

Calc 3 - Assignment 4

Note Title

9/14/2011

① Find area of parallelogram with vertices

$A(-2, 1)$, $B(0, 4)$, $C(4, 2)$, and $D(2, -1)$. Hint: to

take cross products of \mathbb{R}^2 vectors, consider them

embedded in \mathbb{R}^3 with z -coordinates 0. Thus, a

vector $\langle a, b \rangle \in \mathbb{R}^2$ is equivalent to $\langle a, b, 0 \rangle \in \mathbb{R}^3$

② Find the parametric equation of the lines

a) through $(6, -5, 2)$ parallel to $3i + 2j - k$

b) through $(1, 2, 3)$ and $(-4, 3, 0)$

c) through $(1, 9, 6)$ perpendicular to the
plane $x + 3y + z = 5$

d) through $(2, 1, 0)$, perpendicular to both $i + j$
and $j + k$

③ Are the following lines parallel, skew, or

intersecting. If they intersect, find that point.

a) $L_1: \langle -6t, 1+9t, -3t \rangle$

$L_2: \langle 1+2s, 4-3s, s \rangle$

b) $L_1: \langle 1+2t, 3t, 2-t \rangle$

$L_2: \langle -1+s, 4+s, 1+3s \rangle$

not parallel
& not intersecting

④ Find an equation of the plane:

a) through $(6, 3, 2)$ perpendicular to $\langle -2, 1, 5 \rangle$

b) through $(-1, 6, -5)$ parallel to $x + y + z + 2 = 0$

c) through $(3, -1, 2)$, $(8, 2, 4)$, and $(-1, -2, -3)$

d) through $(6, 0, -2)$ containing the line

$$l(t) = (4, 3, 7) + t \langle -2, 5, 4 \rangle$$

⑤ Find the cosine of the angle between the

planes $x + y + z = 0$ and $x + 2y + 3z = 1$

⑥ Sketch the following planes

a) $2x + 5y + z = 10$

b) $3x + y + 2z = 6$

(Hint: sketch lines you get when you let $x=0$ in the yz -plane, $y=0$ in the xz -plane, and $z=0$ in xy -plane. These lines should form a triangle.)