

DISTANCE FORMULA

GIVEN (x_1, y_1, z_1) AND (x_2, y_2, z_2)

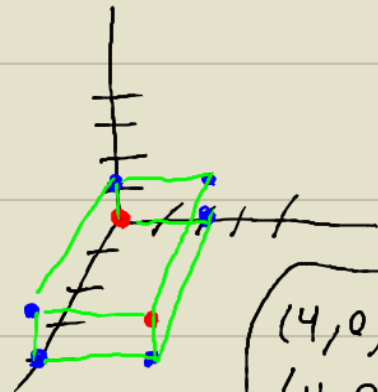
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

4. $P_1 (3, -1, 5)$ $P_2 (7, 1, 2)$
 $x_1 \ y_1 \ z_1$ $x_2 \ y_2 \ z_2$

$$\begin{aligned} d &= \sqrt{(7-3)^2 + (1-(-1))^2 + (2-5)^2} \\ &= \sqrt{4^2 + 2^2 + (-3)^2} \\ &= \sqrt{16 + 4 + 9} \\ d &= \sqrt{29} \end{aligned}$$

5.

$(0, 0, 0)$ $(4, 2, 1)$



$(4, 0, 1)$
$(4, 0, 0)$
$(4, 2, 0)$
$(0, 0, 1)$
$(0, 2, 0)$
$(0, 2, 1)$

POSITION VECTOR

INIT. POINT $P (x_1, y_1, z_1)$

TERMINAL POINT $Q (x_2, y_2, z_2)$

$$\vec{V} = \langle x_2 - x_1, y_2 - y_1, z_2 - z_1 \rangle$$

6. $P = (-2, 1, 3)$ $Q = (5, 7, -4)$

$$\begin{aligned} \vec{V} &= \langle 5 - (-2), 7 - 1, -4 - 3 \rangle \\ &= \langle 7, 6, -7 \rangle \end{aligned}$$

$$= \langle 7, 0, 0 \rangle + \langle 0, 6, 0 \rangle + \langle 0, 0, -7 \rangle$$

$$= 7 \langle 1, 0, 0 \rangle + 6 \langle 0, 1, 0 \rangle - 7 \langle 0, 0, 1 \rangle$$

$$= 7\vec{i} + 6\vec{j} - 7\vec{k}$$

UNIT VECTORS

$$\vec{i} = \langle 1, 0, 0 \rangle$$

$$\vec{j} = \langle 0, 1, 0 \rangle$$

$$\vec{k} = \langle 0, 0, 1 \rangle$$