

# Math 1497 – Calculus II Spring 2022 – Homework 10

**Week 12: Apr. 11 - Apr. 15, 2022**

pg. 759, #21 and 23.

Find the magnitude of the following:

$$\#21 \quad \vec{v} = \langle 8, 15 \rangle \quad \#23 \quad \vec{v} = -i - 5\vec{j}$$

pg. 759, #27.

Using vector operations find the following:

$$(a) \frac{2}{3}\vec{u} \quad (b) 3\vec{v} \quad (c) \vec{v} - \vec{u} \quad (d) 2\vec{u} + 5\vec{v}$$

$$\vec{u} = \langle 4, 9 \rangle, \quad \vec{v} = \langle 2, -5 \rangle$$

pg. 759, #35 and 37.

Find a unit vector in the direction of  $\vec{v}$  the following:

$$\#35 \quad \vec{v} = \langle 3, 12 \rangle \quad \#37 \quad \vec{v} = \left\langle \frac{3}{2}, \frac{5}{2} \right\rangle$$

pg. 777, #3 and 7.

In the following find (a)  $\vec{u} \cdot \vec{v}$  (b)  $\vec{u} \cdot \vec{u}$  (c)  $\|\vec{v}\|^2$  (d)  $(\vec{u} \cdot \vec{v})\vec{v}$  (e)  $\vec{u} \cdot (3\vec{v})$

$$\#3 \quad \vec{u} = \langle 3, 4 \rangle, \quad \vec{v} = \langle -1, 5 \rangle$$

$$\#7 \quad \vec{u} = \langle 2, -3, 4 \rangle, \quad \vec{v} = \langle 0, 6, 5 \rangle$$

pg. 777, #37 and 39.

Find the projection of  $\vec{u}$  onto  $\vec{v}$  and the orthogonal complement for the following.

Draw all vectors.

$$\#37 \quad \vec{u} = \langle 6, 7 \rangle, \quad \vec{v} = \langle 1, 4 \rangle$$

$$\#39 \quad \vec{u} = \langle 2, 3 \rangle, \quad \vec{v} = \langle 5, 1 \rangle$$

pg. 785, #7 and 9.

Find the cross product  $\vec{u} \times \vec{v}$ ,  $\vec{v} \times \vec{u}$ , and  $\vec{v} \times \vec{v}$  for the following.

$$\#7 \quad \vec{u} = -2\vec{i} + 4\vec{j}, \quad \vec{v} = 3\vec{i} + 2\vec{j} + 5\vec{k}$$

$$\#9 \quad \vec{u} = \langle 7, 3, 2 \rangle, \quad \vec{v} = \langle 1, -1, 5 \rangle$$

pg. 794, #13, 19 and 23.

Find the equation of the line

#13 through  $(5, -3, -2)$  and  $(-2/3, 2/3, 1)$

#19 through  $(2, 3, 4)$  and perpendicular to the plane  $3x + 2y - z = 6$

# 23 through  $(2, 1, 2)$  and parallel to the line  $x = -t, y = 1 + t, z = -2 + t$

pg. 795, #45, 49 and 51.

Find the equation of the plane

#45 through  $(0, 0, 0)$ ,  $(2, 0, 3)$  and  $(-3, -1, 5)$ .

#49 through  $(1, 2, 3)$  and parallel to the plane  $xy$  plane.

**Due:** Friday Apr. 15, 2022 by 4:00pm.