

Key

Quiz 2

This is a two-stage quiz. During the first stage, use your knowledge & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyone's name on it!!!) to be turned in for the group.

1. [3] Find an equation of a line passing through $P(1, 0, 3)$ and $Q(0, 4, 0)$.

There are LOTS of correct answers?

(4.5) Looking for $(x, y, z) = (x_0, y_0, z_0) + t(v_1, v_2, v_3)$ where $t \in \mathbb{R}$

$\vec{v}$ = directional vector

= $\overrightarrow{QP}$ (4.5)

= $\langle 1-0, 0-4, 3-0 \rangle$

= $\langle 1, -4, 3 \rangle$ (+1)

so (4.5) $(x, y, z) = (1, 0, 3) + t(1, -4, 3)$ works

2. Consider $6x + 3y + 2z = 12$

- (a) [1] Identify the equation as a line, curve, plane, or other.

plane

- (b) [2] Sketch the line, curve, plane or other object given.

Clearly identify at least one point.

axis label (4.5)

point (4.5)

sketch (4.5) #42

if $x=0$ and $y=0$ then $0+0+2z=12$

$\Rightarrow z=6$ so $(0, 0, 6)$

if $x=0$ and $z=0$ then $0+3y+0=12$

$\Rightarrow y=4$ so $(0, 4, 0)$

if $y=0$ and $z=0$ then $6x+0+0=12 \Rightarrow x=2$ so $(2, 0, 0)$

3. Let $\vec{u}$, $\vec{v}$, and $\vec{w}$ be the vectors shown on the right with $3 = \|\vec{u}\| = \|\vec{v}\| = \|\vec{w}\|$.

- (a) [2] Find $\vec{u} \cdot \vec{v} = \|\vec{u}\| \cdot \|\vec{v}\| \cos \theta$ (4.5)

= $3 \cdot 3 \cos 60^\circ$ (+1)

= $9 \cdot \frac{1}{2} = 4\frac{1}{2}$

find coordinates $\vec{v} = (3\frac{\sqrt{3}}{2}, -3\frac{1}{2}, 0)$ $\vec{u} = (-\frac{3\sqrt{3}}{2}, \frac{3}{2}, 0)$

- (b) [2] Find $\vec{u} \times \vec{v}$. (Be careful!!!)

$\|\vec{u} \times \vec{v}\| = \|\vec{u}\| \|\vec{v}\| \sin \theta$ (4.5)

= $3 \cdot 3 \cdot \sin 60^\circ$ (+1)

= $9 \cdot \frac{\sqrt{3}}{2} \approx 7.79$

so $\vec{u} \times \vec{v}$ has magnitude $\frac{9\sqrt{3}}{2}$ at the page (+5)

