

CH 6 REVIEW

1. a)  $\vec{CD} = (-2, -3) - (-1, 0) = \langle -1, -3 \rangle$   
 $\vec{AB} = (-3, 5) - (4, 2) = \langle -7, 3 \rangle$

$2\vec{CD} - \vec{AB}$   
 $2\langle -1, -3 \rangle - \langle -7, 3 \rangle$   
 $\langle -2, -6 \rangle - \langle -7, 3 \rangle$   
 $\langle 5, -9 \rangle$

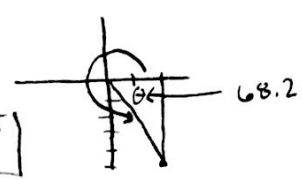
b)  $\vec{AD} = (-2, -3) - (4, 2) = \langle -6, -5 \rangle$   
 $\vec{AD} + \vec{AB} = \langle -6, -5 \rangle + \langle -7, 3 \rangle$   
 $= \langle -13, -2 \rangle$

c)  $\vec{DB} = (-3, 5) - (-2, -3) = \langle -1, 8 \rangle$   
 $\vec{AC} = (-1, 0) - (4, 2) = \langle -5, -2 \rangle$

$\vec{DB} - 3\vec{AC}$   
 $\langle -1, 8 \rangle - 3\langle -5, -2 \rangle$   
 $\langle -1, 8 \rangle + \langle 15, 6 \rangle$   
 $\langle 14, 14 \rangle$

2. a)  $|w| = \sqrt{2^2 + (-5)^2} = \sqrt{29}$

$\tan \theta = \frac{-5}{2} \rightarrow \theta = -68.2^\circ$   
 $360 - 68.2 = 291.8^\circ$



b)  $|v| = \sqrt{(-3)^2 + 1^2} = \sqrt{10}$

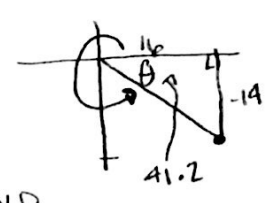
$\tan \theta = \frac{1}{-3} \rightarrow \theta = -18.4^\circ$   
 $180 - 18.4 = 161.6^\circ$



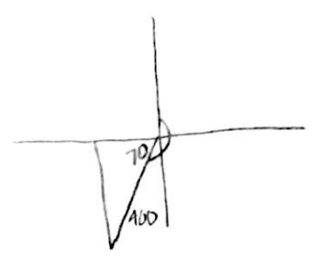
c)  $2\langle 2, -5 \rangle - 4\langle -3, 1 \rangle$   
 $\langle 4, -10 \rangle + \langle 12, -4 \rangle$   
 $\langle 16, -14 \rangle$

MAG:  $\sqrt{16^2 + (-14)^2} = \sqrt{452} = 2\sqrt{113}$

$\tan \theta = \frac{-14}{16} \rightarrow \theta = -41.2^\circ$   
 $360 - 41.2 = 318.8^\circ$



3. PLANE

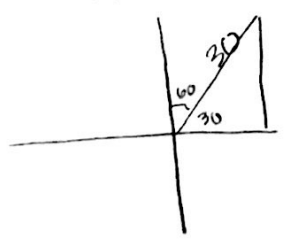


$\langle 400 \cos 70, 400 \sin 70 \rangle$

a)  $\langle -136.8, -375.9 \rangle$

$P+W = \langle -110.8, -360.9 \rangle$

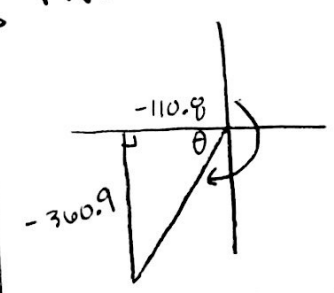
WIND



$\langle 30 \cos 30, 30 \sin 30 \rangle$

b)  $\langle 26, 15 \rangle$

P+W



SPEED =  $\sqrt{(-110.8)^2 + (-360.9)^2} = 377.5$  MPH

$\tan \theta = \frac{-360.9}{-110.8} \rightarrow \theta = 72.9^\circ$

$270 - 72.9 = 197.1^\circ$  (d)

4. (a) VELOCITY VECTOR:  $\langle 80\cos 60, 80\sin 60 \rangle = \langle 40, 69.282 \rangle$

$$\begin{cases} x = 40t \\ y = -16t^2 + 69.282t \end{cases}$$

(b) LOOK AT  $y$  WHEN  $t = 2 \rightarrow \boxed{74.56 \text{ FT}}$

(c) LOOK AT  $x$  WHEN  $y = 0$   
LOOK AT  $t$  WHEN  $y = 0 \rightarrow$  IT WILL TRAVEL 173.2 - 173.6 FT  
IN THE AIR FOR 4.33 - 4.34 SEC

(d) 40 YDS = 120 FT  
HOW HIGH WHEN BALL IS 120 FT AWAY  $\rightarrow$  63.85 FT HIGH, SO YES!

5.  $x = 3 - 5t$

$y = 5t^2 + 4$

$x - 3 = -5t$

$-x + 3 = 5t$

$\frac{3-x}{5} = t$

$y = 5 \left( \frac{3-x}{5} \right)^2 + 4$

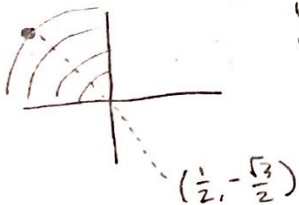
$y = \frac{5}{25} (3-x)^2 + 4$

$y = \frac{1}{5} (3-x)^2 + 4$  (PARABOLA)

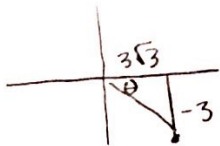
6. (a)  $(4, \frac{5\pi}{6})$   $x = 4\cos \frac{5\pi}{6} = 4(-\frac{\sqrt{3}}{2}) = -2\sqrt{3}$   
 $y = 4\sin \frac{5\pi}{6} = 4(\frac{1}{2}) = 2$  }  $\boxed{(-2\sqrt{3}, 2)}$



(b)  $(-4, -\frac{\pi}{3})$   $x = -4\cos \frac{\pi}{3} = -4(\frac{1}{2}) = -2$   
 $y = -4\sin \frac{\pi}{3} = -4(\frac{\sqrt{3}}{2}) = -2\sqrt{3}$  }  $\boxed{(-2, 2\sqrt{3})}$



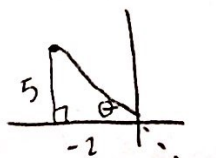
7. (a)  $(3\sqrt{3}, -3)$   $r^2 = (3\sqrt{3})^2 + (-3)^2$   
 $r^2 = 27 + 9$   
 $r^2 = 36$   
 $r = \pm 6$



$\tan \theta = \frac{-3}{3\sqrt{3}} \rightarrow \theta = -30$

$\boxed{\begin{matrix} (6, -30) \\ (-6, 150) \\ (6, 330) \end{matrix}}$

(b)  $(-2, 5)$   $r^2 = 5^2 + (-2)^2$   
 $r^2 = 29$   
 $r = \pm \sqrt{29}$   
 $\tan \theta = \frac{5}{-2} \rightarrow \theta = -68.2$



$\boxed{\begin{matrix} (-\sqrt{29}, -68.2) \\ (\sqrt{29}, 111.8) \\ (-\sqrt{29}, 291.8) \end{matrix}}$

9. (a)  $r = 3 \sin 2\theta$

- 4 PETALS LENGTH 3
- SYM: X, Y, ORIGIN

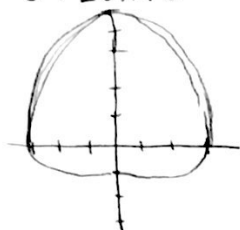
(b)  $r = 4 \cos 3\theta$

- 3 PETALS LENGTH 4
- SYM: X-AXIS

(c)  $r = \sin 4\theta$

- 8 PETALS LENGTH 1
- SYM: X, Y, ORIGIN

10.  $r = 3 + 2 \sin \theta$



11. (a) DOT:  $\langle 2, 3 \rangle \cdot \langle 1, -2 \rangle$

$$= 2(1) + 3(-2)$$

$$= 2 - 6$$

$$= \boxed{-4}$$

ANG:

$$\cos \theta = \frac{-4}{\sqrt{2^2+3^2} \sqrt{1^2+(-2)^2}}$$

$$\cos \theta = \frac{-4}{\sqrt{13} \sqrt{5}}$$

$$\cos \theta = -.496$$

$$\boxed{\theta = 119.7^\circ}$$

(b) DOT:  $\langle -5, 0 \rangle \cdot \langle 3, 6 \rangle$

$$= -5(3) + 0(6)$$

$$= \boxed{-15}$$

ANG:

$$\cos \theta = \frac{-15}{\sqrt{(-5)^2+0^2} \sqrt{3^2+6^2}}$$

$$\cos \theta = \frac{-15}{5 \sqrt{73}}$$

$$\cos \theta = -.351$$

$$\boxed{\theta = 110.6^\circ}$$

(c) DOT:  $\langle 4, 12 \rangle \cdot \langle -1, 2 \rangle$

$$= 4(-1) + 12(2)$$

$$= -4 + 24$$

$$= \boxed{20}$$

ANG:

$$\cos \theta = \frac{20}{\sqrt{4^2+12^2} \sqrt{(-1)^2+2^2}}$$

$$\cos \theta = \frac{20}{\sqrt{160} \sqrt{5}}$$

$$\cos \theta = .707$$

$$\boxed{\theta = 45^\circ}$$

12.  $r = \frac{2}{1 + \cos \theta}$

$$r(1 + \cos \theta) = 2$$

$$r + r \cos \theta = 2$$

$$r + x = 2$$

$$\sqrt{x^2 + y^2} + x = 2$$

$$(\sqrt{x^2 + y^2})^2 = (2 - x)^2$$

$$x^2 + y^2 = 4 - 4x + x^2$$

$$\boxed{y^2 = 4 - 4x}$$

13.  $3x + 4y = 2$

$$3r \cos \theta + 4r \sin \theta = 2$$

$$r(3 \cos \theta + 4 \sin \theta) = 2$$

$$\boxed{r = \frac{2}{3 \cos \theta + 4 \sin \theta}}$$

14.  $r = 4\cos\theta - 4\sin\theta$   
 $r^2 = 4r\cos\theta - 4r\sin\theta$   
 $x^2 + y^2 = 4x - 4y$

15.  $r\sec\theta = 3$   
 $r = 3\cos\theta$   
 $r^2 = 3r\cos\theta$   
 $x^2 + y^2 = 3x$