INTRODUCTION TO THREE DIMENSIONAL GEOMETRY

DISTANCE BETWEEN TWO POINT

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To find the distance between two points $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$ in space.

From the above figure we note that,

$$\angle PAN = 90°$$

Applying Pythagoras theorem,

$$PN^2 = PA^2 + AN^2$$

$$\angle PNQ = 90°$$

$\therefore$ $$PQ^2 = PN^2 + NQ^2$$

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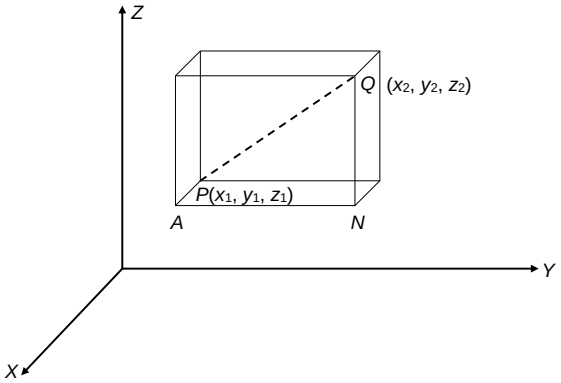
$$PA = (x_2 - x_1)$$

$$AN = (y_2 - y_1)$$

$$NQ = (z_2 - z_1)$$



$\therefore$ $$PQ^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2$$

$\therefore$ $$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$