

## Vectors and Dot products

Date \_\_\_\_\_ Period \_\_\_\_\_

**Find the dot product of the given vectors.**

1)  $\mathbf{u} = \langle 2, -8 \rangle$   
 $\mathbf{v} = \langle 5, -8 \rangle$

2)  $\mathbf{u} = \langle 9, 4 \rangle$   
 $\mathbf{v} = \langle -4, -6 \rangle$

3)  $\mathbf{u} = \langle 6, -3 \rangle$   
 $\mathbf{v} = \langle 2, 1 \rangle$

4)  $\mathbf{u} = \langle -8, -1 \rangle$   
 $\mathbf{v} = \langle -1, 4 \rangle$

5)  $\mathbf{u} = \langle 1, -2 \rangle$   
 $\mathbf{v} = \langle 2, -2 \rangle$

6)  $\mathbf{u} = \langle 4, 6 \rangle$   
 $\mathbf{v} = \langle 2, 8 \rangle$

**State if the two vectors are parallel, orthogonal, or neither.**

7)  $\mathbf{u} = 9\mathbf{i} - 4\mathbf{j}$   
 $\mathbf{v} = -4\mathbf{i} + 9\mathbf{j}$

8)  $\mathbf{u} = 6\mathbf{i} - 4\mathbf{j}$   
 $\mathbf{v} = \frac{16}{3}\mathbf{i} + 8\mathbf{j}$

9)  $\mathbf{u} = 24\mathbf{i} + 12\mathbf{j}$   
 $\mathbf{v} = -3\mathbf{i} + 6\mathbf{j}$

10)  $\mathbf{u} = -12\mathbf{i} - 18\mathbf{j}$   
 $\mathbf{v} = -4\mathbf{i} - 6\mathbf{j}$

**Find the projection of  $\mathbf{u}$  onto  $\mathbf{v}$ .**

11)  $\mathbf{u} = \langle 3, -5 \rangle$   
 $\mathbf{v} = \langle 2, -8 \rangle$

12)  $\mathbf{u} = \langle 6, -3 \rangle$   
 $\mathbf{v} = \langle 5, -2 \rangle$

13)  $\mathbf{u} = \langle -5, -8 \rangle$   
 $\mathbf{v} = \langle 5, 4 \rangle$

14)  $\mathbf{u} = \langle 8, 5 \rangle$   
 $\mathbf{v} = \langle -8, 3 \rangle$

## Answers to Vectors and Dot products (ID: 1)

1) 74

5) 6

9) *Orthogonal*

13)  $\left\langle -\frac{285}{41}, -\frac{228}{41} \right\rangle$

2) -60

6) 56

10) *Parallel*

14)  $\left\langle \frac{392}{73}, -\frac{147}{73} \right\rangle$

3) 9

7) *Neither*

11)  $\left\langle \frac{23}{17}, -\frac{92}{17} \right\rangle$

4) 4

8) *Orthogonal*

12)  $\left\langle \frac{180}{29}, -\frac{72}{29} \right\rangle$