Math 402 - ARC Quiz 1

Lui Name Key

No notes or calculators. Show all work. Note: boldface variables, such as $\mathbf{v}$, represent vectors.

1. (3 points) Let $\mathbf{u} = \langle 8, 1\rangle$ and $\mathbf{v} = \langle 6, -3\rangle$. Compute $2\mathbf{u} - 3\mathbf{v}$

$$2\langle 8,1\rangle - 3\langle 6,-3\rangle$$

$$= \langle 16, 2\rangle - \langle 18, -9\rangle$$

$$= \langle 16-18, 2+9\rangle = \boxed{\langle -2, 11\rangle}$$

2. (4 points) Find two vectors that are parallel to $\overrightarrow{PQ}$, where $P(2, 1, 0)$ and $Q(0, 3, -2)$.

$$\overrightarrow{PQ} = \langle 0-2, 3-1, -2-0\rangle$$

$$= \langle -2, 2, -2\rangle$$

Two parallel vectors : multiply the vector by any two scalars

vector 1 : $-1\langle -2,2,-2\rangle = \boxed{\langle 2,-2,2\rangle}$

vector 2 : $2\langle -2,2,-2\rangle = \boxed{\langle -4,4,-4\rangle}$

3. (3 points) Describe the set of points (x, y, z) that satisfy the equation below.

$$(y + 4)(z - x) = 0$$

All points of the form (x,y,z) in $\mathbb{R}^3$ so that $y = -4$ and/or $x = z$

set notation: $\{(x,y,z) \in \mathbb{R} \mid y = -4 \text{ or } x = z\}$

pretentious math teacher : $\forall (x,y,z) \in \mathbb{R}^3$ such that $y = -4, x = z$