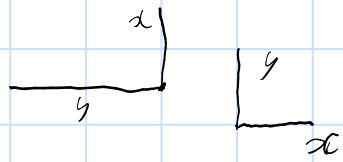
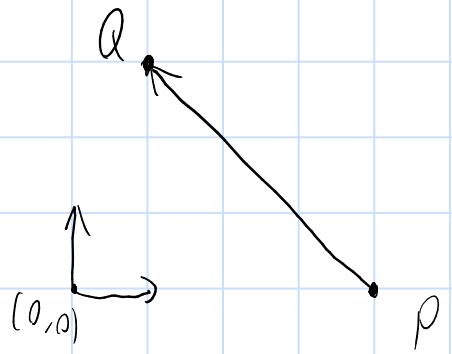
```
CoordFrame2D.identity()
.translate(-1, 0.5)
.rotate(90)
.scale(1, 2)
```



What is the vector v from P to Q if
P = (4,0), Q=(1,3)?

$Q - P = (-3, 3)$



Find the magnitude of the vector (1,2)

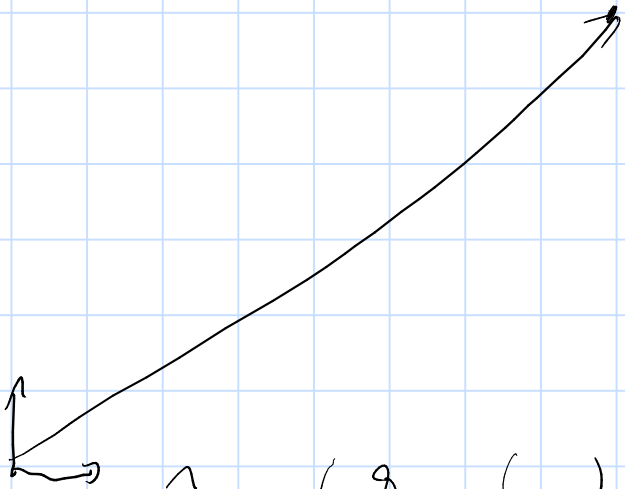
$$v = (1, 2)$$

$$|v| = \sqrt{1^2 + 2^2}$$

$$= \sqrt{5}$$

$$= 2 \cdot 2$$

Normalise the vector (8,6)



$v = (8,6)$

$|v| = \sqrt{8^2 + 6^2}$

$= \sqrt{100}$

$= 10$

$\hat{v} = \left(\frac{8}{10}, \frac{6}{10}\right)$

$= (0.8, 0.6)$

Find the angle between vectors (1,1) and (-1,-1)

$u = \sqrt{2}$

$u = (1, 1)$

$v = (-1, -1)$

$u \cdot v = |u||v| \cos\theta$

$u \cdot v = -2$

$\cos\theta = -1$

$\theta = 180°$

Is vector (3,4) perpendicular to (2,1)?

$(3,4) \cdot (2,1) = 6 + 4 = 10$

Find a vector perpendicular to vector a where a = (2,1)

$a = (2, 1)$

$(-1, 2)$

$(1, -2)$

Find a vector perpendicular to a and b where a = (3,0,2) and b = (4, 1, 8)