Topic: Distance between points in three dimensions

Question: Find the distance between the points.

$(4, -1, 2)$

$(3, 2, -1)$

Answer choices:

A $\sqrt{19}$

B 7

C $\sqrt{7}$

D 19

Solution: A

To find the distance between two points in three dimensions, we'll use

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

where (x_1, y_1, z_1) is one point and (x_2, y_2, z_2) is the other point.

$$D = \sqrt{(3 - 4)^2 + \big[2 - (-1)\big]^2 + (-1 - 2)^2}$$

$$D = \sqrt{1 + 9 + 9}$$

$$D = \sqrt{19}$$

The distance between the points is $\sqrt{19}$.

Topic: Distance between points in three dimensions

Question: In which plane does the point lie?

$$(6,0,-1)$$

Answer choices:

A yz-plane

B $r\theta$-plane

C xy-plane

D xz-plane

Solution: D

We know that

- a point with a zero x-value lies in the yz-plane.
- a point with a zero y-value lies in the xz-plane.
- a point with a zero z-value lies in the xy-plane.

Since $(6,0,-1)$ has a zero y-value, it lies in the xz-plane.