University of Hawai'i at Mānoa | Department of Mathematics
W. Erb | Spring 2018

Math 253A - Accelerated Calculus III

Homework sheet 2 **Due 01/26/2018**

To read: 11.4, 11.5 and 11.6 in the book.

Problem 1

a) Find the intersection line of the planes $2x + 4y + 10z = 0$ and $3x + y = 4$.

b) Give the angle between the planes $2x + 4y + 10z = 0$ and $3x + y = 4$.

c) Give an equation of the plane through the points $(1, 1, 1)$, $(2, 3, 4)$, and $(0, 0, 0)$.

d) Give a vector perpendicular to the plane through the points $(1, 1, 1)$, $(2, 3, 4)$, and $(0, 0, 0)$.

Problem 2

a) Calculate the distance of the point $(1, 5, 7)$ to the plane $3x - 2y + z = 1$.

b) Calculate the distance of the point $(1, 5, 7)$ to the line L going through the two points $(1, 1, 1)$ and $(2, 3, 4)$.

Problem 3

a) Find the area of the triangle with vertices $A = (1, 2, 1)$, $B = (2, 1, 5)$ and $C = (0, 0, 0)$.

b) Calculate the volume of the parallelepiped given by the vectors $\vec{u} = \langle 1, 1, 1\rangle$, $\vec{v} = \langle 1, 3, 1\rangle$ and $\vec{w} = \langle 0, 0, 10\rangle$.

Problem 4 (Geometry of parallelograms)

a) Show that a parallelogram is a rectangle if and only if its diagonals are equal in length.

b) Show that the diagonal of the parallelogram determined by the vectors $\vec{u}$ and $\vec{v}$ bisects the angle between $\vec{u}$ and $\vec{v}$ if the side lengths are equal i.e. if $|u| = |v|$ (See also the image at Exercise 11.3.22 in the book).