

MATH 253 – WORKSHEET 4
EQUATIONS OF LINES AND PLANES

Reminder: $\vec{C} = \vec{A} \times \vec{B}$ has magnitude $|\vec{C}| = |\vec{A}||\vec{B}|\sin\theta$, direction perpendicular to \vec{A}, \vec{B} so that the $\vec{A}, \vec{B}, \vec{C}$ is right-handed in that order. In coordinates

$$\langle a_1, a_2, a_3 \rangle \times \langle b_1, b_2, b_3 \rangle = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = \langle a_2b_3 - a_3b_2, a_3b_1 - a_1b_3, a_1b_2 - a_2b_1 \rangle$$

1. WORKING ON A PLANES

- (1) We will find a unit vector normal to the plane passing through the points $(3, 0, 0)$, $(0, 2, 0)$, $(0, 0, 4)$.
(normal = perpendicular; unit = magnitude 1)

- (a) Find two vectors parallel to the plane:

$$\vec{A} = \qquad \qquad \qquad \vec{B} =$$

- (b) Find their cross product $\vec{A} \times \vec{B} =$

- (c) *Normalize* to obtain a unit vector

2. LINES AND PLANES

(1) Find equations for the line through $(2, 0, 3)$, $(3, 4, 0)$.

(2) Find an equation for the plane passing through $(3, 0, 0)$, $(0, 2, 0)$, $(0, 0, 4)$.