Course Number
Instructor
Date

Section 10.2 Vectors in Space

Objective: In this lesson you learned how to represent vectors and find dot products of and angles between vectors in space.

Important Vocabulary Define each term or concept.

Standard unit vector notation in space

Angle between two nonzero vectors in space

Parallel vectors in space

I. Vectors in Space (Pages 750–752)

What you should learn
How to find the component forms of, the unit vectors in the same direction of, the magnitudes of, the dot products of, and the angles between vectors in space

In space, vectors are denoted by ordered triples of the form

______________________________.

The **zero vector in space** is denoted by ____________________.

If **v** is represented by the directed line segment from $P(p_1, p_2, p_3)$ to $Q(q_1, q_2, q_3)$, the **component form** of **v** is produced by . . .

Two vectors are **equal** if and only if . . .

The **magnitude**(or length) of $\mathbf{u} = \langle u_1, u_2, u_3 \rangle$ is:

$\| \mathbf{u} \| = \sqrt{\qquad\qquad}$ ______________________

A unit vector **u** in the direction of **v** is ______________________.

The **sum** of $\mathbf{u} = \langle u_1, u_2, u_3 \rangle$ and $\mathbf{v} = \langle v_1, v_2, v_3 \rangle$ is

$\mathbf{u} + \mathbf{v} =$ ______________________________.

The **scalar multiple** of the real number c and $\mathbf{u} = \langle u_1, u_2, u_3 \rangle$ is

$c\mathbf{u}$ = ______________________.

The **dot product** of $\mathbf{u} = \langle u_1, u_2, u_3 \rangle$ and $\mathbf{v} = \langle v_1, v_2, v_3 \rangle$ is

$\mathbf{u} \bullet \mathbf{v}$ = ____________________________

If θ is the angle between two nonzero vectors **u** and **v**, then

$\cos \theta$ = _________________________________.

If the dot product of two nonzero vectors is zero, the angle between the vectors is ____________. Such vectors are called __________________.

Example 1: Find the dot product of the vectors $\langle -1, 4, -2 \rangle$ and $\langle 0, -1, 5 \rangle$.

II. Parallel Vectors (Pages 752–753)

> ***What you should learn***
> How to determine whether vectors in space are parallel or orthogonal

Example 2: Determine whether the vectors $\langle 6, 1, -3 \rangle$ and $\langle -2, -1/3, 1 \rangle$ are parallel.

To use vectors to determine whether three points P, Q, and R in space are collinear, . . .

III. Applications of Vectors in Space (Page 754)

> ***What you should learn***
> How to use vectors in space to solve real-life problems

Describe a real-life application of vectors in space.

Homework Assignment

Page(s)

Exercises