Precalculus
Vector Test Review

Name _____

Date _____

For 1-3, determine the direction and magnitude of the vector $\overrightarrow{PQ}$

1. $P = (2,3),\ Q = (5,9)$

2. $P = (-7,0),\ Q = (-4,-5)$

3. $P = (-3,5),\ Q = (7,-11)$

For 4-10, let $u = \langle 3,1\rangle,\ v = 2i + j$, and $w = \langle -6,-2\rangle$. Evaluate. Write any resultant vectors in $ai + bj$ form.

4. $u + v$

5. $u - v$

6. $2(v - w)$

7. $u + \frac{1}{2}w$

8. $u \cdot v$

9. $w \cdot v$

10. $u \cdot w$

11. Unit vector of w

For 12-14, determine the component form of the vector v whose magnitude and direction angle θ are given.

12. $\|v\| = 10, \theta = 235°$

13. $\|v\| = 3, \theta = 310°$

14. $\|v\| = 6, \theta = 140°$

For 15-17, determine the angle between vectors u and v.

15. $u = \langle 2,4\rangle,\ v = \langle 0,-5\rangle$

16. $u = 2j,\ v = 4i + j$

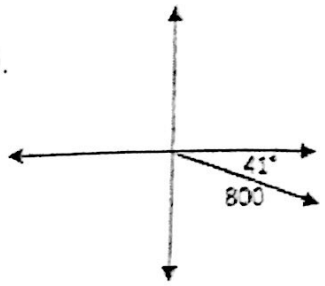
17. $u = \sqrt{2}i + \sqrt{2}j,\ v = i - j$

For 18-20, write the resultant component vector in $v = ai + bj$ form.

18. A vector with a magnitude of 60 and a bearing of 199°.

19. A vector with a length of 5 and a direction of N81°W.

20.



21. Jane left camp three days ago on a journey into the jungle. Three days of her journey can be described by position vectors $\overrightarrow{d_1} = \langle 7, 8 \rangle$, $\overrightarrow{d_2} = \langle 6, 2 \rangle$, and $\overrightarrow{d_3} = \langle 2, 9 \rangle$. How far is Jane from the camp at the end of day three and in what direction is Jane from camp at the end of day three? Assume 0° is the rightward direction.

22. A plane traveling at 400 mph is flying with a bearing of 40°. There is a wind of 50 mph from the south. If no correction is made for the wind, what is the final bearing and speed of the plane?

23. An object at the origin is acted upon by two forces. A 150-pound force makes an angle of 20° with the positive x-axis, and the other force of 100 pounds makes an angle of 70° with the positive x-axis. Determine the direction and magnitude of the resultant force.

Eliminate the parameter.

24. $x = t - 3, \quad y = 2t + 1, \quad t \geq 0$

25. $x = t + 5, \quad y = \sqrt{t}, \quad t \geq 0$

26. $x = -2 + t^2, \quad y = 1 + 2t^2, \quad for\ any\ t$

27. $x = e^t, \quad y = t, \quad for\ any\ t$

28. $x = 3\cos t, \quad y = 3\sin t, \quad 0 \leq t \leq 2\pi$

29. $x = 2\sin t - 3, \quad y = 2\cos t + 1, \quad 0 \leq t \leq 2\pi$

30. A golfer at a driving range stands on a platform 2 feet above the ground and hits the ball with an initial velocity of 120 feet/second at an angle of 39° with the horizontal. There is a 32-foot-high fence 400 feet away. Determine the position of the ball as a pair of parametric equations. Will the ball fall short, hit the fence, or go over the wall?

31. Suppose a professional football player kicks a football with an initial velocity of 29 yards per second at an angle of 68° to the horizontal. Suppose a kick returner catches the ball 5 seconds later. Determine the position of the ball as a pair of parametric equations. How far has the ball traveled horizontally and what is its vertical height at the time it is caught?