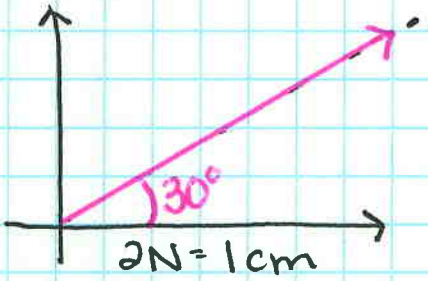
Chp. 8.

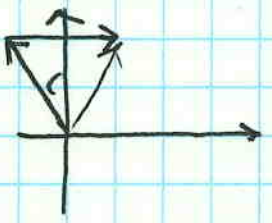
1. i V | ii S | iii V | iv V

2.

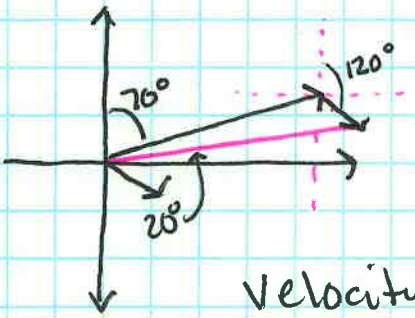


3. 2km N30W
2 km E

2km N 30°E



4. 475 mph 070°
80 mph Wind 120°



$\langle 475\cos 20, 475\sin 20\rangle$
$\langle 80\cos 330, 80\sin 330\rangle$

$\langle 446.354, 162.460\rangle$
$+ \langle 69.282, -40\rangle$

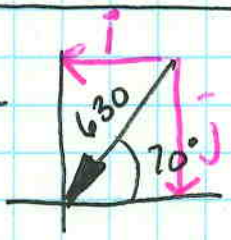
$\langle 515.636, 122.460\rangle$

velocity $= \sqrt{515.636^2 + 122.460^2} = 529.978$ mph

direction $\tan^{-1}\left(\frac{122.460}{515.636}\right) = 13.360°$

true bearing $= 90° - 13.360° = 076.64°$

5.

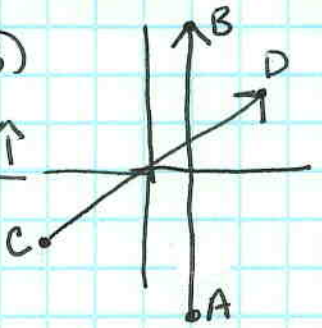


$-i = 630\cos 70 = -215.473\,N\,i$
$-j = 630\sin 70 = 596.006\,N\,j$
$\vec{V} = -215.473\hat{i} - 596.006\hat{j}$

6.a) initial A(1,-3) terminal B(1,3)

$i = (3-(-3)) = 6 \quad \langle 6i, 0j \rangle \quad \vec{v} = 6\hat{i}$

$j = (1-1) = 0$



b. C.(-4,-3) D(5,3)

$i = (5-(-4)) = 9 \quad 9\hat{i} + 6\hat{j}$

$j = (3-(-3)) = 6$

7a) Mag. A(1,-3) B(1,3) b) C(4,-2) D(-3,-2)

$\hat{i} = (-3-3) = -6$ mag = 6 $\quad \hat{i} = (-3-4) = -7$ mag = 7

$\hat{j} = (1-1) = 0 \quad \hat{j} = (-2-(-2)) = 0$

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8. $2w + y \quad \vec{w} = \langle 2, -5 \rangle \quad y = \langle 2, 0 \rangle$

$= \langle 4, -10 \rangle + \langle 2, 0 \rangle = \langle 6, -10 \rangle$

---

9. Unit Vector

A $\vec{v} = \langle 4, -2 \rangle$

$|v| = \sqrt{16+4}$

$|v| = \sqrt{20}$

$u = \frac{4\sqrt{20}}{20}\hat{i} + \frac{-2\sqrt{20}}{20}$

$\vec{u} = \frac{\sqrt{20}}{5}\hat{i} - \frac{\sqrt{20}}{10}\hat{j}$

B. $\vec{w} = \langle 5, -3 \rangle$

$|w| = \sqrt{25+9} = \sqrt{34}$

$\vec{v} = \frac{5\sqrt{34}}{34}\hat{i} - \frac{3\sqrt{34}}{3}$

10. A D(-4,3) E(-1,5)

$\hat{i} = -1+4 = 3$

$\hat{j} = 5-3 = 2$

$3\hat{i}+2\hat{j}$

B. $\langle 2,9\rangle$

$= 2\hat{i}+9\hat{j}$

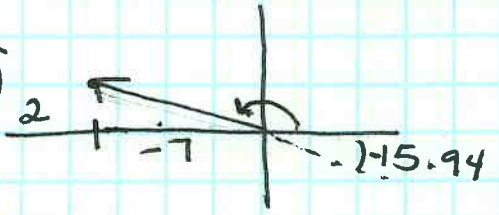
---

11. $\vec{v}$ mag 7, dir 60°

$\langle 7\cos 60, 7\sin 60\rangle$

$\langle 3.5, 6.06\rangle$

12.a) direction of $\vec{r} = -7\hat{i}+2\hat{j}$



$\tan^{-1}\left(\frac{2}{-7}\right) = -15.94$

dir $\vec{r} = 90-15.94 = 74.1°$

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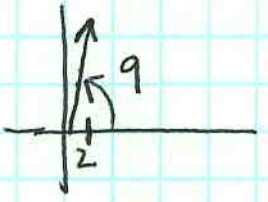
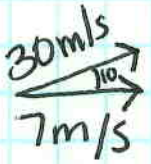
b) $\vec{p} = \langle 2,9\rangle$



$\tan^{-1}\left(\frac{9}{2}\right) = 77.5°$

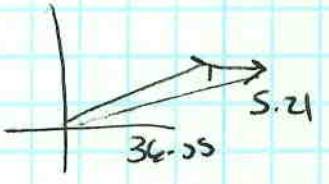
13.



$\vec{r} = \langle 7, 0\rangle$

$\vec{k} = \langle 30\cos 10, 30\sin 10\rangle$

$= \langle 29.55, 5.21\rangle$



$\vec{R} = \langle 36.55, 5.21\rangle$

Speed $= \sqrt{36.55^2+5.21^2} = 37$ m/s at 8.18°

$\tan^{-1}\left(\frac{5.21}{36.55}\right) = 8.18°$