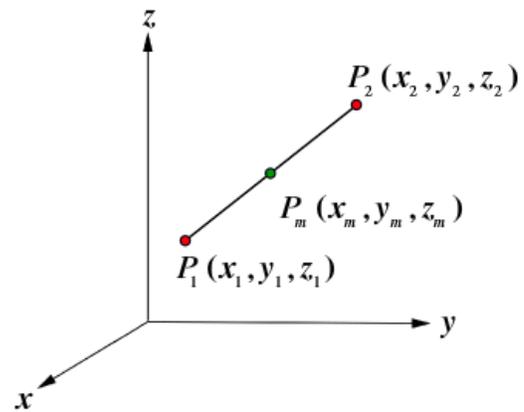


Midpoint Formula

The midpoint P_m of the line segment joining the points $P_1(x_1, y_1, z_1)$ and $P_2(x_2, y_2, z_2)$ has coordinates:

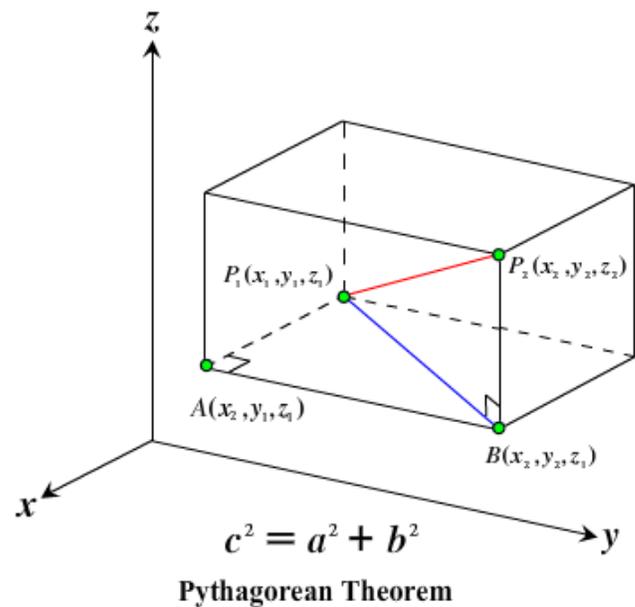
$$P_m \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}, \frac{z_1 + z_2}{2} \right)$$



Distance Formula in Three Dimensions

The distance d between the points $P_1(x_1, y_1, z_1)$ and $P_2(x_2, y_2, z_2)$ is:

$$d = |P_1P_2| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$



Equation of a Sphere

An equation of a sphere with center $C(h, k, l)$ and radius r is:

$$(x - h)^2 + (y - k)^2 + (z - l)^2 = r^2$$

If the center is the origin $C(0, 0, 0)$ the equation of a sphere reduces to:

$$x^2 + y^2 + z^2 = r^2$$

