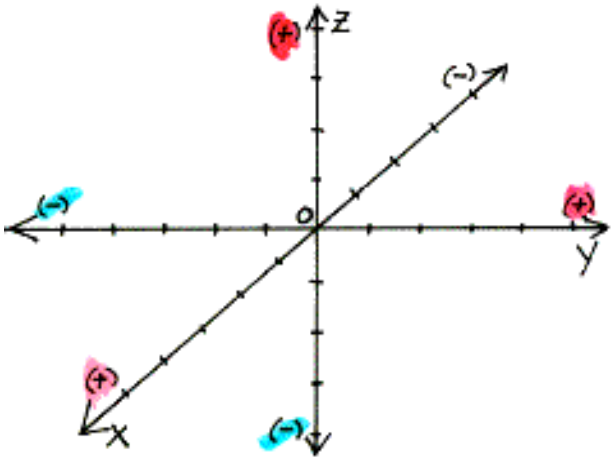
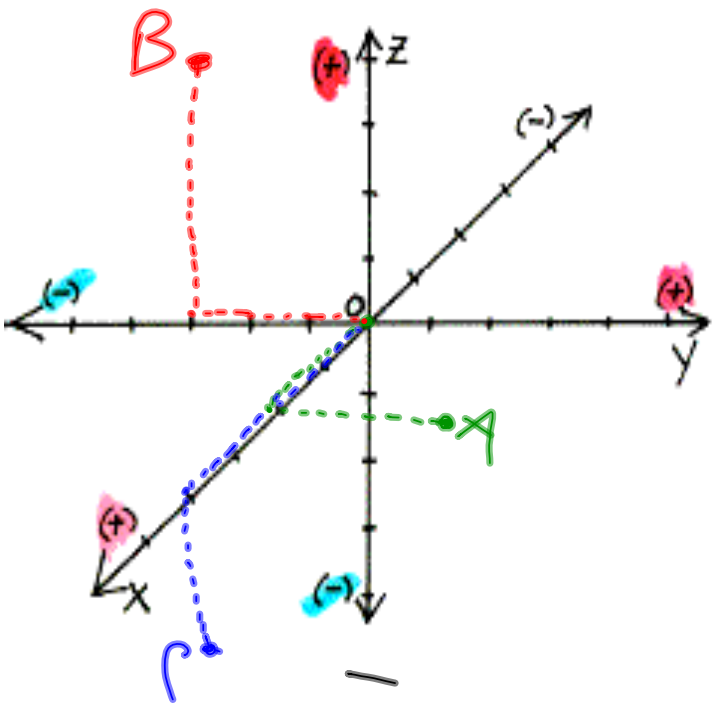
Ordered Triple:

* How a point in space is represented.

* **(x, y, z)**



1. Plot the following points:



A (2, 3, 0)

B (0, -3, 4)

C (4, 0, -2)

Distance:

* The distance between points in space can be found by using a special case of the distance formula.

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

2. Determine the distance between F (4, -2, 0) and G (-2, 3, -1).

x_1 y_1 z_1 x_2 y_2 z_2

$$\sqrt{(-2+4)^2 + (3+2)^2 + (-1-0)^2}$$

$$\sqrt{(-6)^2 + (5^2) + (-1)^2}$$

$$\sqrt{36 + 25 + 1}$$

$$\sqrt{62}$$

Midpoint:

* The midpoint in space between two points can be found by using a special midpoint formula.

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

3. Determine the midpoint M of segment FG if F (4, -2, 0) and G (-2, 3, -1)

midpt. of FG = $\left(\frac{4+-2}{2}, \frac{-2+3}{2}, \frac{0+-1}{2}\right)$

$\left(1, \frac{1}{2}, \frac{-1}{2}\right)$

Translations (slides):

* Can be performed in space

* (x, y, z) ----------→ (x + a, y + b, z + c)

4. Translate the following points using the following translations.

B (0, -5, 8): (x, y, z) ---→ (x - 4, y + 3, z - 5)

$(0-4, -5+3, 8-5)$

$(-4, -2, 3)$

Dilation's (size changes) can also be performed in space.

(x, y, z) -------→ k(x, y , z) = (kx, ky, kz)

5. Perform the indicated dilations for the ordered triple.

a. (3, 0, -4) with k = 2

$(2 \cdot 3, 2 \cdot 0, 2 \cdot -4)$

$(6, 0, -8)$