Chapter 10 review!

1. Given the parametric equations $\begin{cases} x = 2 - t \\ y = t^2 - 1 \end{cases}$, eliminate the parameter $t$ to write an equation in $x$ and $y$ that represents the same curve.

2. Given the parametric equations $\begin{cases} x = \sqrt{2t} \\ y = 2t + t^2 \end{cases}$, eliminate the parameter $t$ to write an equation in $x$ and $y$ that represents the same curve.

Let $\vec{u} = \langle 2, -4 \rangle$ and $\vec{v} = \langle -3, -2 \rangle$.

3. Determine $\|\vec{v}\|$.

4. Determine $3\vec{u} - 2\vec{v}$.

5. Determine $\vec{u} \bullet \vec{v}$.

6. Let $\vec{u} = \langle 4, -1 \rangle$ and $\vec{v} = \langle 3, 0 \rangle$.
   Determine $2\vec{u} - 4\vec{v}$.

7. Let $\vec{u} = \langle 2, -4 \rangle$ and $\vec{v} = \langle -3, -2 \rangle$.
   Determine the measure of the angle between $\vec{u}$ and $\vec{v}$ to the nearest tenth of a degree.

8. Prove that if $\vec{u}$, $\vec{v}$, and $\vec{w}$ are two-dimensional vectors, then $\vec{u} \bullet \vec{v} + \vec{u} \bullet \vec{w} = \vec{u} \bullet (\vec{v} + \vec{w})$.

9. Prove that if $\vec{u}$ and $\vec{v}$ are two-dimensional vectors, then $\vec{u} \bullet \vec{v} = \vec{v} \bullet \vec{u}$.

10. Find all vectors of magnitude 1 that are orthogonal to the vector $\vec{v} = \langle -3, -2 \rangle$.

11. Find all vectors of magnitude 2 that are orthogonal to the vector $\vec{v} = \langle 3, 0 \rangle$.

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12. A ship's mast is partially stabilized by stays. If one of the stays makes an angle of 58° with the horizontal, and the tension force at the base of the stay is 435 pounds, express the force as a vector in component form.

13. An airplane is traveling 320 miles per hour in a direction 45° north of west. Find the component representation of the airplane's velocity vector.

14. A plane's compass setting is 45° north of east at an airspeed of 345 miles per hour and there is a wind blowing from the north at 45 miles per hour. Find the actual speed and direction of the plane.

15. A rower sets off at 3.4 miles per hour, moving upstream across a river at an angle of 65° with the bank of the river, where the current is 0.3 miles per hour downstream. Find the actual speed and direction of the rower.

The path of a thrown ball is given by the parametric equations $\begin{cases} x = t + 3 \\ y = \pm 16t^2 + 14t + 6 \end{cases}$, where $x$ and $y$ are in feet and $t$ is in seconds.

16. Give the vertical velocity at release.

17. Where is the ball after 1 second?

18. Where does the ball hit the ground?

Consider the parametric equations $\begin{cases} x = t + 3 \\ y = t - 2 \end{cases}$ when $\pm 3 \le t \le 1$.

19. Graph the equations.

20. How would the graph of these equations be different if you changed the $t$ in both equations to $2t$?

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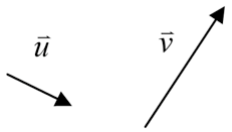
Let $A = (2, \pm 1)$ and $B = (\pm 3, 4)$.

21. Sketch the vector with initial point $A$ and its tip at $B$.

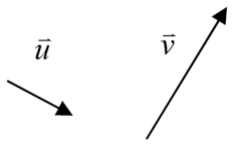
22. Find the component representation of the vector with initial point $A$ and its tip at $B$.

23. Find a polar representation of the vector with initial point $A$ and its tip at $B$.

24. Sketch $\vec{u} + \vec{v}$ given the vectors $\vec{u}$ and $\vec{v}$ as shown.




25. Sketch $2\vec{u} + \vec{v}$ given the vectors $\vec{u}$ and $\vec{v}$ as shown.




26. Write parametric equations for the line through the point $(3, \pm 2)$ and parallel to the vector $\langle 1.5, 7.33 \rangle$.

27. Write parametric equations for the line through the point $(4, \pm 1)$ and parallel to the vector $\langle -4, 3.2 \rangle$.