

# Worksheet

## Problem 1. Equation of a plane

The (non-unit-length) normal

$$n = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}$$

of a plane  $P$  is given. In addition, it is known that the point

$$p = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$$

is on the plane. What is the value  $\alpha$  on the right hand side of the point-normal equation  $n \cdot x = \alpha$  for  $P$ ?

## Problem 2. Find an orthogonal vector

Given

$$x = \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix},$$

find  $y_3$  in

$$y = \begin{bmatrix} -1 \\ 1 \\ y_3 \end{bmatrix}$$

so that  $x \perp y$ .

## Problem 3. Orthogonalization step

Given two vectors  $x$  and  $y$ , which of the following makes  $x \perp y'$ ?

(A)  $y' = y - \frac{(x,y)}{(x,x)}x$

(B)  $y' = y - \frac{(x,y)}{(y,x)}x$

(C)  $y' = y - \frac{(x,y)}{(y,x)}y$

(D)  $y' = y - \frac{(x,y)}{(y,y)}y$

(E)  $y' = y - \frac{(x,y)}{(y,y)}x$