Math 120 QR

Alex Hernandez Juarez

Fall 2024

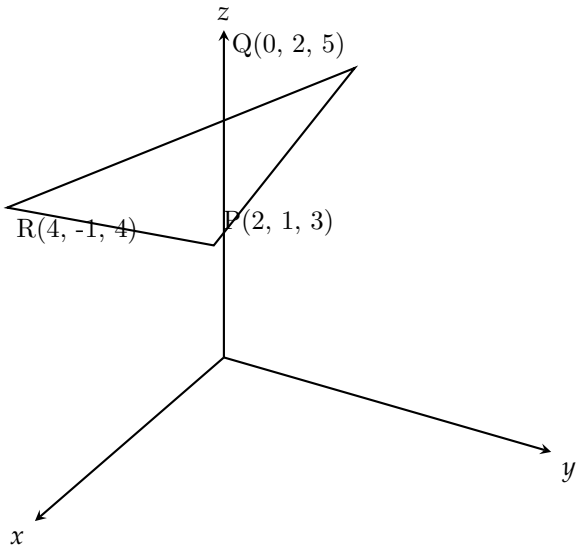
Contents

Chapter 1

1.1 PSet 1

Question 1

Find the lengths of the sides of the triangle with vertices P (2, 1, 3), Q(0, 2, 5) and R(4, -1, 4). Is the triangle an acute triangle (all sides less than 90°), a right triangle, or an obtuse triangle (one angle greater than 90°)



Solution: Image:

$$\overrightarrow{PQ} = \langle 0-2, 2-1, 3-5\rangle = \langle -2, 1, -2\rangle$$

$$\overrightarrow{QR} = \langle 4-0, -1-2, 4-3\rangle = \langle 4, -3, 1\rangle$$

$$\overrightarrow{RP} = \langle 2-4, -1-1, 3-4\rangle = \langle -2, -2, 1\rangle$$

$$|\overrightarrow{PQ}| = \sqrt{(-2)^2 + 1^2 + (-2)^2} = \sqrt{5}$$

$$|\overrightarrow{QR}| = \sqrt{(4)^2 + (-3)^2 + (1)^2} = \sqrt{26}$$

$$|\overrightarrow{RP}| = \sqrt{(-2)^2 + (-2)^2 + (1)^2} = \sqrt{5}$$

angles:

$$|\overrightarrow{PQ}|^2 = 26 = 5 + 5 - 2\sqrt{5}\sqrt{5}\cos\theta$$

$$16 = -2\sqrt{5}\sqrt{5}\cos\theta$$
$$\frac{16}{2\sqrt{5}\sqrt{5}} = -\cos(\theta)$$
$$\frac{8}{5} = -\cos(\theta)$$

Example 1.1.1: Hi

hi