3.3.20

EE24BTECH11011-B.PRANAY KUMAR

Question:
Draw a triangle PQR in which $QR = 3$ cm, $QP - PR = 6$ cm, and $\angle PQR = 45°$.

Solution:
For triangle PQR with $QR = 3$ cm, $QP - PR = 6$ cm, and $\angle PQR = 45°$.
From the Law of Cosines(3.1.1.1)

$$QP^2 = QR^2 + PR^2 - 2(QR)(PR)\cos\angle PQR \tag{0.1}$$

Let k be defined as:

$$k = QP - PR \tag{0.2}$$

So, the expression for QP in terms of k is:

$$QP = \frac{k^2 + QR^2}{2((k - QR\cos\angle PR)} \tag{0.3}$$

where $\angle PR$ is the angle opposite side QR.

Therefore, the side lengths are approximately:
1) $QR = 3$ cm
2) $PR \approx 1.67$ cm
3) $QP \approx 7.67$ cm

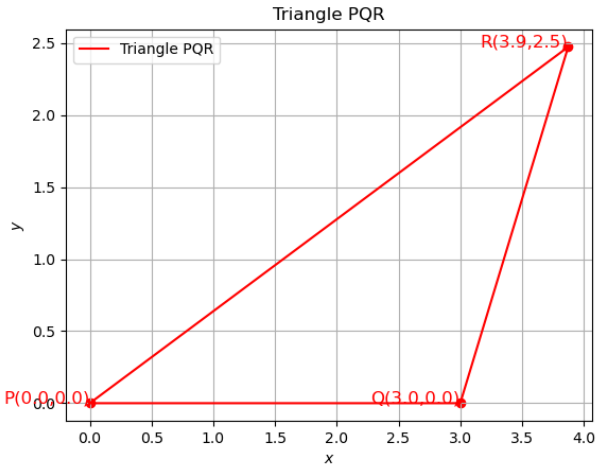

Fig. 3.1: Triangle PQR