MATH-253: HW1

Due on 1/22/2024

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2.1

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a) $\overrightarrow{RP} = \langle -1-(-3), 3-7 \rangle = \langle 2, -4 \rangle$
b) $\overrightarrow{PQ} = 2\vec{i} - 4\vec{j}$

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a) $\overrightarrow{PQ} = \langle 2, 2 \rangle$, $\overrightarrow{PR} = -\overrightarrow{RP} = \langle -2, 4 \rangle$.

Therefore:

$$\begin{aligned} 2\overrightarrow{PQ} - 2\overrightarrow{PR} &= 2 \cdot \langle 2, 2 \rangle - 2 \cdot (-2, 4) \\ &= \langle 4, 4 \rangle - (-4, 8) \\ &= \langle 8, -4 \rangle \end{aligned}$$

b) $8\vec{i} - 4\vec{j}$

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$\|\overrightarrow{PQ}\| = \sqrt{2^2 + 2^2} = \sqrt{8} = 2\sqrt{2}$
a) $\langle 1, 1 \rangle$
b) $\vec{i} + \vec{j}$

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$$\vec{v} = \langle 2-(-1), 1-(-3) \rangle = \langle 3, 4 \rangle$$

$$\|\langle v \rangle\| = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5$$

$$\left\langle \frac{3}{5}, \frac{4}{5} \right\rangle$$

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$$\vec{v} = \langle x-1, 0-1 \rangle = \langle x-1, -1 \rangle$$

$$\|\vec{v}\| = \sqrt{10} = \sqrt{(x-1)^2 + (-1)^2}$$

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