

Accel Math III Practice Worksheet: Operations on Vectors
Unit #7: Extended Trigonometry and Dot Product

Name _____

Given $\mathbf{u} = \langle -2, 5 \rangle$ and $\mathbf{v} = \langle 4, 3 \rangle$, find the following.

1. $\mathbf{u} + \mathbf{v}$ 2. $\mathbf{u} - \mathbf{v}$ 3. $\mathbf{v} - \mathbf{u}$ 4. $5\mathbf{v}$ 5. $-5\mathbf{v}$ 6. $3\mathbf{u} + 6\mathbf{v}$

Write each vector in the form $a\mathbf{i} + b\mathbf{j}$. Round a and b to three decimal places, if necessary.

7. $\langle -5, 8 \rangle$ 8. $\langle 6, -3 \rangle$ 9. $\langle 2, 0 \rangle$ 10. $\langle 0, -4 \rangle$
11. direction angle 45° , magnitude 8 12. direction angle 210° , magnitude 3
13. direction angle 115° , magnitude .6 14. direction angle 208° , magnitude .9

Find the dot product for each pair of vectors.

15. $\langle 6, -1 \rangle, \langle 2, 5 \rangle$ 16. $\langle -3, 8 \rangle, \langle 7, -5 \rangle$ 17. $\langle 2, -3 \rangle, \langle 6, 5 \rangle$
18. $\langle 1, 2 \rangle, \langle 3, -1 \rangle$ 19. $\langle 4, 0 \rangle, \langle 5, -9 \rangle$ 20. $\langle 2, 4 \rangle, \langle 0, -1 \rangle$

Find the angle between each pair of vectors.

21. $\langle 2, 1 \rangle, \langle -3, 1 \rangle$ 22. $\langle 1, 7 \rangle, \langle 1, 1 \rangle$ 23. $\langle 1, 2 \rangle, \langle -6, 3 \rangle$
24. $\langle 4, 0 \rangle, \langle 2, 2 \rangle$ 25. $\langle 3, 4 \rangle, \langle 0, 1 \rangle$ 26. $\langle -5, 12 \rangle, \langle 3, 2 \rangle$

Let $\mathbf{u} = \langle -2, 1 \rangle$, $\mathbf{v} = \langle 3, 4 \rangle$, and $\mathbf{w} = \langle -5, 12 \rangle$. Use properties of the dot product to evaluate each of the following.

27. $(3\mathbf{u}) \cdot \mathbf{v}$ 28. $\mathbf{u} \cdot (\mathbf{v} - \mathbf{w})$ 29. $\mathbf{u} \cdot \mathbf{v} - \mathbf{u} \cdot \mathbf{w}$ 30. $\mathbf{u} \cdot (3\mathbf{v})$