

# More examples (Sec 1.1)

Monday, October 3, 2022 12:02 PM

Set

- roster  $A = \{1, 2, 3, 4, 5\}$
- set-builder  $A = \{x \mid x \in \mathbb{N}, 1 \leq x \leq 5\}$
- interval notation  $A = [0, 2) = \{x \mid x \in \mathbb{R} \text{ and } 0 \leq x < 2\}$



Ex  $A = \{x \mid x \leq 1 \text{ or } x \geq 0\} = \mathbb{R} = (-\infty, \infty)$



$B = \{x \mid x \leq 1 \text{ and } x \geq 0\}$   
 $= [0, 1]$

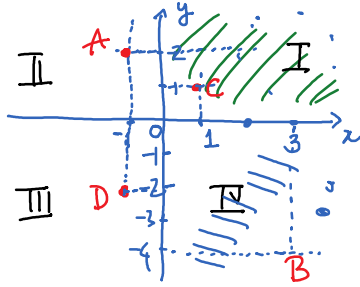


$$C = \underbrace{(0,3)}_{\text{closed}} \cap \underbrace{[1,4]}_{\text{closed}} = \underbrace{[1,3)}_{\text{closed at 1, open at 3}}$$



Ex

$A(-1,2)$ ,  $B(3,-4)$ ,  $C(1,1)$ ,  $D(-1,-2)$   
x-coord y-coord.



C in 1<sup>st</sup> quadrant

A in 2<sup>nd</sup> ...

B in 4<sup>th</sup> ...

D in 3<sup>rd</sup> ...

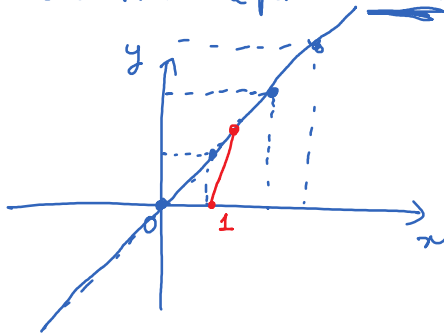
$x, y > 0$

$x > 0, y < 0$

Distance bet A & B  $d = \sqrt{(x_A - x_B)^2 + (y_A - y_B)^2} = \sqrt{(-1-3)^2 + (2-(-4))^2}$   
 $= \sqrt{(-4)^2 + 6^2}$   
 $= \sqrt{16 + 32} = \sqrt{48} \approx 6.9$

$A(-1,2)$ ,  $B(3,-4)$   
 $x_A$   $y_A$   $x_B$   $y_B$

Ex Find  $x$  such that the point  $(x,x)$  is 1 unit away from  $(1,0)$ .



Distance formula bet.  $(x,x)$  &  $(1,0)$ .

$$1 = d = \sqrt{(x-1)^2 + (x-0)^2}$$

Square both sides:

$$1^2 = (x-1)^2 + (x-0)^2$$

$$\textcircled{1} = \underbrace{(x-1)(x-1)} + \underbrace{x^2} = x^2 - x - x + 1 + x^2 = 2x^2 - 2x + 1$$

$$\begin{array}{r} 1 = 2x^2 - 2x + 1 \\ -1 \qquad \qquad -1 \\ \hline \boxed{0 = 2x^2 - 2x} \end{array}$$

$$= \underline{2x}x - \underline{2x}1$$

$$0 = 2x(x-1)$$

$$x=0 \text{ or } x-1=0$$

$$\boxed{x=0 \text{ or } x=1}$$