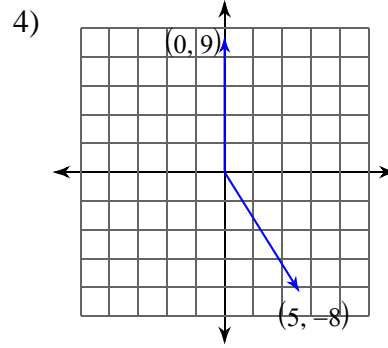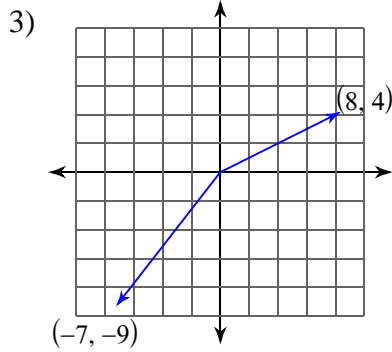Name_____

Two-Dimensional Vector Dot Products

Date_____ Period____

Find the dot product of the given vectors.

1) $\vec{u} = \langle 3, 9 \rangle$
   $\vec{v} = \langle 6, 5 \rangle$

2) $\vec{u} = -\vec{i} + 5\vec{j}$
   $\vec{v} = -6\vec{i} - 2\vec{j}$

3)

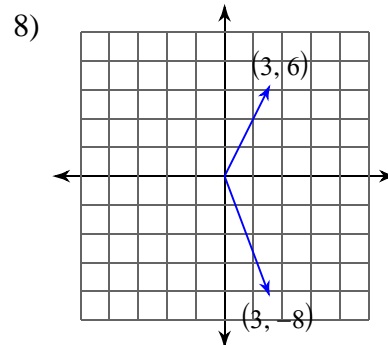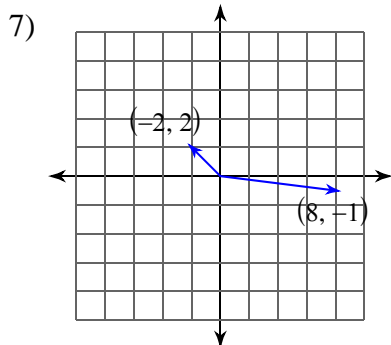(8, 4)

(−7, −9)

4)

(0, 9)

(5, −8)

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

5) $\vec{u} = \langle 4, -9 \rangle$
   $\vec{v} = \langle -9, 4 \rangle$

6) $\vec{u} = -5\vec{i} - 2\vec{j}$
   $\vec{v} = -10\vec{i} + 25\vec{j}$

Find the measure of the angle between the two vectors.

7)

(−2, 2)

(8, −1)

8)

(3, 6)

(3, −8)

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

10) $\vec{u} = -8\vec{j}$
    $\vec{v} = -9\vec{i} - 2\vec{j}$

Find the projection of u onto v.

11) $\vec{u} = \langle 8, 2 \rangle$
    $\vec{v} = \langle -7, -3 \rangle$

12) $\vec{u} = 5\vec{i} - 5\vec{j}$
    $\vec{v} = 7\vec{i} - 5\vec{j}$

Find the projection of u onto v. Then write u as the sum of two orthogonal vectors.

13) $\vec{u} = \langle -2, -3 \rangle$
    $\vec{v} = \langle -7, 9 \rangle$

Name_____

Two-Dimensional Vector Dot Products

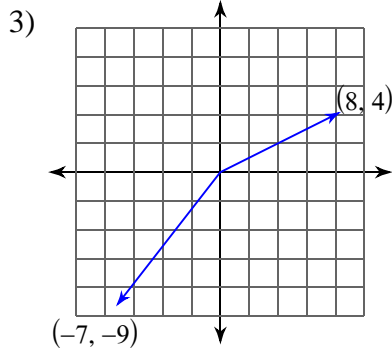Date_____ Period_____

Find the dot product of the given vectors.

1) $\vec{u} = \langle 3, 9 \rangle$
   $\vec{v} = \langle 6, 5 \rangle$

   63

2) $\vec{u} = -\vec{i} + 5\vec{j}$
   $\vec{v} = -6\vec{i} - 2\vec{j}$

   −4

3)

(8, 4)

(−7, −9)

−92

4)

(0, 9)

(5, −8)
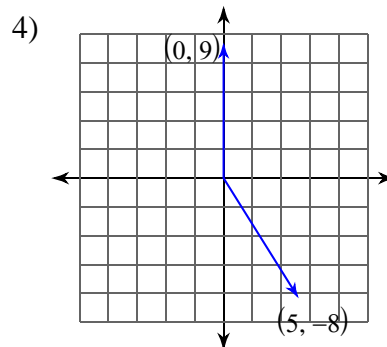
−72

State if the two vectors are parallel, orthogonal, or neither.
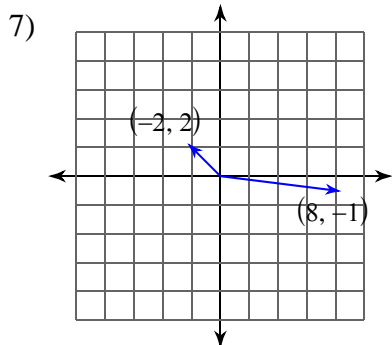
5) $\vec{u} = \langle 4, -9 \rangle$
   $\vec{v} = \langle -9, 4 \rangle$
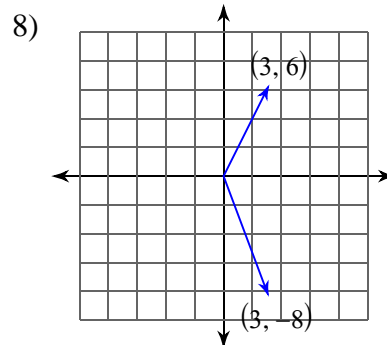
   Neither

6) $\vec{u} = -5\vec{i} - 2\vec{j}$
   $\vec{v} = -10\vec{i} + 25\vec{j}$

   Orthogonal

Find the measure of the angle between the two vectors.

7)

(−2, 2)

(8, −1)

142.13°

8)

(3, 6)

(3, −8)

132.88°

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

59.04°

10) $\vec{u} = -8\vec{j}$
$\vec{v} = -9\vec{i} - 2\vec{j}$

77.47°

Find the projection of u onto v.

11) $\vec{u} = \langle 8, 2 \rangle$
$\vec{v} = \langle -7, -3 \rangle$

$\left\langle \dfrac{217}{29}, \dfrac{93}{29} \right\rangle$

12) $\vec{u} = 5\vec{i} - 5\vec{j}$
$\vec{v} = 7\vec{i} - 5\vec{j}$

$\left\langle \dfrac{210}{37}, -\dfrac{150}{37} \right\rangle$

Find the projection of u onto v. Then write u as the sum of two orthogonal vectors.

13) $\vec{u} = \langle -2, -3 \rangle$
$\vec{v} = \langle -7, 9 \rangle$

$\left\langle \dfrac{7}{10}, -\dfrac{9}{10} \right\rangle$

$\vec{u} = \left\langle \dfrac{7}{10}, -\dfrac{9}{10} \right\rangle + \left\langle -\dfrac{27}{10}, -\dfrac{21}{10} \right\rangle$