MATH 3335
HOMEWORK # 2, DUE FRIDAY SEPTEMBER 6

PROFESSOR WAGNER

Do p. 34 # 14, 18, 23, 25, 28. #28 may need explanation. "The angle subtended at the circumference by a diameter of a circle" is an angle formed by selecting a point P on the circle and drawing two lines from P to the ends of the diameter. Show that the angle formed by these lines at P is a right angle, using vector methods.

(1) Express $2\mathbf{i} - \mathbf{j} + 3\mathbf{k}$ as the sum of a vector parallel, plus a vector perpendicular, to $2\mathbf{i} + 4\mathbf{j} - 2\mathbf{k}$.
(2) Find the dihedral angle between the planes
$$2x + y - 2z = 5,$$
$$3x - 4y = 2.$$
(3) Find a vector parametric equation for the line of intersection for the two planes in #2.
(4) Find the distance between the planes
$$2x + y - 2z = 5,$$
$$2x + y - 2z = -1.$$
(5) Find the distance from the point $(1, -2, 3)$ to the line $\frac{x}{2} + y - z = 0$.
(6) Find an equation for the plane through the points $(1, 0, -1)$, $(2, 0, 1)$, $(1, 1, 0)$.
(7) Find the altitude of a parallelepiped determined by $\mathbf{a}$, $\mathbf{b}$, and $\mathbf{c}$, if the base is taken to be the parallelogram determined by $\mathbf{a}$ and $\mathbf{b}$, and if
$$\mathbf{a} = (1, 0, 1),$$
$$\mathbf{b} = (0, 2, 1)$$
$$\mathbf{c} = (1, 3, 0).$$

Date: September 2, 2016.