VECTORS

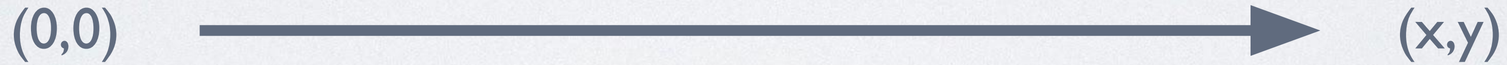
but simply,

object

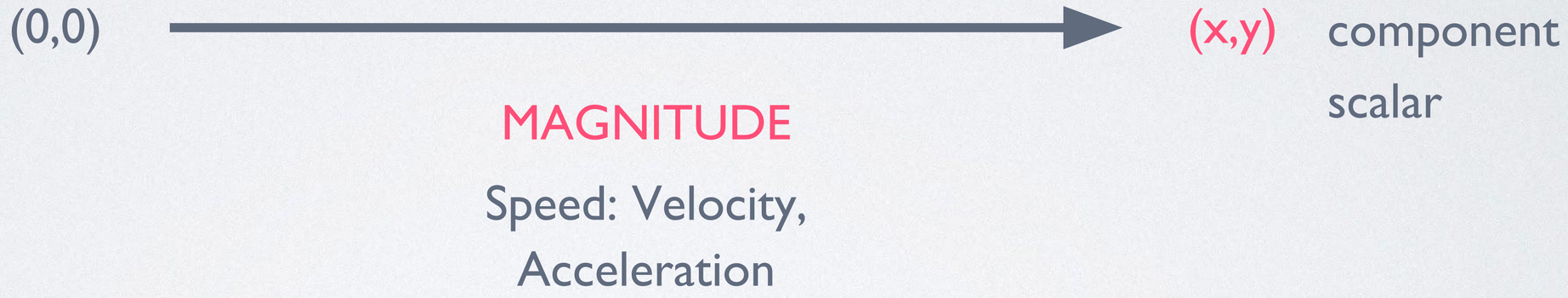
(x, y)

object

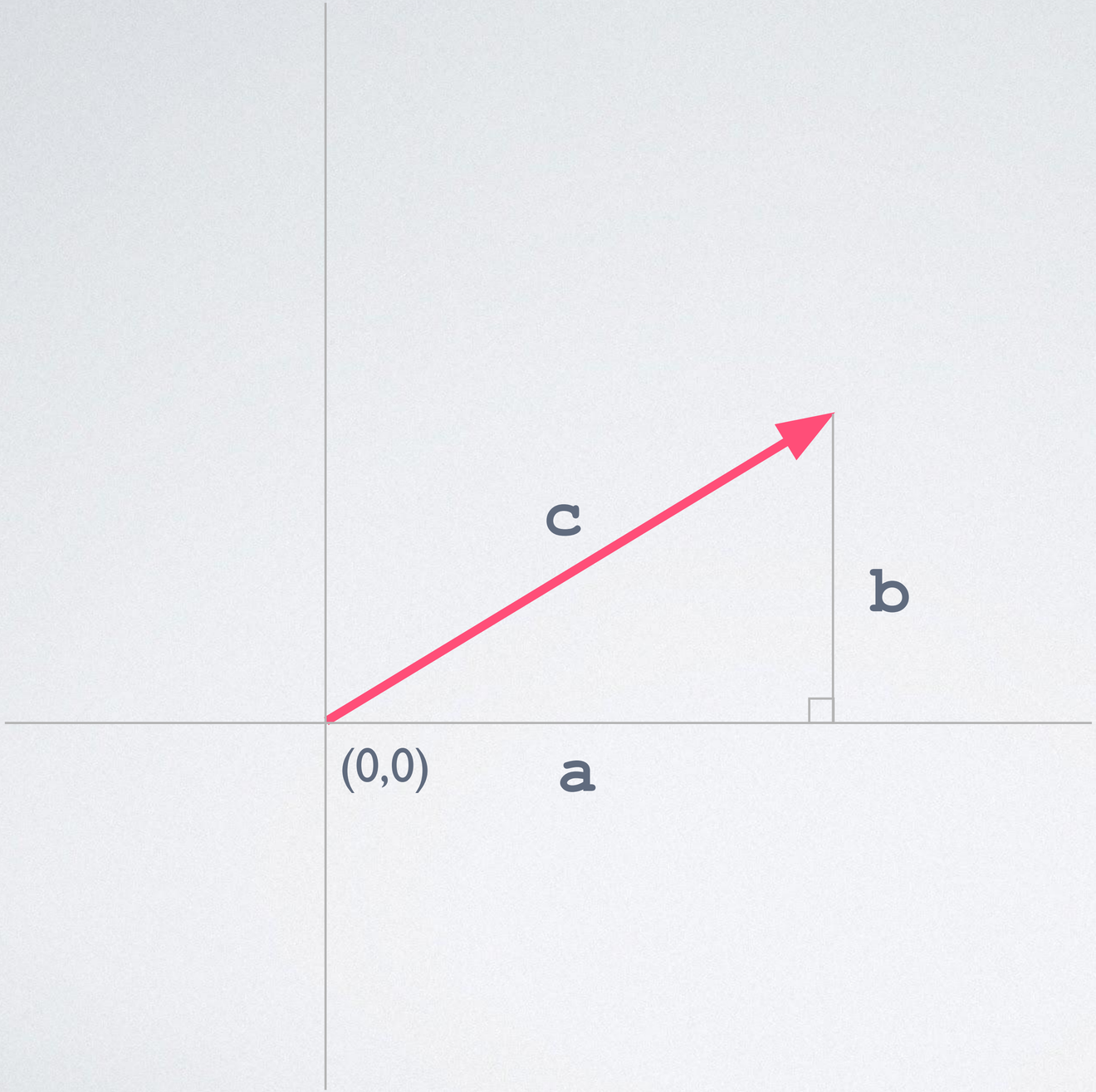
(x, y, z)


(0,0)
(x,y)


(0,0)
(x,y)
MAGNITUDE


(0,0)
(x,y)
component
scalar
MAGNITUDE
Speed: Velocity,
Acceleration

VECTOR MAGNITUDE

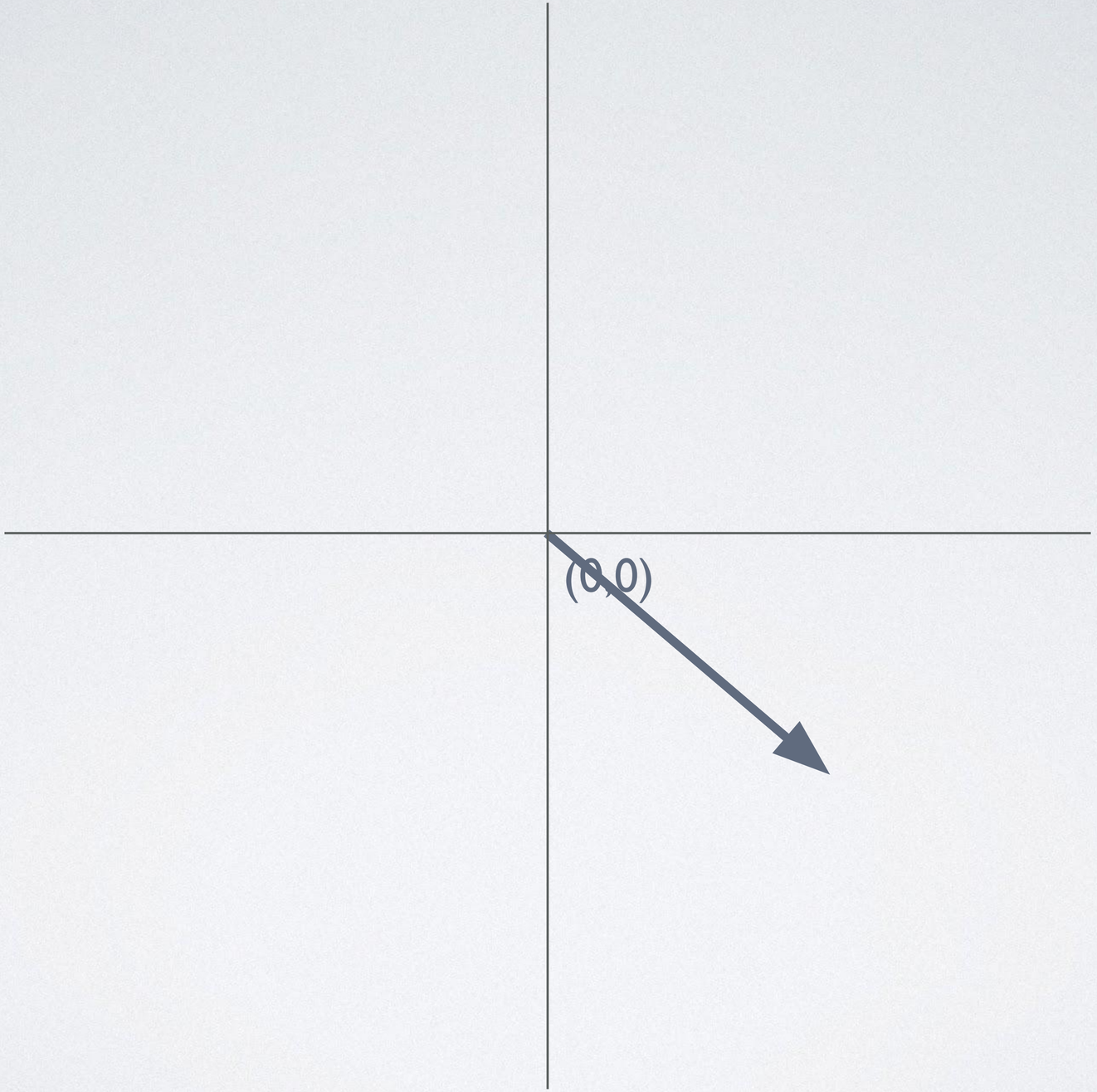


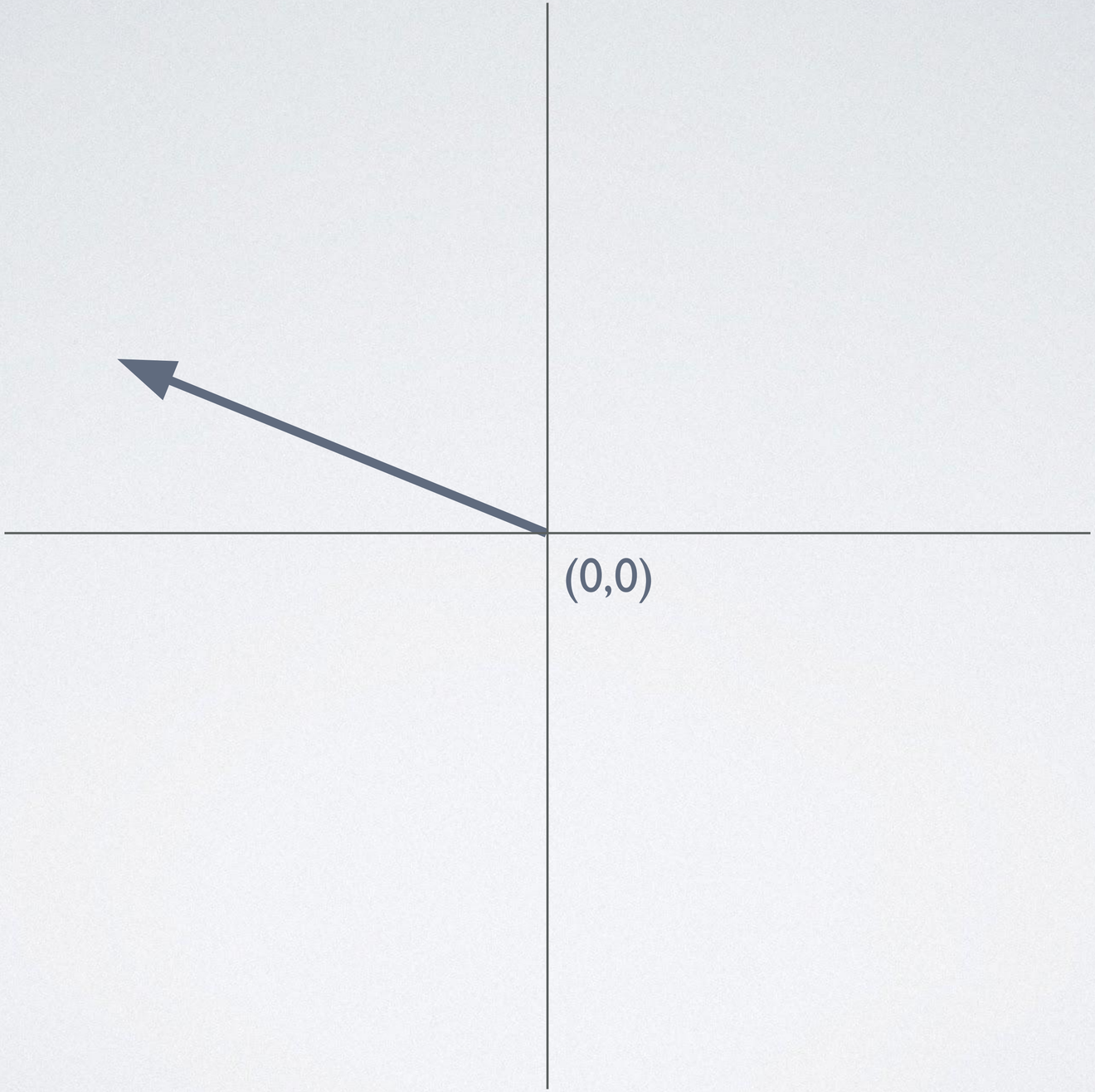
MAGNITUDE

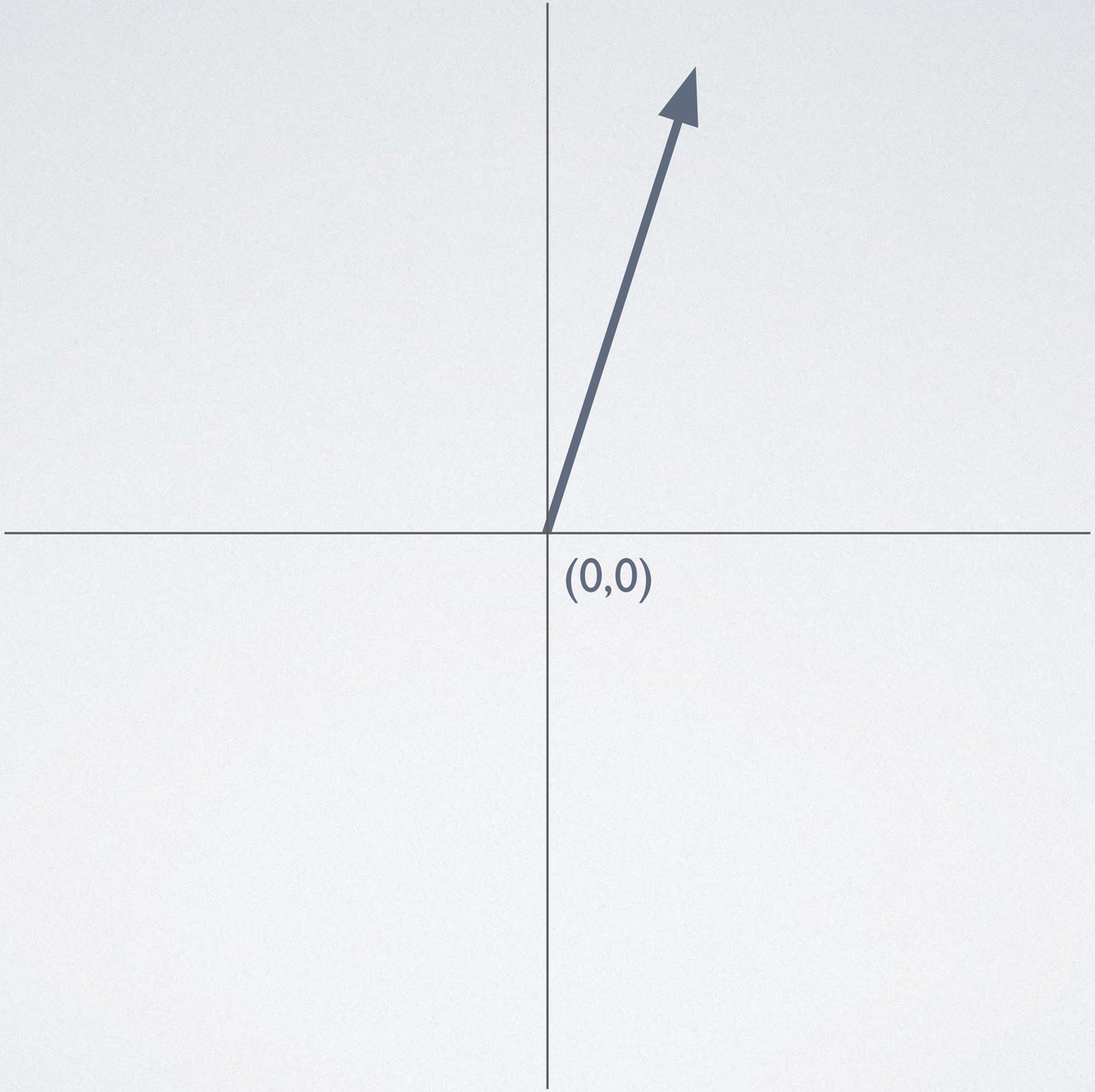
$$c^2 = a^2 + b^2$$

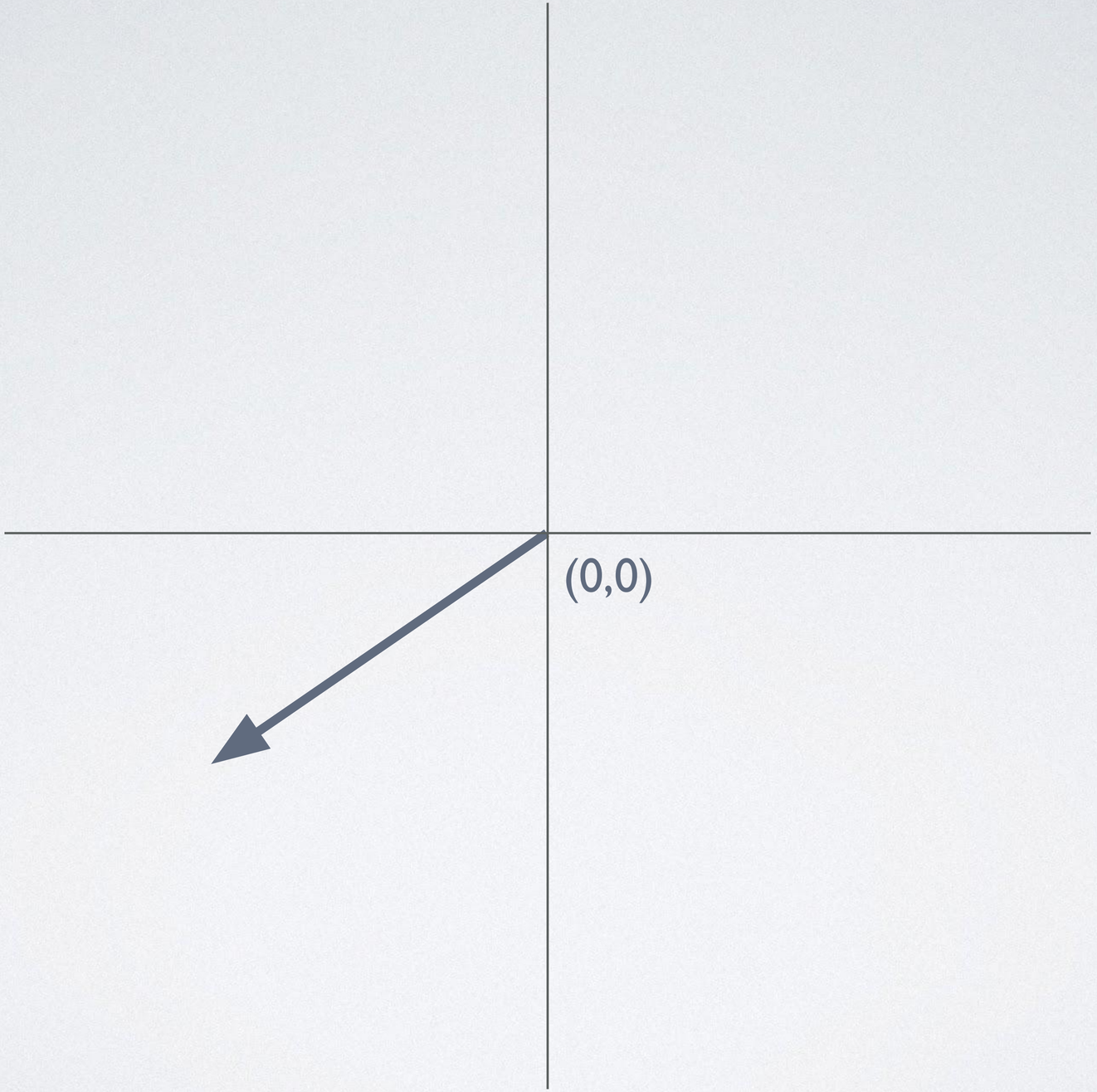
$$c = \sqrt{a^2 + b^2}$$

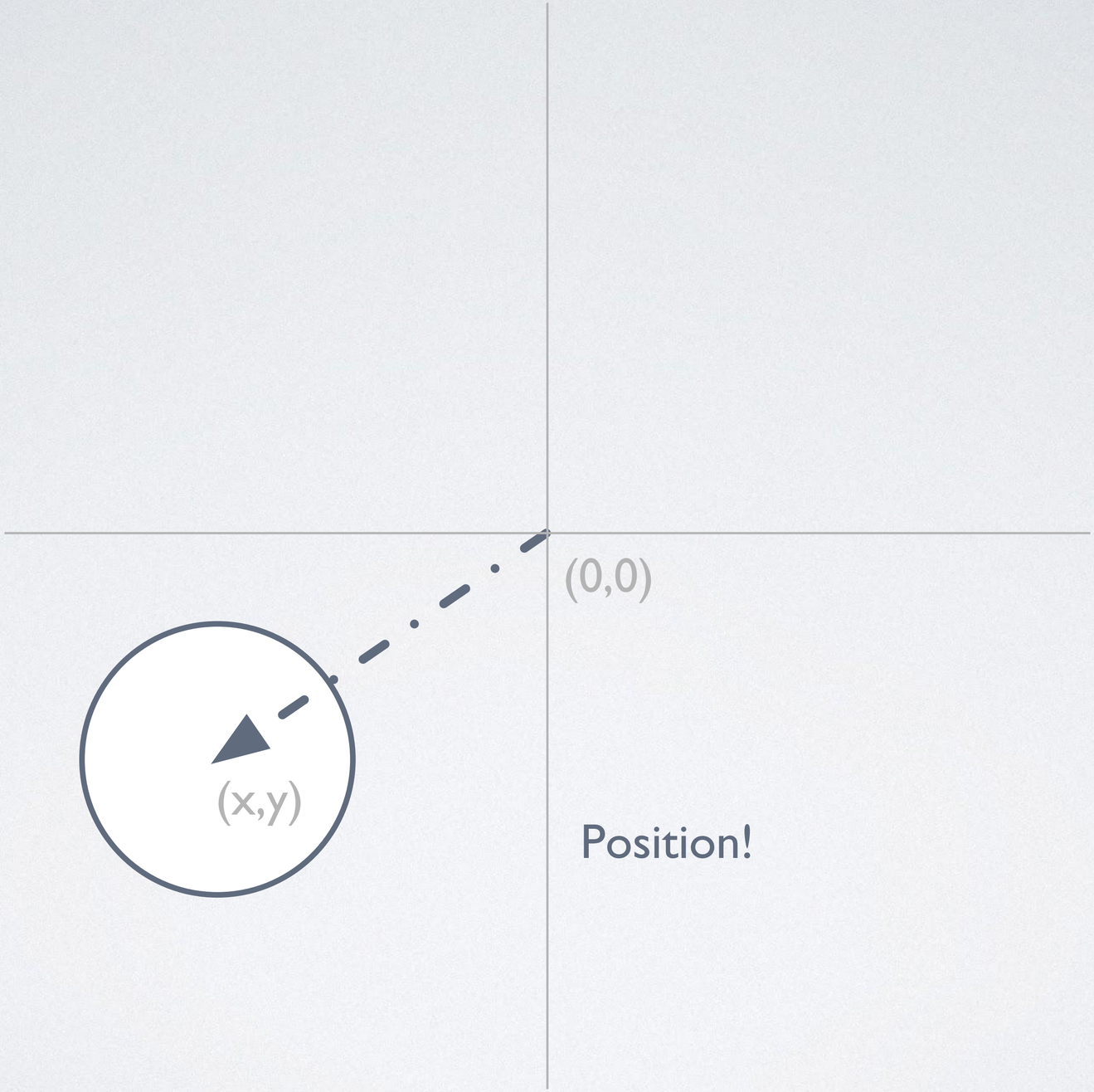
Pythagorean Theorem
:D

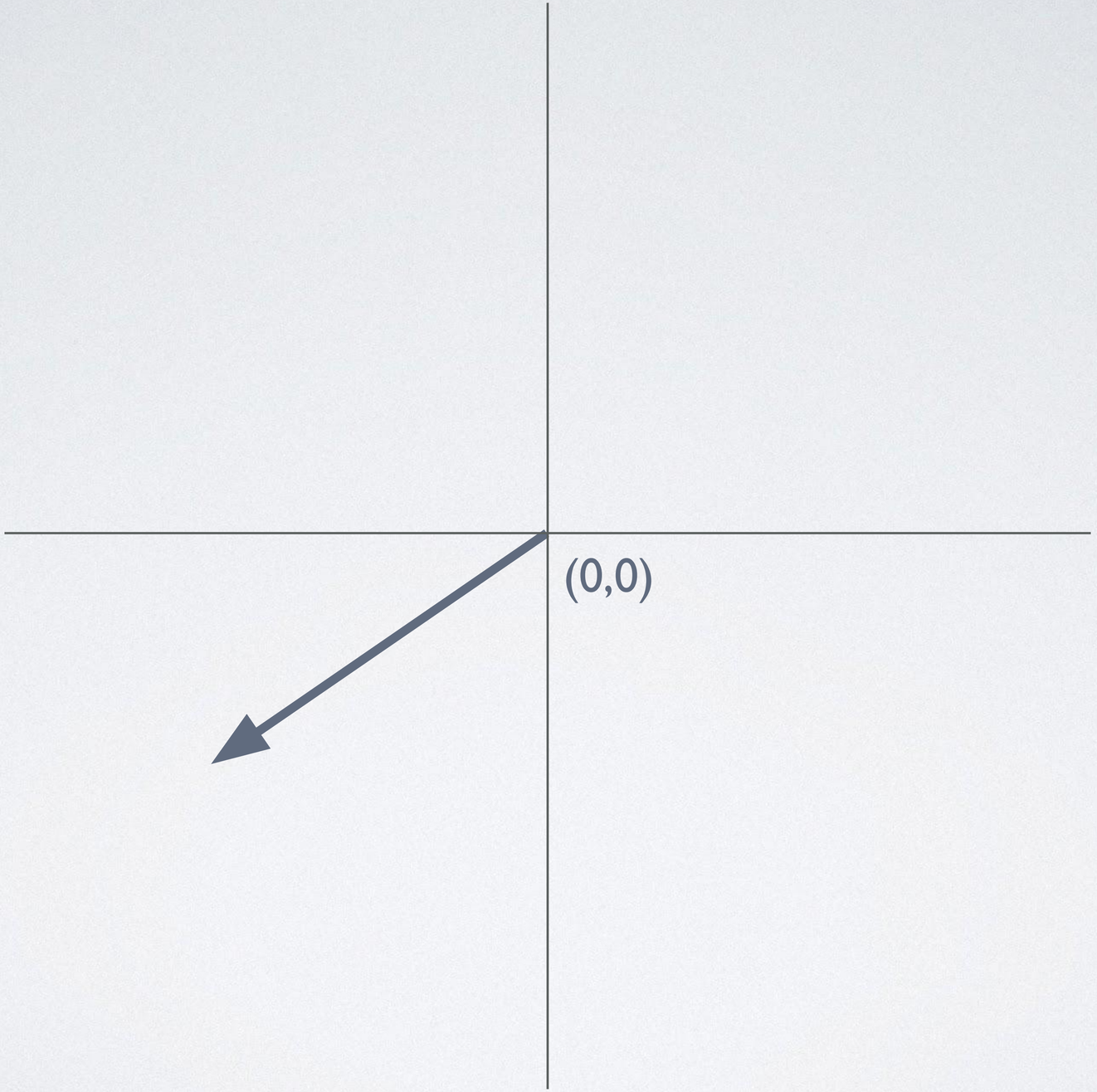

(0,0)

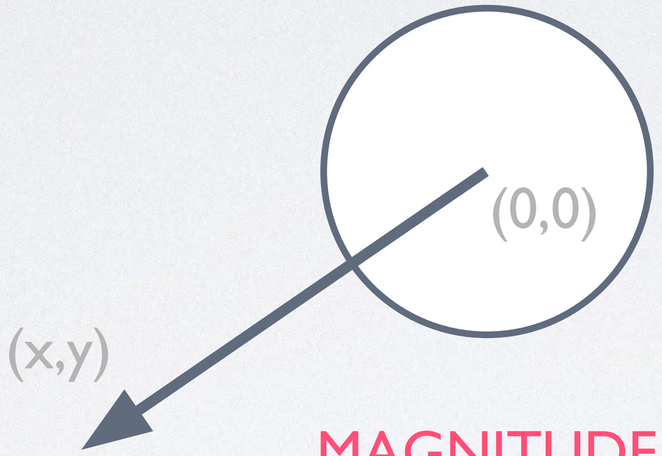

(0,0)


(0,0)


(0,0)


(0,0)
(x,y)
Position!


(0,0)



MAGNITUDE

Speed !

```
x = x + xspeed;
y = y + yspeed;
```

```
x = x + xspeed;

y = y + yspeed;

z = z + zspeed;
```

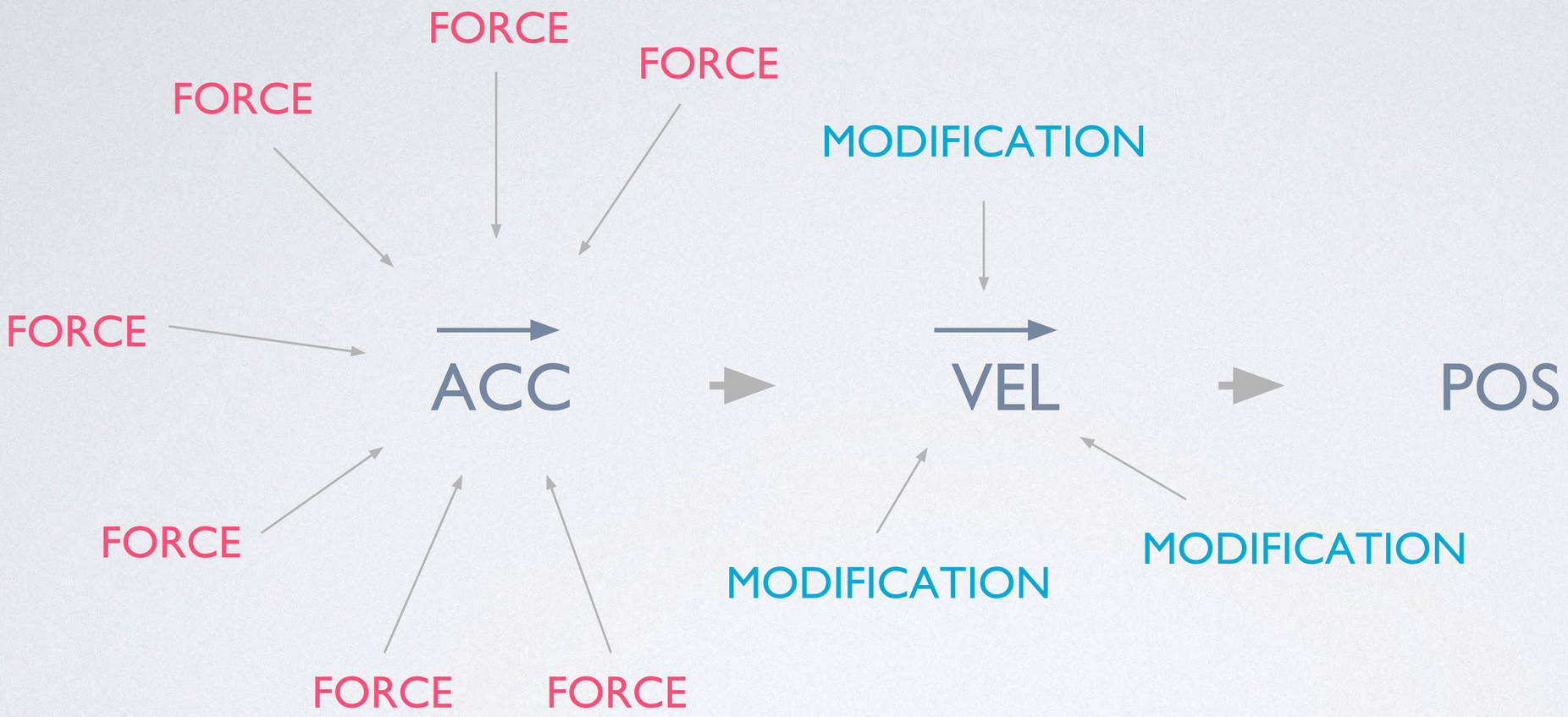
```
x = x + xspeed;
y = y + yspeed;
z = z + zspeed;
```

```
pos = pos + vel;
```

IN PHYSICS

NEXT POSITION = CURRENT POSITION + $\overrightarrow{\text{VECTOR}}$

IN PHYSICS


FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
MODIFICATION
ACC
VEL
POS
MODIFICATION
MODIFICATION

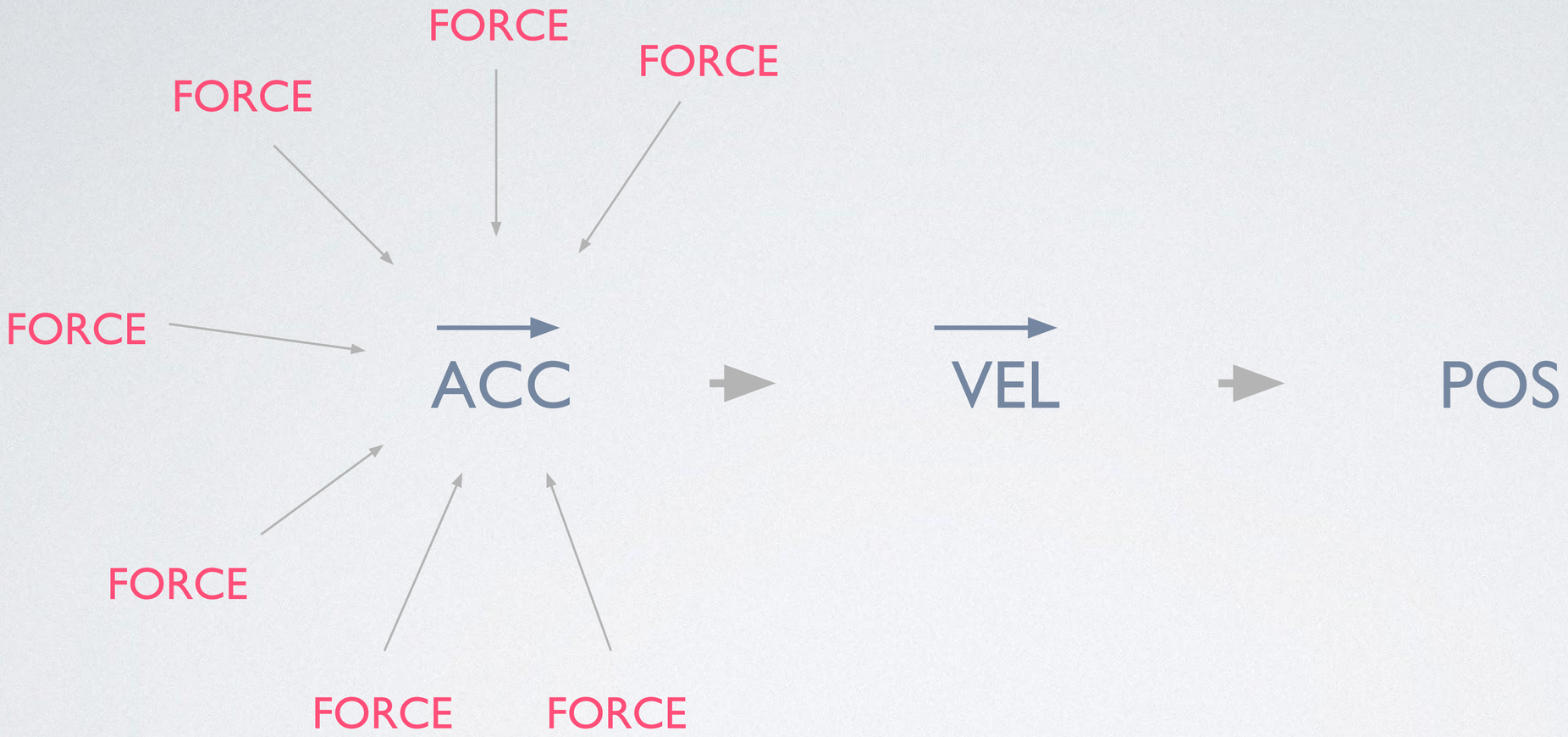

FORCE
FORCE
FORCE
FORCE
ACC
VEL
POS
MODIFICATION
MODIFICATION
FORCE
FORCE
FORCE
xspeed = xspeed + xacc;
yspeed = yspeed + yacc;
zspeed = zspeed + zacc;
xspeed *= 0.98;
yspeed *= 0.98;
zspeed *= 0.98;
x = x + xspeed;
y = y + yspeed;
z = z + zspeed;
xspeed *= 0.7;
yspeed *= 0.7;
zspeed *= 0.7;


ACC
VEL
POS

+ - * /

Unfortunately, we cannot use these operators…

VECTOR ADDITION

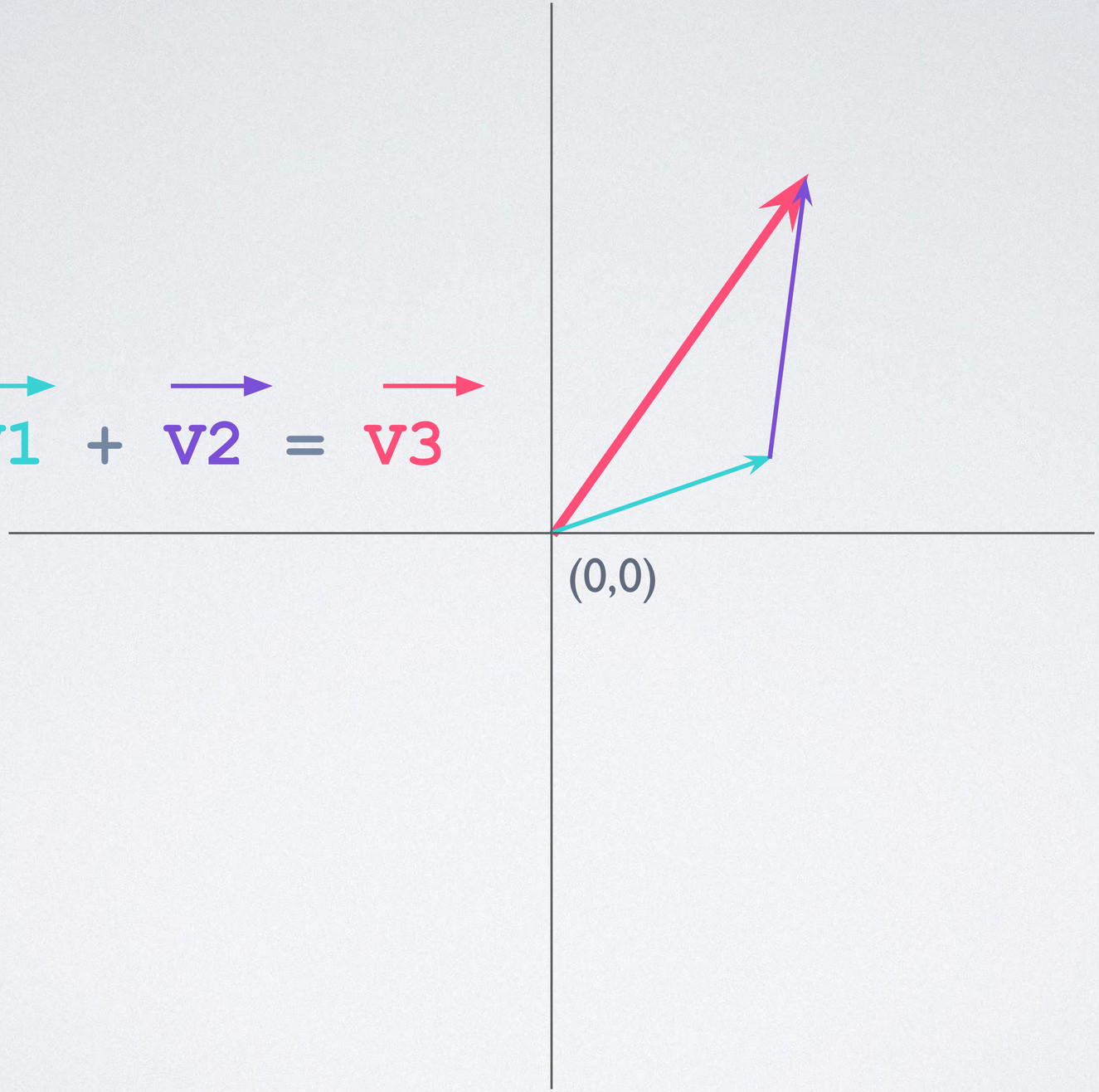

FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
ACC
VEL
POS

```
acc.add(force);
```

```
acc = acc + force
```

```
acc.add(force);
vel.add( acc );
pos.add( vel );
```

$\vec{v1} + \vec{v2} = \vec{v3}$

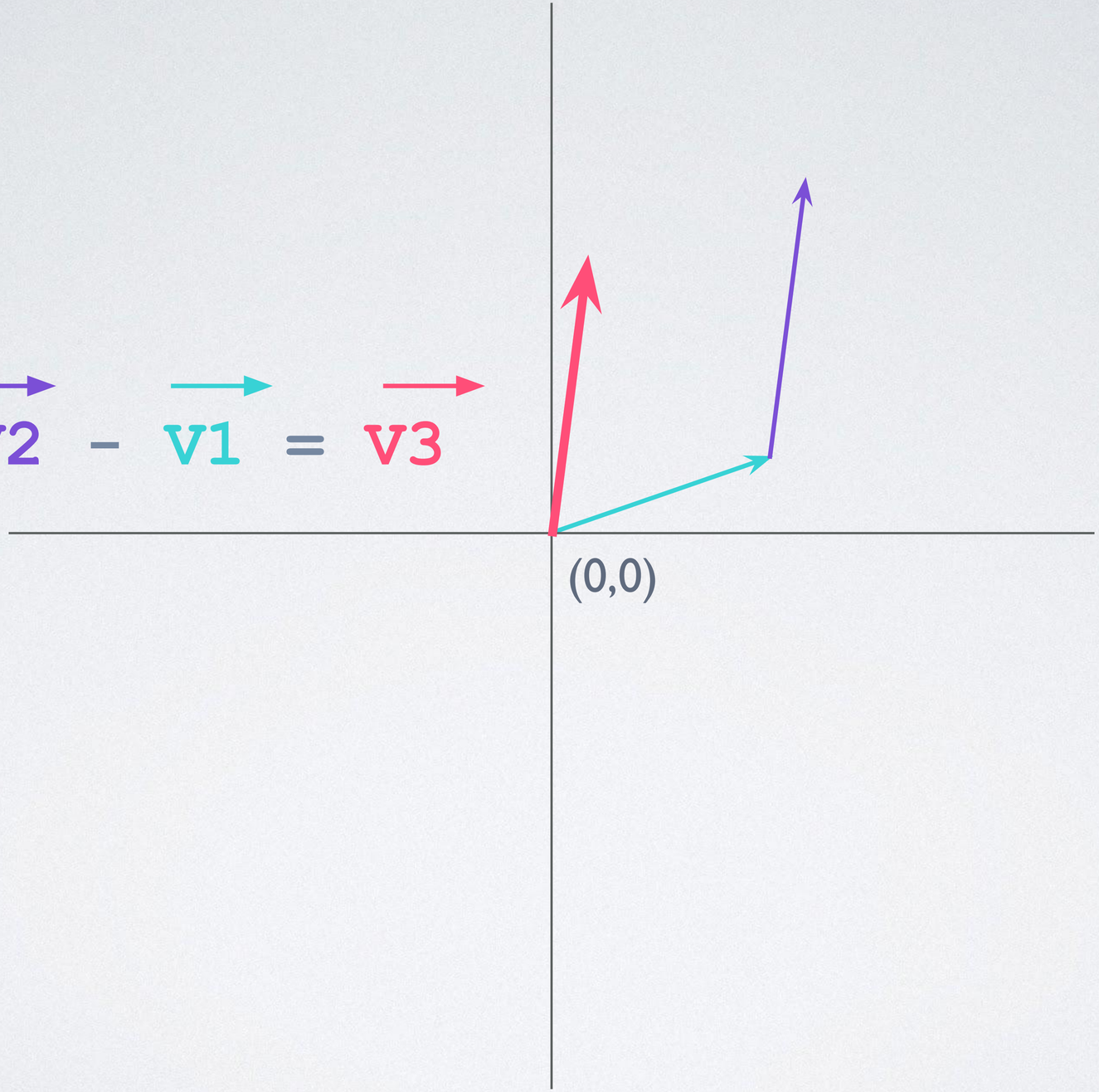


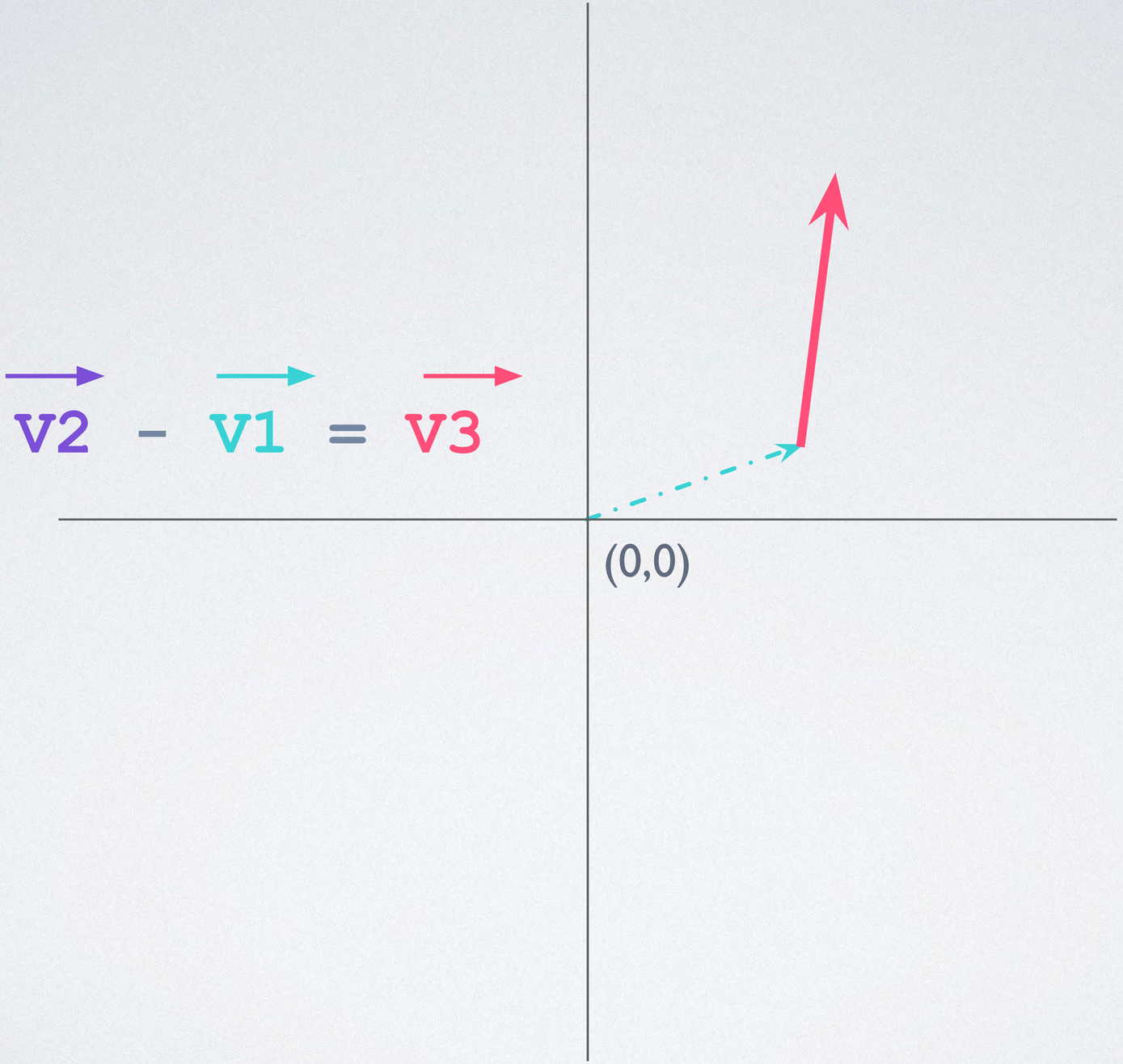
```
v1 = (6, 10)
     +
v2 = (3, -2)
     =
    (9, 8)
```

VECTOR SUBTRACTION


```
v2.sub(v1);
```

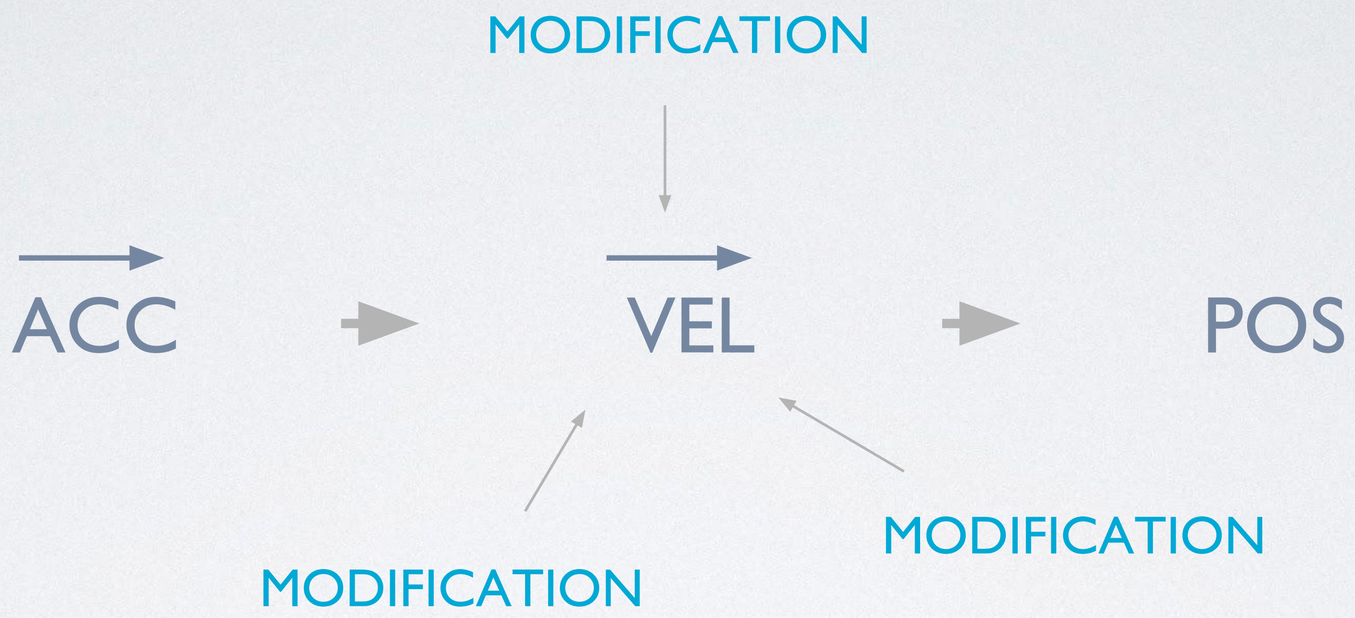
$\vec{v2} - \vec{v1} = \vec{v3}$



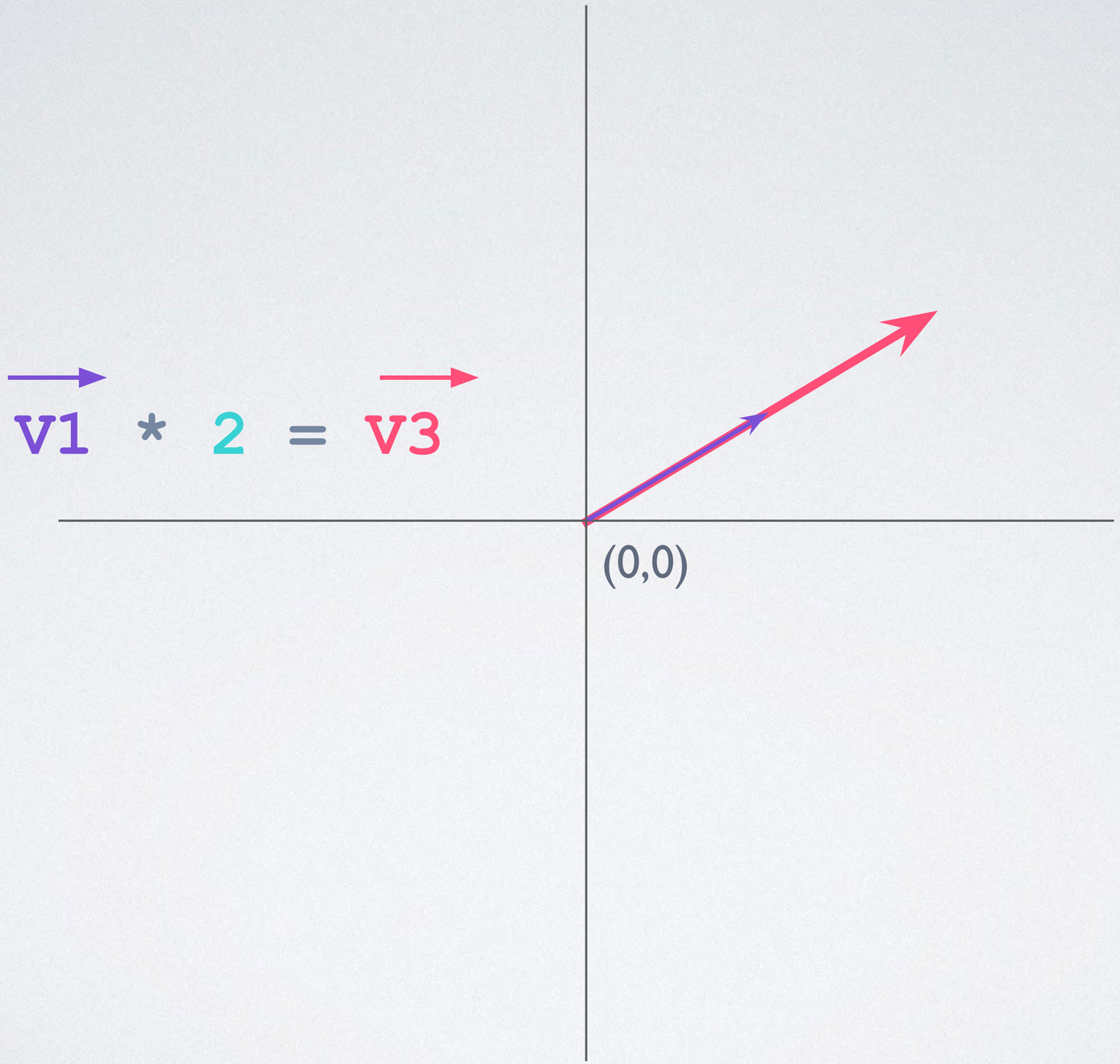

v2 - v1 = v3
(0,0)

```
v1 = (6, 10)
      -
v2 = (3, -2)
      =
     (3, 12)
```

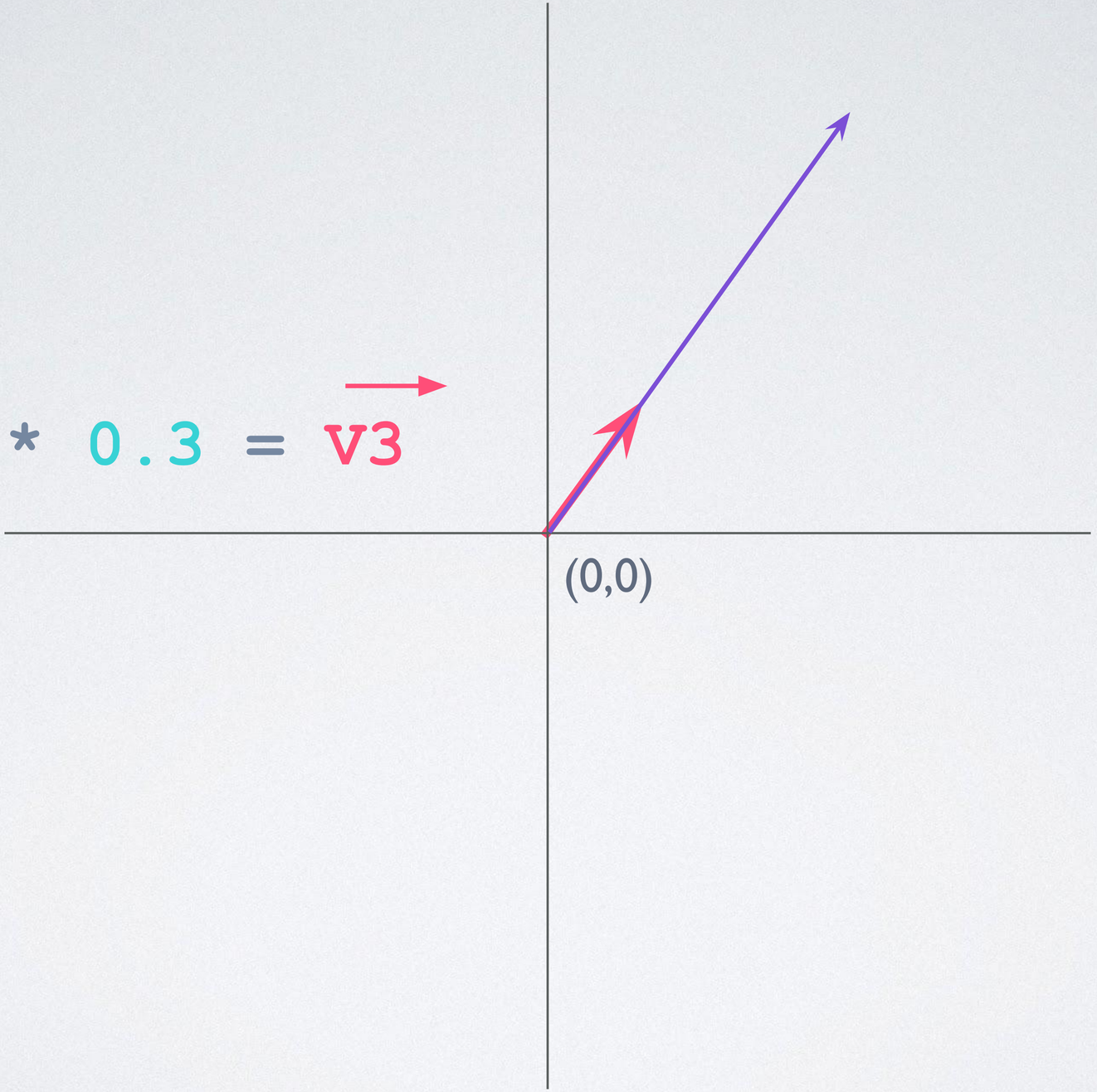
VECTOR MULTIPLICATION


MODIFICATION
ACC
VEL
POS
MODIFICATION
MODIFICATION

```
vel.mult(0.98);
```


v1 * 2 = v3
(0,0)

$\vec{v1} * 0.3 = \vec{v3}$



```
vel = (6, 10)
        *
        3
        =
   (18, 30)
```