

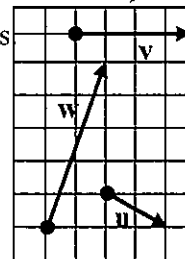
Vector Worksheet #1

Use separate paper--graph paper if necessary.

Introduction to Vectors

Algebra II/Trigonometry Honors

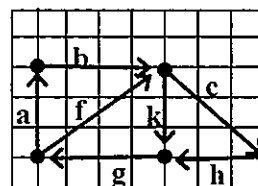
In Problems 1-6, use the vectors in the figure at the right to **graph** the following vectors



1. $v + w$ 2. $u + v$ 3. $3u$
 4. $w - v$ 5. $3v + u - 2v$ 6. $2u - 3v + w$

In Problems 7- 12, determine whether each statement is true or false.

7. $a + b = f$ 8. $k + g = f$ 9. $c + h = k$
 10. $b + k + g = a$ 11. $a - b = g - k$ 12. $a + b + k + g = 0$



In Problems 13 – 18, if vector v has initial point P and terminal point Q , write v in the form $ai + bj$ and in the form $\langle a, b \rangle$. That is, find its **position vector**.

13. $P(3,2), Q(8,9)$ 14. $P(5,3), Q(1,0)$ 15. $P(-1, -5), Q(6,2)$
 16. $P(4,7), Q(-4,-2)$ 17. $P(-1,4), Q(6, -5)$ 18. $P(-3,-5), Q(-5,-7)$

In Problems 19 – 22, find $2u, u + v$, and $3u - 4v$, for the given vectors of u and v .

19. $u = \langle 2,7 \rangle, v = \langle 3,1 \rangle$ 20. $u = \langle -2,5 \rangle, v = \langle 2,8 \rangle$ 21. $u = i, v = -2j$ 22. $u = 2i, v = 3i - 2j$

In Problems 23 – 28, find $\|v\|$.

23. $v = 3i - 4j$ 24. $v = -5i + 12j$ 25. $v = i - j$
 26. $v = -i - j$ 27. $v = -2i + 3j$ 28. $v = 6i + 2j$

Vector Worksheet #2

Use separate paper or graph paper if necessary.

Algebra II/Trig Honors

Vectors - Worksheet 2

Given the vectors $\vec{u} = \langle -3, 4 \rangle$, $\vec{v} = \langle 3, -2 \rangle$, $\vec{a} = \langle -5, 1, 4 \rangle$, and $\vec{b} = \langle 6, -4, -1 \rangle$, find each of the following linear combinations.

1. $3\vec{u} - 4\vec{v}$

2. $-4\vec{u} + 5\vec{v}$

3. $\frac{1}{2}\vec{u} + \frac{3}{2}\vec{v}$

4. $2\vec{a} + 7\vec{b}$

5. $\frac{2}{3}\vec{a} + \frac{1}{2}\vec{b}$

6. $\frac{-2}{5}\vec{a} - \frac{4}{5}\vec{b}$

Use the formula $\cos\theta = \frac{\vec{u} \cdot \vec{v}}{\|\vec{u}\|\|\vec{v}\|}$ to find the angle θ between the vectors \vec{u} and \vec{v} .

7. $\vec{u} = \langle 3, 5 \rangle$ $\vec{v} = \langle -6, 4 \rangle$

8. $\vec{u} = \langle 3, -2 \rangle$ $\vec{v} = \langle -6, 9 \rangle$

9. $\vec{u} = \langle 2, 1 \rangle$ $\vec{v} = \langle 7, -4 \rangle$

10. $\vec{u} = \langle 2, 4, 6 \rangle$; $\vec{v} = \langle -1, -4, 2 \rangle$

11. $\vec{u} = \langle -2, 0, 3 \rangle$; $\vec{v} = \langle 2, 2, 2 \rangle$

12. $\vec{u} = \langle 1, -2, 3 \rangle$; $\vec{v} = \langle 2, -1, -2 \rangle$

Resolve each vector into component form.

13. 40 lbs at 40°

14. 60 lbs. at 100°

15. 6N at 220°

16. 12N at 300°

Find the magnitude and direction (as an angle in standard position) of each vector in Problems 17-22

17. $\langle -3, -4 \rangle$

18. $\langle -5, 10 \rangle$

19. $\langle -6, -2 \rangle$

20. $\langle \sqrt{3}, -1 \rangle$

21. $\langle -1, 7 \rangle$

22. $\langle 14, 8 \rangle$

Vector Worksheet 2A

Use separate paper or graph paper if necessary.

Algebra II/ Trig Honors

Perpendicular And Parallel Vectors

Name _____

Period _____

Find the cross product of each of the following vectors \mathbf{u} and \mathbf{v} .

1. $\mathbf{u} = \langle 2, 3, 4 \rangle$ $\mathbf{v} = \langle -1, 6, 4 \rangle$ 2. $\mathbf{u} = \langle 4, -7, 2 \rangle$ $\mathbf{v} = \langle 5, 0, 8 \rangle$

3. $\mathbf{u} = \langle 1, 1, 5 \rangle$ $\mathbf{v} = \langle -2, 3, -5 \rangle$ 4. $\mathbf{u} = \langle 1, -3, 5 \rangle$ $\mathbf{v} = \langle 0, 2, 6 \rangle$

Find the dot product of each of the following vectors \mathbf{u} and \mathbf{v} .

5. $\mathbf{u} = (2, 3, 4)$ $\mathbf{v} = (-1, 6, 4)$ 6. $\mathbf{u} = (4, -7, 2)$ $\mathbf{v} = (5, 0, 8)$ 7. $\mathbf{u} = (1, 1, 5)$ $\mathbf{v} = (-2, 3, -5)$

By definition, two vectors \vec{u} and \vec{v} are parallel if $\vec{u} = k\vec{v}$, for some scalar k . Simply put, \vec{u} and \vec{v} are parallel if they are multiples of each other.

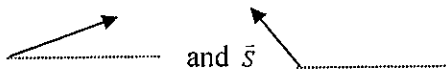

- 8) Find the vector parallel to $\vec{u} = \langle 9, -6 \rangle$ when $k = 3$.
- 9) Find the vector parallel to $\vec{v} = \langle -4, -2 \rangle$ when $k = -4$.
- 10) Vectors \mathbf{u} and \mathbf{v} are parallel. Find the value of k if $\vec{u} = \langle 2, 8 \rangle$ & $\vec{v} = \langle 3, 12 \rangle$. (Hint: Use $\vec{u} = k\vec{v}$).
- 11) Vectors \mathbf{a} and \mathbf{b} are parallel. Find the value of k if $\vec{a} = \langle 4, -6 \rangle$ & $\vec{b} = \langle -12, 18 \rangle$.

Find the value of m that makes the two vectors (a) perpendicular and (b) parallel.

- 12) $\langle -4, 7 \rangle$ & $\langle 8, m \rangle$ 13) $\langle 6, m \rangle$ & $\langle -1, -4 \rangle$ 14) $\langle 2m, 10 \rangle$ & $\langle -3, 6 \rangle$ 15) $\langle 5, 8 \rangle$ & $\langle -2, m \rangle$

Good Job Everyone. Now on to some review problems:

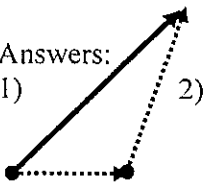
Use the following vectors to answer #16 - #21: $\vec{x} = \langle 1, -3, 5 \rangle$, $\vec{y} = \langle 0, 2, 6 \rangle$, & $\vec{z} = \langle 5, -3, 1 \rangle$.

- 16) Find $3\vec{x} + 4\vec{y}$ 17) Find $\vec{x} - \vec{z}$ 18) Find the angle between \vec{y} & \vec{z}
- 19) Write \vec{y} as a sum of unit vectors 20) Find $||\vec{y}||$ 21) Find $2\vec{x}$
- 22) If $\vec{w} = \langle -3, 4 \rangle$ and $\vec{v} = \langle -4, 5 \rangle$; If $\vec{u} = 4\vec{w} - 3\vec{v}$ Express \vec{u} as the sum of unit vectors
- 23) Given \vec{R}  and \vec{S} ; Draw the resultant $\vec{R} - \vec{S}$

Vector Worksheet 1

Answers:

1)



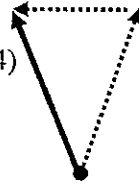
2)



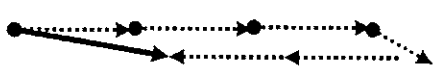
3)



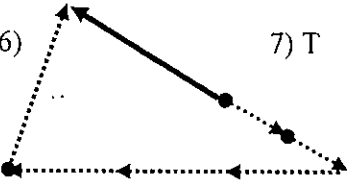
4)



5)



6)



7) T 8) F 9) T 10) F 11) T 12) T 13) $\langle 5, 7 \rangle$; $5i + 7j$

14) $\langle -4, -3 \rangle$; $-4i - 3j$ 15) $\langle 7, 7 \rangle$; $7i + 7j$ 16) $\langle -8, -9 \rangle$; $-8i - 9j$

17) $\langle 7, -9 \rangle$; $7i - 9j$ 18) $\langle -2, -2 \rangle$; $-2i - 2j$

19) $\langle 4, 14 \rangle$; $\langle 5, 8 \rangle$; $\langle -6, 17 \rangle$ 20) $\langle -4, 10 \rangle$; $\langle 0, 13 \rangle$; $\langle -14, -17 \rangle$ 21) $\langle 2, 0 \rangle$; $\langle 1, -2 \rangle$; $\langle 3, 8 \rangle$

22) $\langle 4, 0 \rangle$, $\langle 5, -2 \rangle$, $\langle -6, 8 \rangle$ 23) 5 24) 13 25) $\sqrt{2}$ 26) $\sqrt{2}$ 27) $\sqrt{13}$ 28) $2\sqrt{10}$

Vector Worksheet 2

1. $\langle -21, 20 \rangle$ 2. $\langle 27, -26 \rangle$ 3. $\langle 3, -1 \rangle$ 4. $\langle 32, -26, 1 \rangle$ 5. $\langle \frac{-1}{3}, \frac{-4}{3}, \frac{13}{6} \rangle$ 6. $\langle \frac{-14}{5}, \frac{14}{5}, \frac{-4}{5} \rangle$ 7. 87.2° 8.

157.4° 9. 56.3° 10. 100.1° 11. 80.8° 12. 100.26° 13. $30.6i + 25.7j$ 14. $-10.4i + 59.1j$

15. $-4.6i + -3.9j$ 16. $6i - 10.4j$ 17. $m = 5$, $\theta = -53.1^\circ$ 18. $m = 5\sqrt{5}$, $\theta = 116.6^\circ$

19. $m = 2\sqrt{10}$, $\theta = 198.4^\circ$ 20. $m = 2$, $\theta = -30^\circ$ 21. $m = 5\sqrt{2}$, $\theta = 98.1^\circ$ 22. $m = 2\sqrt{65}$, $\theta = 29.7^\circ$

Answers:

Vector Worksheet 2A

1. $\langle -12, -12, 15 \rangle$ 2. $\langle -56, -22, 35 \rangle$ 3. $\langle -20, -5, 5 \rangle$ 4. $\langle -28, -6, 2 \rangle$ 5. 32 6. 36 7. -24 8. $\langle 27, -18 \rangle$

9. $\langle 16, 8 \rangle$ 10. $2/3$ 11. $-1/3$ 12. $32/7$; -14 13. $-3/2$; 24 14. 10; $-5/2$ 15. $5/4$; $-16/5$ 16. $\langle 3, -1, 39 \rangle$

17. $\langle -4, 0, 4 \rangle$ 18. 90° 19. $2\vec{j} + 6\vec{k}$ 20. $2\sqrt{10}$ 21. $\langle 2, -6, 10 \rangle$ 22. \vec{j} 23.

