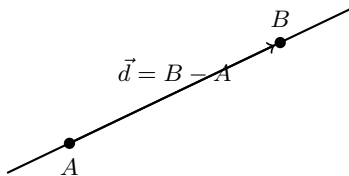


Question 1

Find vector, parametric, and symmetric equations of the line through $A = (-2, 3, 1)$ and $B = (4, -1, 7)$. Determine the point on the line whose x -coordinate is 7.

Question 1 – Solution

Strategy Use $B - A$ as a direction vector and keep one common parameter in all coordinates.



Equations A direction is $\langle 6, -4, 6 \rangle = 2 \langle 3, -2, 3 \rangle$. Thus

$$\vec{r} = \langle -2, 3, 1 \rangle + t \langle 3, -2, 3 \rangle, \quad x = -2 + 3t, \quad y = 3 - 2t, \quad z = 1 + 3t,$$

and $\boxed{(x + 2)/3 = (y - 3)/(-2) = (z - 1)/3}$.

Requested point From $-2 + 3t = 7$, $t = 3$, giving $\boxed{(7, -3, 10)}$.

Verification $t = 0$ gives A and $t = 2$ gives B .