$

$\sqrt{38.85^2 + 51.66^2} = \boxed{64.6}$ $\theta = \tan^{-1}\left(\frac{51.66}{38.85}\right) = \boxed{53.1^\circ}$

13.

$$(a) A - B + C = 38.85 - (-14.82) = \boxed{53.67}$$

$$A - B + C = 20.66 - 21.97 + (-31) = \boxed{-32.31}$$

$$\sqrt{(53.67)^2 + (-32.31)^2} = \boxed{62.6} \quad \theta = \tan^{-1}\left(\frac{-32.31}{53.67}\right) = \boxed{31^\circ} \text{ below x axis}$$

$$(b) A + B - C = 38.85 + (-14.82) = \boxed{24.03}$$

$$A + B - C = 20.66 + 21.97 - (-31) = \boxed{73.63}$$

$$\sqrt{(24.03)^2 + (73.63)^2} = \boxed{77.5} \quad \theta = \tan^{-1}\left(\frac{73.63}{24.03}\right) = \boxed{71.9^\circ}$$

$$(c) C - A - B = -38.85 - (-14.82) = \boxed{-24.03}$$

$$C - A - B = -31 - 20.66 - 21.97 = \boxed{-73.63}$$

$$\sqrt{(-24.03)^2 + (-73.63)^2} = \boxed{77.5} \quad \theta = \tan^{-1}\left(\frac{-73.63}{-24.03}\right) = \boxed{71.9^\circ} \text{ below x axis}$$

15.

$$x = -4580 \cos(38.4) \approx \boxed{-3589}$$

$$y = 4580 \sin(38.4) \approx \boxed{2845}$$

$$z = 2450 \text{ m}$$

$$\sqrt{(-3589)^2 + (2845)^2 + (2450)^2} \approx \boxed{5336 \text{ m}}$$