Chapter 1.1 : Notation / Graphing / Numbers

𝔻 Digits 0-9
ℕ Natural (0), 1, 2, 3, ...
ℤ Integers -3, -2, 0, 5, 512
ℚ Rational $-3/7$, 2, $5/2$, 0
𝕀 Irrational π, e, φ, $\sqrt{2}$
ℝ Real any # you could think of + use
(comolex $i = \sqrt{-1}$)

a is an element of the reals → $a \in \mathbb{R}$ (a is a real #)
ex: $\sqrt{2} \in \mathbb{I}$, $\pi \notin \mathbb{N}$

Intervals

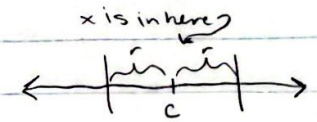
x has to be between, not including, 2 & 7
$\in$ ( ) → $x \in (2,7)$

x is between 3 and 15, including 15
[ ] → $x \in (3,15]$

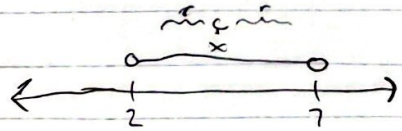
Absolute Values

$|x|$ means distance from x to 0
$|x-c|$ means distance from x to c
$|x-c| < r$ means the distance from x and c is less than r units
(x value, c center, r radius)

ex:



ex.



$= |x - 9/2| < 5/2$

r = distance from center to end

$c = \frac{end_1 + end_2}{2}$

$= \frac{7+2}{2} = 9/2$

$r: 7 - 9/2 = 14/2 - 9/2 = 5/2$

Turning absolute value into interval

$|x-3| \leq 5$

$\downarrow$

$-5 \leq x-3 \leq 5$

$+3 \quad +3 \quad +3$

$-2 \leq x \leq 8$

So, $x \in [-2, 8]$

$|x-c| \leq r$

$\downarrow$

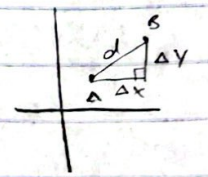
$-r \leq x-c \leq r$

Graphing (x,y charts)

$f(x) = x^2 + 3x - 4$

x	f(x)
-3	$f(-3) = (-3)^2 + 3(-3) - 4 = 6$
-1	-6
0	-4
1	0
3	14

Distance formula



$A = (2,2)$

$B = (7,5)$

$d^2 = \Delta x^2 + \Delta y^2$

$d = \sqrt{\Delta x^2 + \Delta y^2}$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$d = \sqrt{5^2 + 3^2} = 5.8$