Pre-Calculus: Review of Vectors and Parametric Equations (Use your own paper)

Given the following coordinates, find the component form, magnitude, and direction angle of each vector.

A(-3, -5) B(5, 1) C(-3, 11)

1. Vector AB 2. Vector BC 3. Vector AC

Given $u = \langle -3,2 \rangle$ and $v = \langle 2,4 \rangle$ Find the following and sketch the resultant vector

4. u + v 5. u – v

Given $u = \langle -3,2 \rangle$ and $v = \langle 2,4 \rangle$
Find the following.

6. 2u – 3v 7. v + 4u

Write the following in component form.

8. 8i + 6j 9. 5i – 2j

Write the following in as a standard linear combination of **i** and **j**.

10. $u = \langle -3,2 \rangle$ 11. $v = \langle 2,4 \rangle$

Find a unit vector in the direction of the given vector. Write the result in component form and as a standard linear combination of **i** and **j**.

12. $u = \langle -3,2 \rangle$ 13. $v = \langle 2,4 \rangle$

Find the component form of v given its magnitude and the direction angle.

14. $|v| = 5 \quad \theta = 42^\circ$ 15. $|v| = 7 \quad \theta = 142^\circ$

16. Forces with magnitudes of 2000 newtons and 900 newtons act on a machine part at angle of $\theta = 30^\circ$ and $\theta = -45^\circ$, respectively with the positive x-axis. Find the direction and magnitude of the resultant of these forces.

17. An airplane is flying in the direction 332° with an airspeed of 580 mph. The wind at the altitude of the plane, is blowing from the southwest with a velocity of 60 mph.
a. Draw a picture that gives a visual representation of the problem.
b. Fine the speed of the jet and the direction it is flying in.

18. An airplane is flying in the direction 148° with an airspeed of 860 kmh. Because of the wind, its groundspeed and direction are, respectively, 800 kmh and 140°. Find the direction and speed of the wind.

Find the dot product of u and v and then find the angle between the 2 vectors u and v.

19. $u = \langle -3,2 \rangle \quad v = \langle 2,4 \rangle$

Determine whether u and v are orthogonal, parallel or neither.

20. $u = \langle 2,-2 \rangle \; v = \langle -1,-1 \rangle$

21. $u = \langle 2,4 \rangle \; v = \langle -3,-6 \rangle$

Sketch the curve represented by the parametric equations. Then eliminate the parameter and write the corresponding rectangular equation whose graph represents the curve.

22. $x = 3 - 2t \quad y = 2 + 3t$

23. $x = t + 2 \quad y = t^2$

Find a set of parametric equation for the line

24. Passes through (2, -1) and (5, -2)

Find a set of parametric equation for the line segment

25. Endpoints (1, 4) and (5, -2)

26. **Hitting a baseball**: Trevor Story, rookie shortstop of the Colorado Rockies, hits a baseball at 3 feet above the ground with an initial speed of 126ft/sec at angle of 29 degrees with the horizontal. Will the ball clear a 10 foot wall that is 375 feet away?

27. The men's horseshoe pitching court has metal stakes 45 feet apart. The stakes stand 18 inches out of the ground.

a. Alan pitches a horseshoe at 50 feet per second, at a 15° angle to the ground. He releases the horseshoe at about 2.5 feet above the ground and 1.75 feet in front of the stake at one end. Write parametric equations modeling a typical throw.

b. How long is the thrown horseshoe in the air?

c. How close to 45 ft is the horizontal component when the horseshoe hits the ground?

d. How far in the horizontal direction is the horseshoe when the horseshoe is 1.5 feet above the ground?