data

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Introduction to Vectors

We all know that two points are equal to eachother if and only if their corresponding coordinates are equal.
That is, if $A(a_1, a_2)$ and $B(b_1, b_2)$. Then the two points are exactly the same if $a_1 = b_1$ and $a_2 = b_2$

These two points are in the xy-coordinate system.
The xy-coordinate system is two dimensional and is represented by $\mathbb{R}^2$

It is the same in a 3-dimensional coordinate system which is denoted by $\mathbb{R}^3$.

That is, two points $C(c_1, c_2, c_3)$ and $D(d_1, d_2, d_3)$ are equal if and only if $c_1 = d_1$, $c_2 = d_2$ and $c_3 = d_3$
In this course, we will only look at vectors in the xy-coordinate system

Example
Let $A(x, -3)$ and $B(2, y)$. Find x and y such that A and B are the same point

$x = 2$

$y = -3$

Example
Let $C(x+y, -3)$ and $D(-2, 2x+y)$. Find x and y such that the points C and D are identical
The two points are the same if $\rightarrow \begin{cases} x+y=-2 \\ 2x+y=-3 \end{cases}$ Solve for x and y

$x+y=-2$

$x = -2-y$ put this expression of x in the 2nd equation

$2(-2-y)+y=-3$

$-4-2y+y=-3$ or $-4-y=-3 \Rightarrow -y = 4-3 = 1$.

$\Rightarrow y=-1 \Rightarrow x=-2-(-1)=-1$