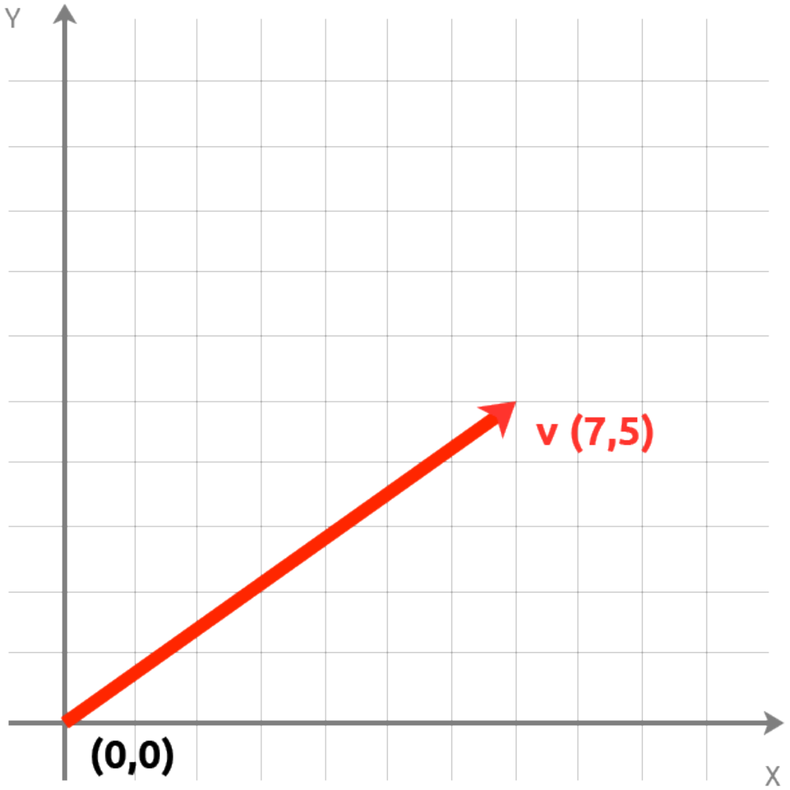
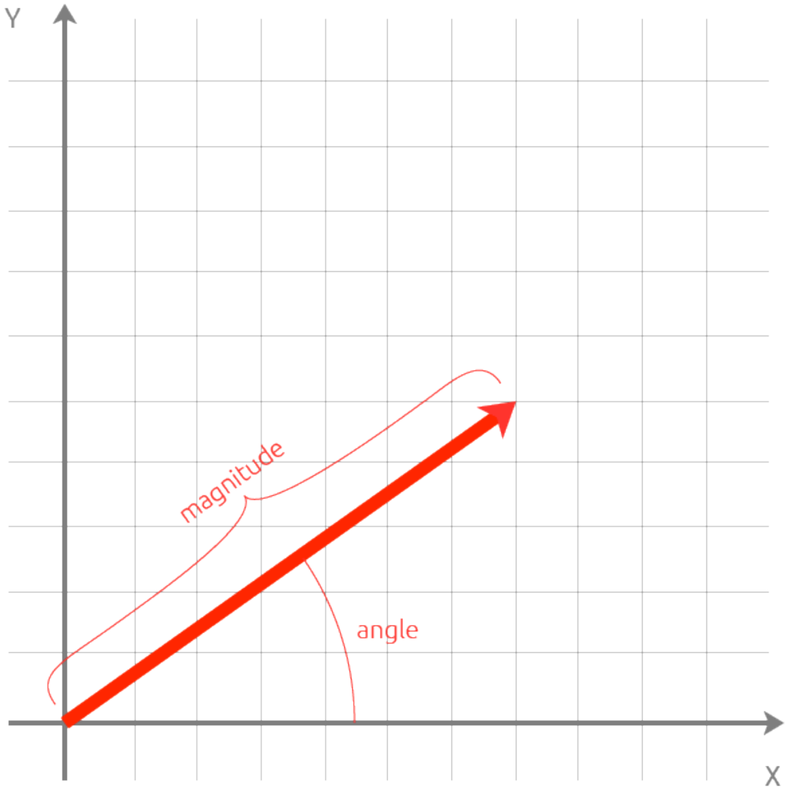
Vector Basics

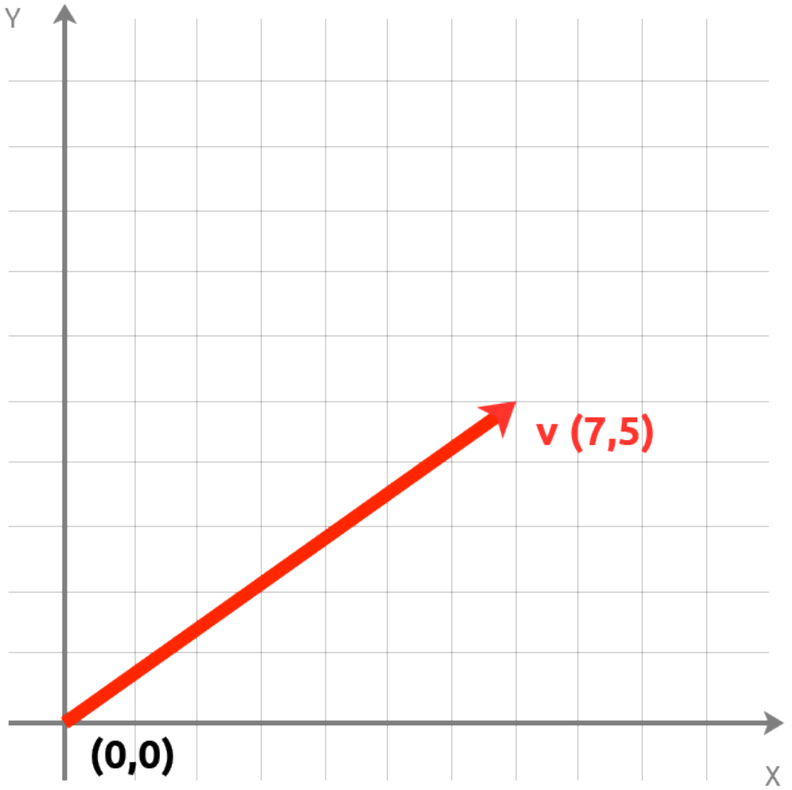
Carl Emil Carlsen, 2012



Vectors start at (0,0) and end at (x,y)

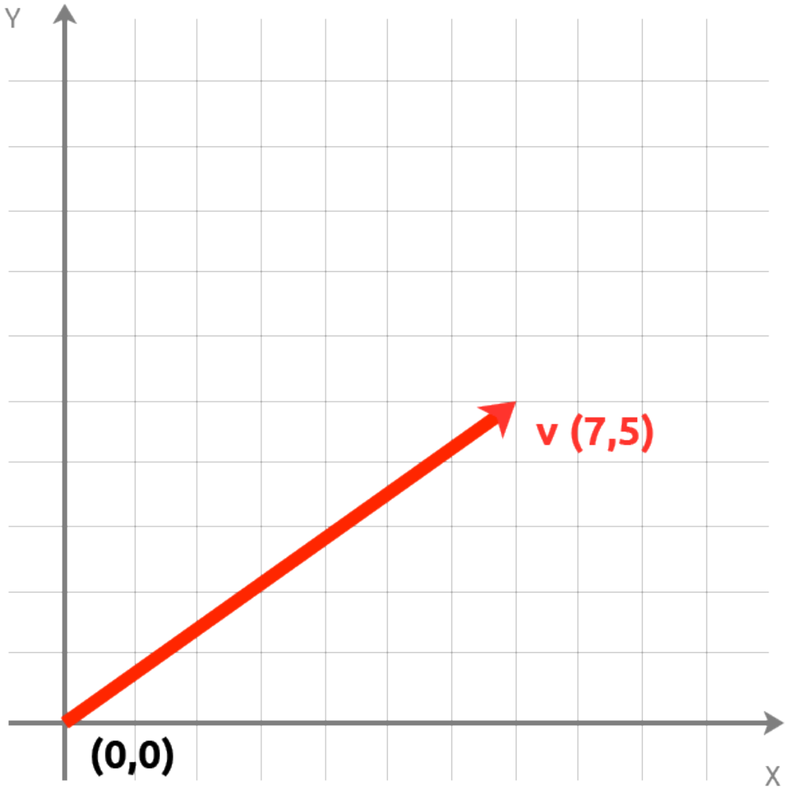


Vectors have a direction and a magnitude



Vectors are instantiated like this

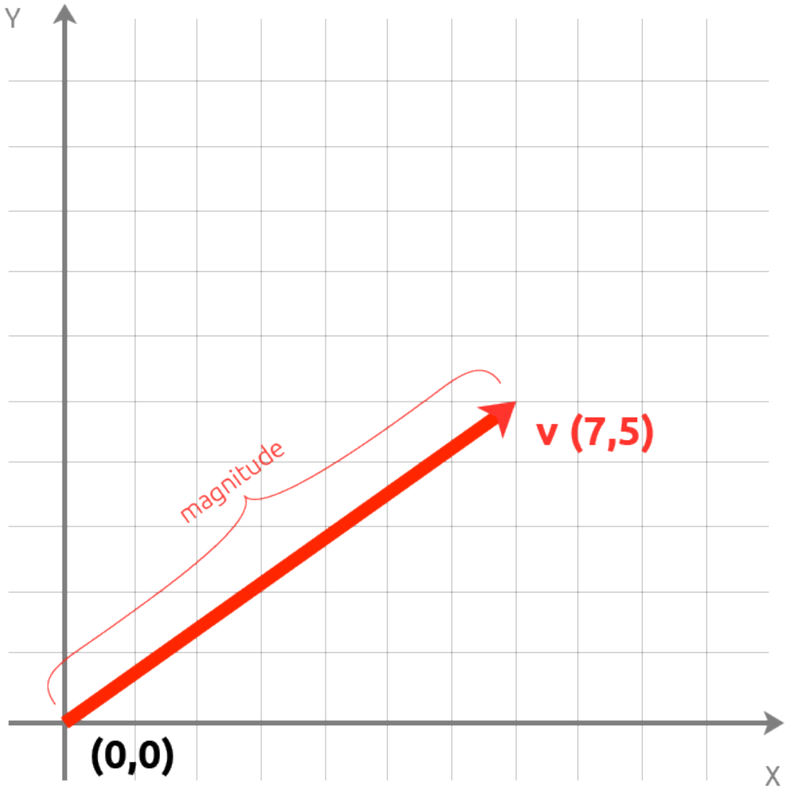
```
// instantiate a vector
Vector2 v = new Vector2(7,5);
```



Access x and y values like this

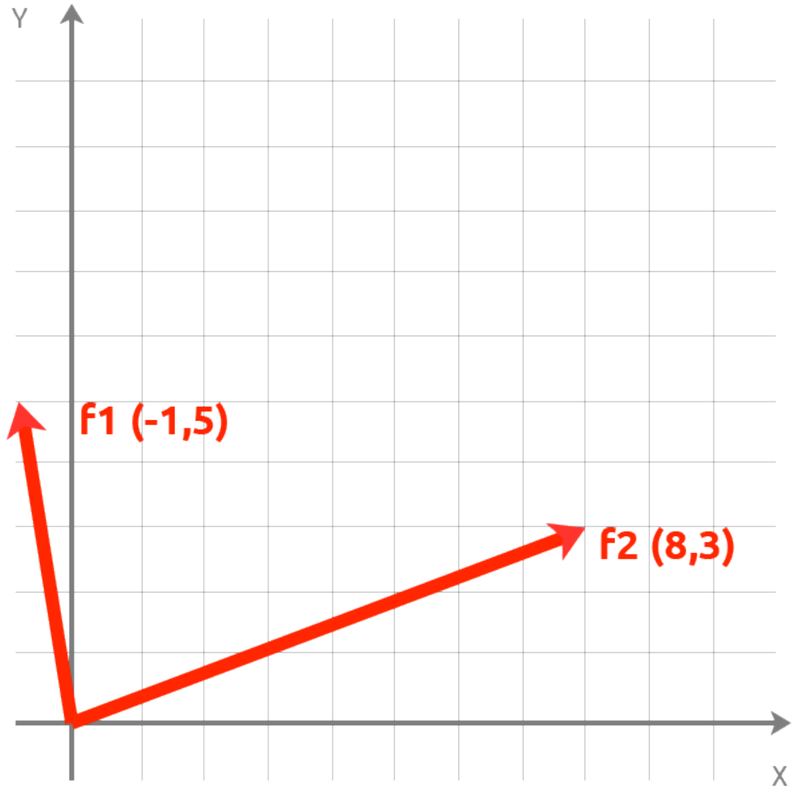
```
// instantiate a vector
Vector2 v = new Vector2(7,5);

// log x value
Debug.Log( “x: ” + v.x );

// log y value
Debug.Log( “y: ” + v.y );
```

```
=>
x: 7.0
y: 5.0
```



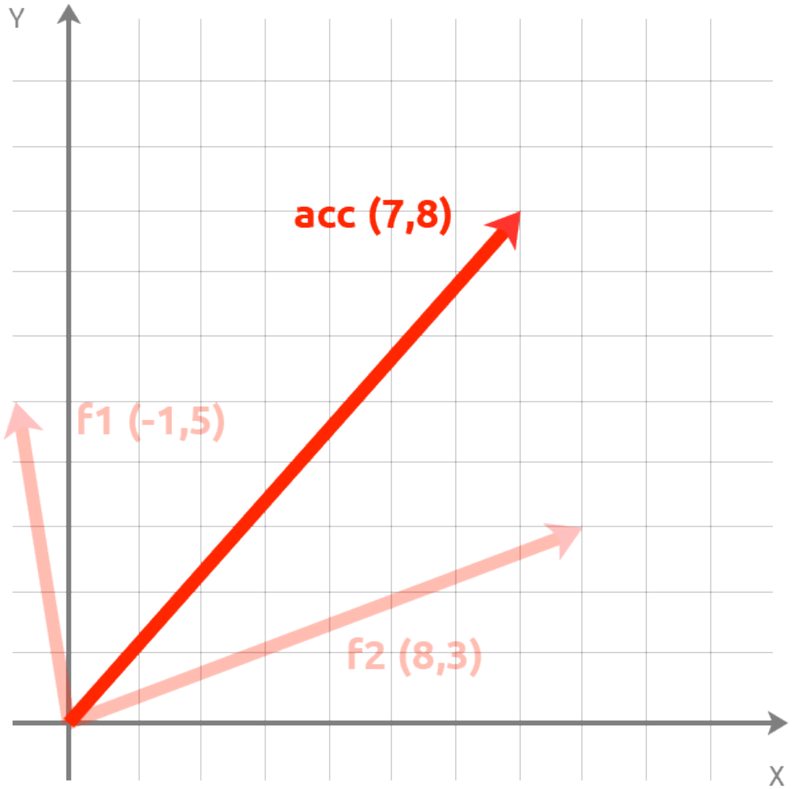
Get magnitude like this

```
// instantiate a vector
Vector2 v = new Vector2(7,5);

// log magnitude
Debug.Log( “magnitude: ” + v.magnitude );


=>
magnitude: 8.602325
```



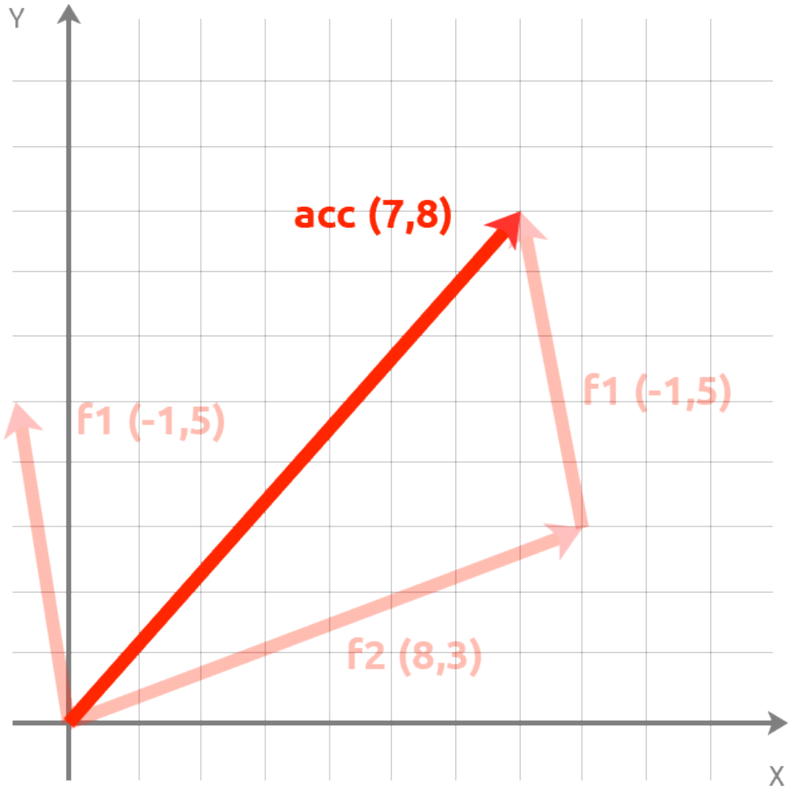
Here we define two force vectors

```
// instantiate a vector to store a force
Vector2 f1 = new Vector2(-1,5);

// and another one
Vector2 f2 = new Vector2(2,3);
```



We add the two forces and store the result in an acceleration vector

```
// instantiate a vector to store a force
Vector2 f1 = new Vector2(-1,5);

// and another one
Vector2 f2 = new Vector2(2,3);

// add the forces
Vector2 acc = f1 + f2;
```



We are simply adding x and y values, nothing more

```
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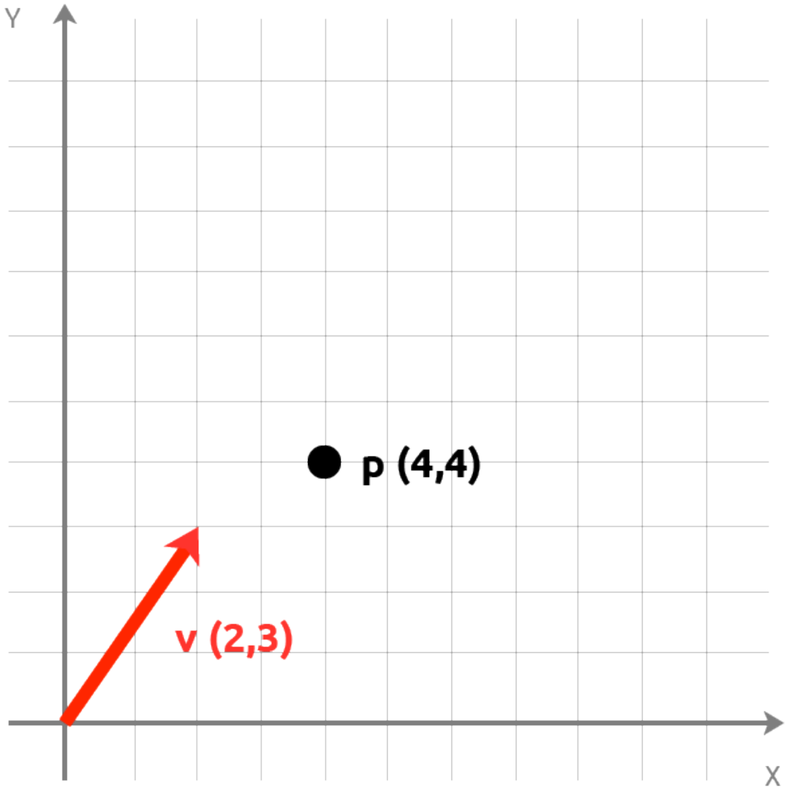
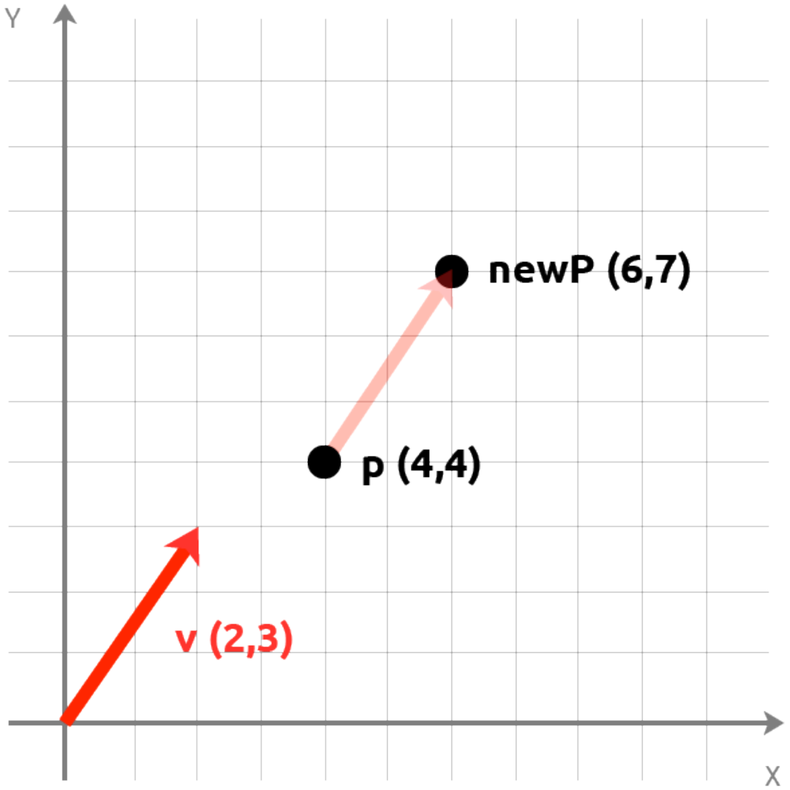


In computation vectors are used to store and manipulate both vectors and positions

```
// instantiate a vector to store a position
Vector2 p = new Vector2(4,4);

// instantiate a vector to store a velocity
Vector2 v = new Vector2(2,3);
```

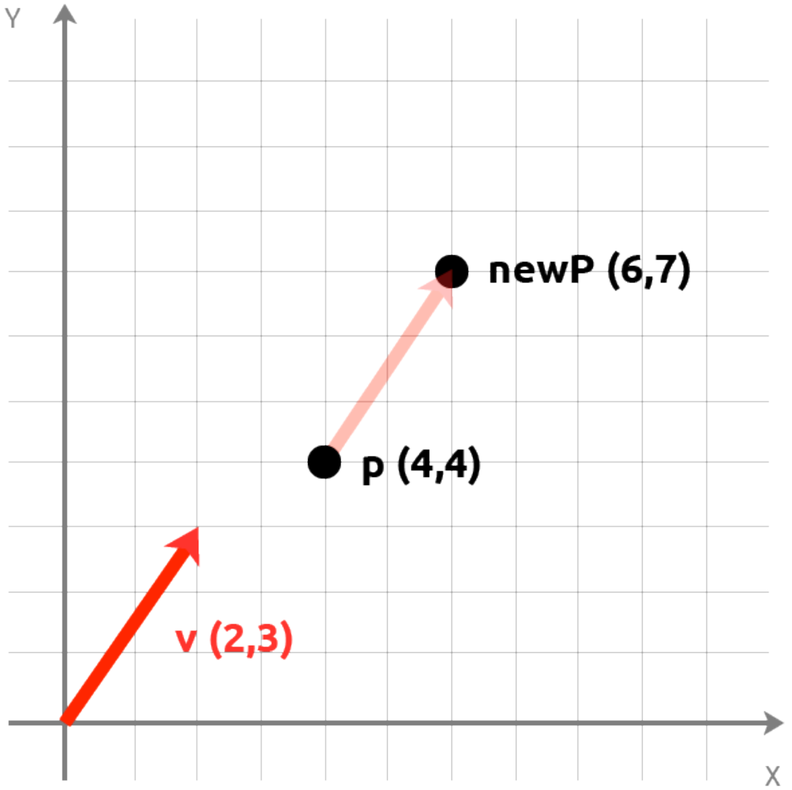


Here we add a velocity to a position

```
// instantiate a vector to store a position
Vector2 p = new Vector2(4,4);

// instantiate a vector to store a velocity
Vector2 v = new Vector2(2,3);

// add the velocity to the position
Vector2 newP = p + v;
```



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Vector2 p = new Vector2(4,4);

// instantiate a vector to store a velocity
Vector2 v = new Vector2(2,3);

// add the velocity to the position
Vector2 newP = p + v;
```
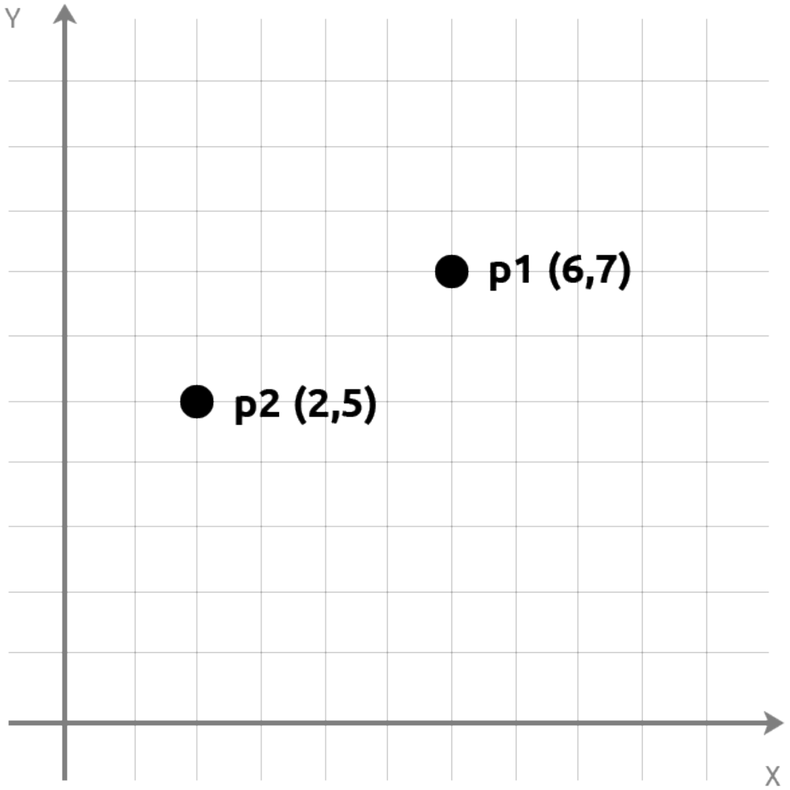
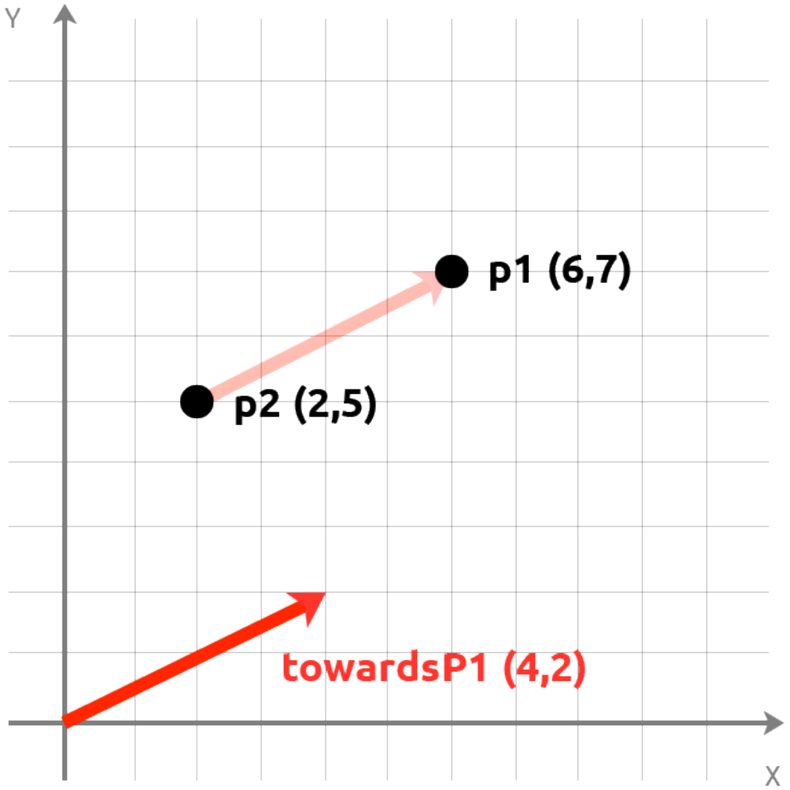

This is what happens behind the scene

```
Vector2 newP = new Vector2( p.x + v.x, p.y + v.y );
```



Subtracting position2 from position1 gives us a vector pointing from position2 towards position1

```
// instantiate a vector to store a position
Vector2 p1 = new Vector2(6,7);

// instantiate a vector to store a position
Vector2 p2 = new Vector2(2,3);

// find a vector that points from p2 towards p1
Vector2 towardsP1 = p1 - p2;
```



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