

# HOMWORK ASSIGNMENT 1

Name:

Due: Thursday September 5, 7 PM

Note: Homework must be submitted online on Canvas (scanned).

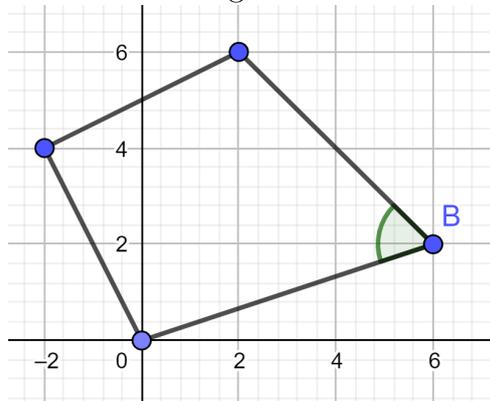
## PROBLEM 1:

Consider the points  $A(-1, 2, 3)$  and  $B(0, -1, 1)$ .

1. Write  $\vec{AB}$  in the form  $u_1\vec{i} + u_2\vec{j} + u_3\vec{k}$ .
2. Find the components of the vector  $\vec{BA}$ .
3. Find the distance from  $A$  to  $B$ , and the modulus of the vector  $\vec{BA}$ ,  $|\vec{BA}|$ . What is  $\vec{BA} \cdot \vec{BA}$ ? And  $\vec{AB} \cdot \vec{AB}$ ? What about  $\vec{AB} \cdot \vec{BA}$ ?
4. Write  $\vec{BA}$  as a product of its length and its direction.

## PROBLEM 2:

Find the shaded angle:



## PROBLEM 3:

1. Find the equation for the plane through the point  $A(1, -2, 1)$  that is perpendicular to the vector from the origin to  $A$ .
2. Find the parametric equations of the line that goes through the origin and through the point  $A$ .
3. Find the distance from  $P(1, 1, 1)$  to the plane in part 1.

PROBLEM 4:

Find the domain of the following functions and decide if it is open, closed, bounded or unbounded:

1.  $f(x, y) = \sqrt{(xy)}$ ,
2.  $f(x, y) = \ln(1 - x^2 - y^2)$ ,
3.  $f(x, y) = \arccos(y - x^2)$ ,
4.  $f(x, y) = \ln(y)\sqrt{x}$ ,
5.  $f(x, y) = \frac{1}{x^2-1} \frac{1}{\ln(y)}$ .

PROBLEM 5:

Find the domain and range of the following functions, decide if its domain is open, closed, bounded or unbounded, and describe the level curves of the functions:

1.  $f(x, y) = e^{-(x^2+y^2)}$ ,
2.  $f(x, y) = \sqrt{(9 - x^2 - y^2)}$ .

PROBLEM 6:

If the function  $T(x, y, z) = 10^{x^2+y+z^2}$  represents the temperature at every point  $(x, y, z)$  of a (*very big*) room, sketch the surface that is at 100 degrees.

PROBLEM 7:

Read Sections 14.2 (we will go over it on Tuesday) and 14.3 (Thursday) of *Thomas' Calculus Early Transcendentals* book.