2.2.26

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Question:
Find the area of the triangle formed by the points $P(-1.5, 3)$, $Q(6, -2)$ and $R(-3, 4)$.
Solution:
Let us solve the given equation theoretically and then verify the solution computationally
According to the question,
Given three points

$$\mathbf{P} = \begin{pmatrix} -1.5 \\ 3 \end{pmatrix} \mathbf{Q} = \begin{pmatrix} 6 \\ -2 \end{pmatrix} \mathbf{R} = \begin{pmatrix} -3 \\ 4 \end{pmatrix} \tag{0.1}$$

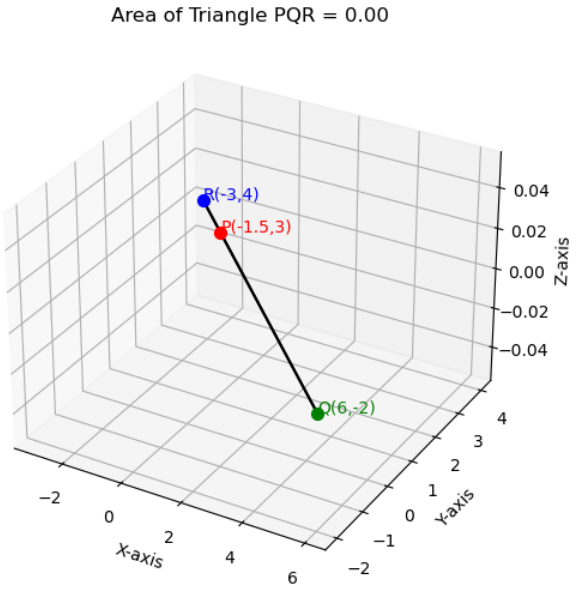
$$\mathbf{Q} - \mathbf{P} = \begin{pmatrix} 7.5 \\ -5 \end{pmatrix} \tag{0.2}$$

$$\mathbf{R} - \mathbf{P} = \begin{pmatrix} -1.5 \\ 1 \end{pmatrix} \tag{0.3}$$

$$ar(PQR) = \frac{1}{2} \|(\mathbf{Q} - \mathbf{P}) \times (\mathbf{R} - \mathbf{P})\| \tag{0.4}$$

$$ar(PQR) = \frac{1}{2} \|(\mathbf{Q} - \mathbf{P}) \times (\mathbf{R} - \mathbf{P})\| = 0 \tag{0.5}$$

points are collinear
From the figure it is clearly verified that the theoretical solution matches with the computational solution.


Area of Triangle PQR = 0.00
R(-3,4)
P(-1.5,3)
Q(6,-2)
X-axis
Y-axis
Z-axis
−2
0
2
4
6
−2
−1
0
1
2
3
4
0.04
0.02
0.00
−0.02
−0.04