Student: Cole Lamers **Date:** 07/27/19	**Instructor:** Kelly Galarneau **Course:** CA&T Internet (70263) Galarneau	**Assignment:** 7.5 The Dot Product

1. Complete the sentence below.

   The dot product of $\mathbf{v} = \langle a_1, a_2 \rangle$ and $\mathbf{w} = \langle b_1, b_2 \rangle$ is defined as $\mathbf{v} \cdot \mathbf{w} =$ _____.

   The dot product of $\mathbf{v} = \langle a_1, a_2 \rangle$ and $\mathbf{w} = \langle b_1, b_2 \rangle$ is defined as $\mathbf{v} \cdot \mathbf{w} = a_1 b_1 + a_2 b_2$.

2. Complete the sentence below.

   If v and w are orthogonal, then $\mathbf{v} \cdot \mathbf{w} =$____.

   If v and w are orthogonal, then $\mathbf{v} \cdot \mathbf{w} =$ 0 .

3. Complete the sentence below.

   If $\mathbf{v} \cdot \mathbf{w} = 0$, then the two vectors **v** and **w** are _____.

   If $\mathbf{v} \cdot \mathbf{w} = 0$, then the two vectors **v** and **w** are orthogonal.

4. Decide whether the following statement is true or false.

   If $\mathbf{v} \cdot \mathbf{w} < 0$ then the angle between **v** and **w** is an obtuse angle.

   Choose the correct answer below.

   - (•) True
   - ( ) False

5. For $\mathbf{u} = \langle 5, -5 \rangle$ and $\mathbf{v} = \langle -2, 2 \rangle$ find $\mathbf{u} \cdot \mathbf{v}$.

   $\mathbf{u} \cdot \mathbf{v} =$ −20

6. For the following vectors, find $\mathbf{u} \cdot \mathbf{v}$.

   $\mathbf{u} = \langle 6, -12 \rangle$ and $\mathbf{v} = \langle 2, 1 \rangle$

   $\mathbf{u} \cdot \mathbf{v} =$ 0

7. Find the dot product of **u** and **v**.

   $\mathbf{u} = 2\mathbf{i} - \mathbf{j}$ and $\mathbf{v} = -5\mathbf{i} + 4\mathbf{j}$

   $\mathbf{u} \cdot \mathbf{v} =$ −14 (Simplify your answer.)

8. Find the dot product $\mathbf{u} \cdot \mathbf{v}$.

   $\mathbf{u} = 2\mathbf{i} - 2\mathbf{j}$ $\mathbf{v} = 3\mathbf{j}$

   $\mathbf{u} \cdot \mathbf{v} =$ −6 (Simplify your answer.)

9. Find $\mathbf{u} \cdot \mathbf{v}$, where θ is the angle between the vectors **u** and **v**.

   $\|\mathbf{u}\| = 4, \|\mathbf{v}\| = 2, \theta = \frac{\pi}{3}$

   $\mathbf{u} \cdot \mathbf{v} \approx$ 4 (Round to one decimal place as needed.)

10. Find $\mathbf{u} \cdot \mathbf{v}$, where θ is the angle between the vectors **u** and **v**.

    $\|\mathbf{u}\| = 9, \|\mathbf{v}\| = 4, \theta = 75^\circ$

    $\mathbf{u} \cdot \mathbf{v} \approx$ 9.3 (Round to the nearest tenth as needed.)

11. Find the angle between the vectors **v** and **w**.

$\|\mathbf{v}\| = 2$, $\|\mathbf{w}\| = \sqrt{7}$, and $\mathbf{v} \cdot \mathbf{w} = \sqrt{3}\sqrt{7}$

The angle between the vectors **v** and **w** is 30 °.
(Type an integer or a decimal. Do not include the degree symbol in your answer.)

12. Given $\mathbf{v} = 9\mathbf{i} + 4\mathbf{j}$ and $\mathbf{w} = 5\mathbf{i} - \mathbf{j}$, find the angle between **v** and **w**.

What is the angle between **v** and **w**?

35.3 °
(Type your answer in degrees. Do not round until the final answer. Then round to the nearest tenth as needed.)

13. Find the angle between the vectors **v** and **w**.

$\mathbf{v} = 2\mathbf{i} + 7\mathbf{j}$, $\mathbf{w} = -7\mathbf{i} + 2\mathbf{j}$

The angle between the vectors **v** and **w** is 90 °.
(Type an integer or a decimal. Do not include the degree symbol in your answer.)

14. Let **v** and **w** be two vectors in the plane of magnitudes 7 and 8, respectively. The angle between **v** and **w** is 61°. Find $\|\mathbf{v} + \mathbf{w}\|$.

$\|\mathbf{v} + \mathbf{w}\| \approx$ 12.9 (Round to one decimal place as needed.)

15. Let **v** and **w** be two vectors in the plane of magnitudes 3 and 6, respectively. The angle between **v** and **w** is 60°. Find $\|2\mathbf{v} + \mathbf{w}\|$.

$\|2\mathbf{v} + \mathbf{w}\| =$ $6\sqrt{3}$ (Type an exact answer, using radicals as needed.)

16. Let **v** and **w** be two vectors in the plane of magnitudes 8 and 7, respectively. The angle between **v** and **w** is 58°. Find the angle between $\mathbf{v} + \mathbf{w}$ and **w**.

The measure of the angle is about 31.1 °.
(Do not round until the final answer. Then round to one decimal place as needed.)

17. This question has been removed from this assignment by your instructor; you have received full credit.

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19. A vector **F** represents a force that has a magnitude of 16 pounds, and $\frac{\pi}{3}$ is the angle for its direction. Find the work done by the force in moving an object from the origin to the point (8,3). Distance is measured in feet.

The work done is 105.6 foot-pounds.
(Type an integer or a decimal rounded to the nearest tenth as needed.)

20. This question has been removed from this assignment by your instructor; you have received full credit.

21. Watch the video and then solve the problem below.

Click here to watch the video.[1]

Let **v** and **w** be two vectors of magnitude 8 and 13, respectively. Let the angle between **v** and **w** be 62°. Find $\mathbf{v} \cdot \mathbf{w}$.

$\mathbf{v} \cdot \mathbf{w} \approx$ 48.8 (Type an integer or decimal rounded to one decimal place as needed.)

1: http://mediaplayer.pearsoncmg.com/assets/cQ7VEyH3hkw9x1AIHz6L82LJG2Mh3b4t?clip=2

22. This question has been removed from this assignment by your instructor; you have received full credit.