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Things covered today coordinates system what is the basic of 3 dimensional coordinate how 2d and 3d vector work and differ from each other

Some basic covered today are  
scaler is a single numerical value in one dimensional space.

We can represent our distance from zero on the  $x$  axis by a scalar value.

We also learned that our  $x$  coordinate is our position along the  $x$  axis and  $x y$  coordinates represent

our position on the  $XY$  plane and that these are represented by an ordered pair.

We learned that  $X, y, z$  coordinates represent our position in three dimensional space and these are

represented by an ordered triple with  $x$  first, then  $Y$ , then  $Z$  last.

And we learn that in any coordinate system, the point in space where all coordinates are zero is the origin.

2) Vectors - two vectors are equal if they're  $X$  and  $Y$  components are equal, If their components are equal, then that means their direction and their magnitude are equal. And these are the only things that matter when determining if two vectors are the same.

It doesn't matter where they start in the  $XY$  plane or in the three dimensional world.

We've also learned that we could calculate a vectors components by subtracting 0.1 from 0.2 for the

X and Y coordinates.

So we have this formula for the vector from 0.1 to 0.2.

It's always going to be the coordinates at the head minus the coordinates at the tail for both the X

and Y components.

3) Vector Operation – operation possible on vector like multiplication with scalar or constant ;

How to do vector addition and vector subtraction and they are done by component wise addition/subtraction

Vector Normalization - A vector multiplied by that vector gives us the unit vector or the vector in the same direction with a length of one.

So in the case of this vector, with a length of 100, we would multiply the vector by one over 100, and that gives us the unit vector.

So this is the general formula for reducing a vector down to a vector with a length of one, but still pointing in the same direction.

Doing this to a vector is known as normalizing the vector, and we say that the resulting unit vector is normalized.