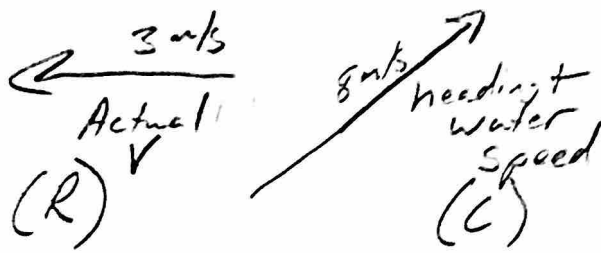


5.



	X(m/s)	Y(m/s)
(C) Current	-8.66	-5.66
(C) Speed + Heading	5.66	5.66
(R) Actual V	-3	0

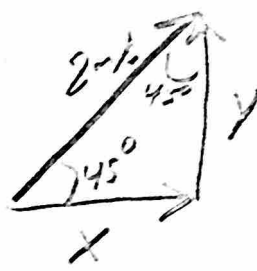
Subtract Speed and heading from Actual V to find Current

We know these

$$\sin 45^\circ = \frac{Y}{8 \text{ m/s}}$$

$$8 \text{ m/s} (\sin 45) = Y$$

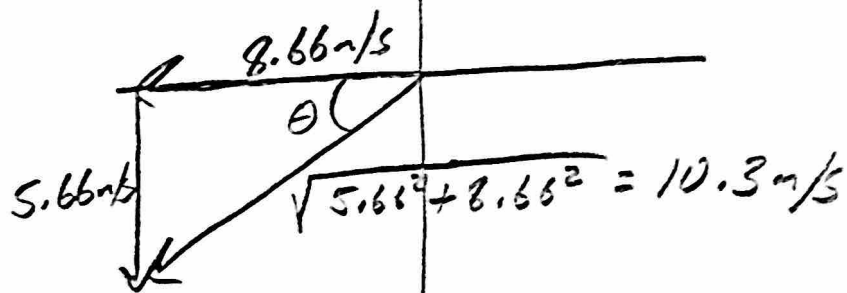
$$Y = 5.66 \text{ m/s}$$



$Y = Y = 5.66 \text{ m/s}$   
Isosceles triangle

$$-3 - (5.66) = -8.66$$

$$0 - 5.66 = -5.66$$

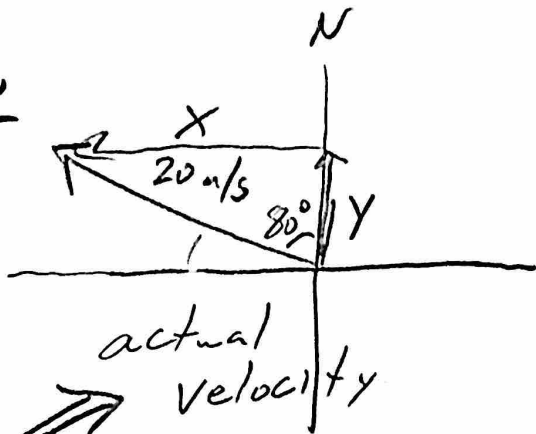


Current Magnitude = 10.3 m/s

$$\theta = \tan^{-1} \left( \frac{5.66 \text{ m/s}}{8.66 \text{ m/s}} \right) = 33.2^\circ \text{ below } -x$$

or  
56.8° left of -y

6.

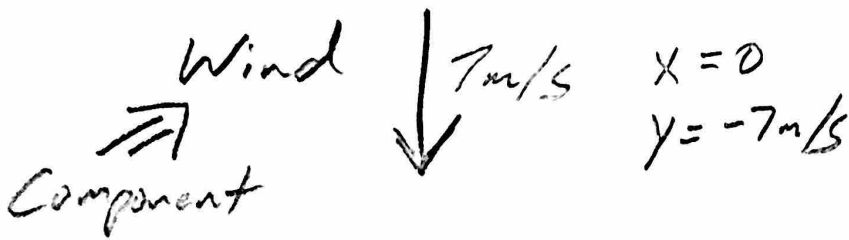


$$\sin 80^\circ = \frac{X}{20 \text{ m/s}}$$

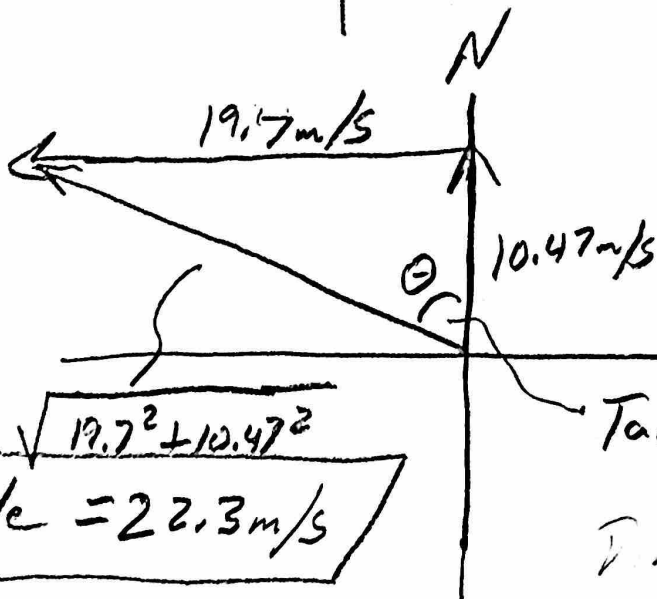
$$X = 20 \text{ m/s} \sin 80^\circ$$

$$X = 19.7 \text{ m/s}$$

$$Y = 20 \text{ m/s} (\cos 80^\circ) = 3.47$$



	X (m/s)	Y (m/s)
(C) Wind	0	-7
(C) Airspeed + heading	-19.7	10.47
(R) Actual Velocity	-19.7	+3.47



$$\sqrt{19.7^2 + 10.47^2}$$

Magnitude = 22.3 m/s

$$\tan^{-1} \left( \frac{19.7}{10.47} \right) = 61.9^\circ \text{ W of N}$$

or

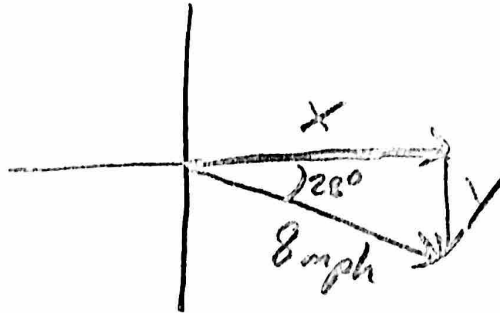
$$28.3^\circ \text{ N of W}$$

7. Cart Heading +  
 ⇒ Speed relative  
 Component to Carrier

↑ 6mph

$X = 0 \text{ mph}$     $Y = 6 \text{ mph}$

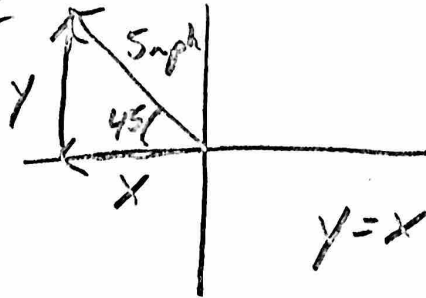
Carrier Heading  
 ⇒ + Water speed  
 Component



$X = \cos 28^\circ (8 \text{ mph})$   
 $= 7.06 \text{ mph}$

$Y = \sin 28^\circ (8 \text{ mph})$   
 $= 3.76 \text{ mph}$

Ocean Current  
 ⇒ Component

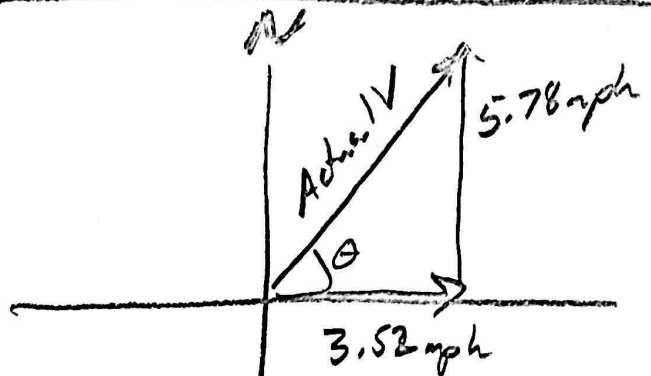


$Y = X = \cos 45^\circ (5 \text{ mph})$   
 $= 3.54 \text{ mph}$

$X = -3.54 \text{ mph}$

$Y = +3.54 \text{ mph}$

	X (mph)	Y (mph)
(C) Current	-3.54	3.54
Carrier Head. (C) + water spd	7.06	-3.76
(C) Cart Head (C) + spd	0	6
(R) Actual Cart Velocity	3.52	5.78



Magnitude =  $\sqrt{3.52^2 + 5.78^2} = 6.77 \text{ mph}$

$\theta = \tan^{-1} \left( \frac{5.78}{3.52} \right) = 58.7^\circ \text{ N of E}$   
 or  $31.3^\circ \text{ E of N}$