***Review Problems Section 6.1,6.4* ALL WORK SHOULD BE DONE NEATLY ON LINED PAPER AND WILL BE GRADED FOR ACCURACY ON DUE DATE. YOU MUST SHOW WORK TO GET HW CREDIT. LATE ASSIGNMENTS WILL NOT BE ACCEPTED FOR MORE THAN 50% CREDIT**

HW PAGE 1 (FRONT SIDE-OMIT NUMBERS 5 and 6) DUE __________________________

HW PAGE 2 (BACK SIDE) DUE____________________________

In Exercises 1–6, let $\mathbf{u} = \langle 2, -1 \rangle$, $\mathbf{v} = \langle 4, 2 \rangle$, and $\mathbf{w} = \langle 1, -3 \rangle$ be vectors. Find the indicated expression.

1. $\mathbf{u} - \mathbf{v}$

2. $2\mathbf{u} - 3\mathbf{w}$

3. $|\mathbf{u} + \mathbf{v}|$

4. $|\mathbf{w} - 2\mathbf{u}|$

5. $\mathbf{u} \cdot \mathbf{v}$

6. $\mathbf{u} \cdot \mathbf{w}$

In Exercises 7–10, let $A = (2, -1)$, $B = (3, 1)$, $C = (-4, 2)$, and $D = (1, -5)$. Find the component form and magnitude of the vector.

7. $3\overrightarrow{AB}$

8. $\overrightarrow{AB} + \overrightarrow{CD}$

9. $\overrightarrow{AC} + \overrightarrow{BD}$

10. $\overrightarrow{CD} + \overrightarrow{AB}$

*** vectors should be given in both component form and as linear combination.**

In Exercises 13 and 14, find **(a)** the direction angles of **u** and **v**

13. $\mathbf{u} = \langle 4, 3 \rangle$, $\mathbf{v} = \langle 2, 5 \rangle$

14. $\mathbf{u} = \langle -2, 4 \rangle$, $\mathbf{v} = \langle 6, 4 \rangle$

Use an algebraic method in Exercises 15–18 to convert the polar coordinates to rectangular coordinates. Approximate exact values with a calculator when appropriate.

15. $(-2.5, 25°)$

16. $(-3.1, 135°)$

(16-18 use unit circle exact values)

17. $(2, -\pi/4)$

18. $(3.6, 3\pi/4)$

Use an algebraic method in Exercises 21–24 to find the polar coordinates of the given rectangular coordinates of point P that satisfy the stated conditions. Approximate exact values with a calculator when appropriate.

(a) $0 \le \theta \le 2\pi$

21. $P = (2, -3)$

22. $P = (-10, 0)$

23. $P = (5, 0)$

24. $P = (0, -2)$

74. Flight Engineering An airplane is flying on a bearing of 80° at 540 mph. A wind is blowing with the bearing 100° at 55 mph.

(a) Find the component form of the velocity of the airplane.

(b) Find the actual speed and direction of the airplane.

75. Flight Engineering An airplane is flying on a bearing of 285° at 480 mph. A wind is blowing with the bearing 265° at 30 mph.

(a) Find the component form of the velocity of the airplane.

(b) Find the actual speed and direction of the airplane.

80. Ferris Wheel Problem Lucinda is on a Ferris wheel of radius 35 ft that turns at the rate of one revolution every 20 sec. The lowest point of the Ferris wheel (6 o'clock) is 15 ft above ground level at the point $(0, 15)$ of a rectangular coordinate system. Find parametric equations for the position of Lucinda as a function of time t in seconds if Lucinda starts $(t = 0)$ at the point $(35, 50)$.

81. Ferris Wheel Problem The lowest point of a Ferris wheel (6 o'clock) of radius 40 ft is 10 ft above the ground, and the center is on the y-axis. Find parametric equations for Henry's position as a function of time t in seconds if his starting position $(t = 0)$ is the point $(0, 10)$ and the wheel turns at the rate of one revolution every 15 sec.

82. Ferris Wheel Problem Sarah rides the Ferris wheel described in Exercise 81. Find parametric equations for Sarah's position as a function of time t in seconds if her starting position $(t = 0)$ is the point $(0, 90)$ and the wheel turns at the rate of one revolution every 18 sec.

CONVERT THE POLAR EQUATION TO RECTANGULAR FORM EQUATION AND DESCRIBE THE GRAPH

31. $r = 5 \csc \theta$ **32.** $r = 4 \sin \theta$

41. $r = 2 \sin \theta - 4 \cos \theta$ **42.** $r = 4 \cos \theta - 4 \sin \theta$

Convert $(x - 3)^2 + (y - 2)^2 = 13$ to polar form.