MATH C 9/13/2010

Note Title 9/13/2010

teacher: PatLaVallo

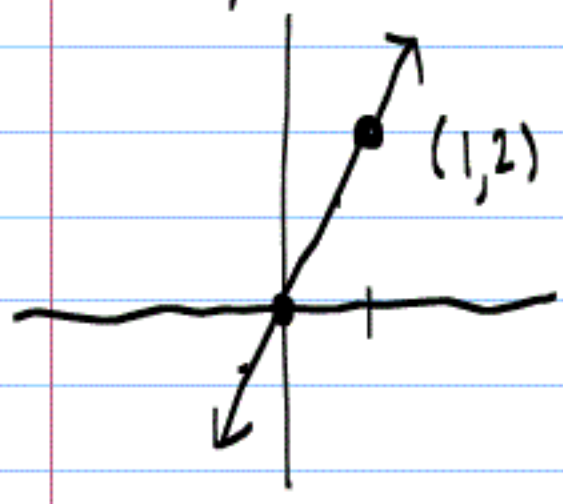
Domain: set of all x values

Range: set of all y values

Ex $A = \{ \overset{(x,y)}{(1,2)}, (5,6), (8,-9) \}$ is a set of ordered pairs

Domain $\{1, 5, 8\}$ Range $\{2, 6, -9\}$

Ex: $y = 2x$

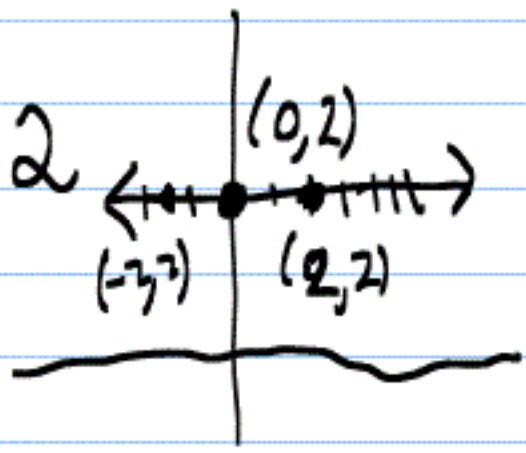


Domain $(-\infty, \infty)$ all Real numbers

"$\mathbb{R}$"

Range $(-\infty, \infty)$

Ex: $y = 2$



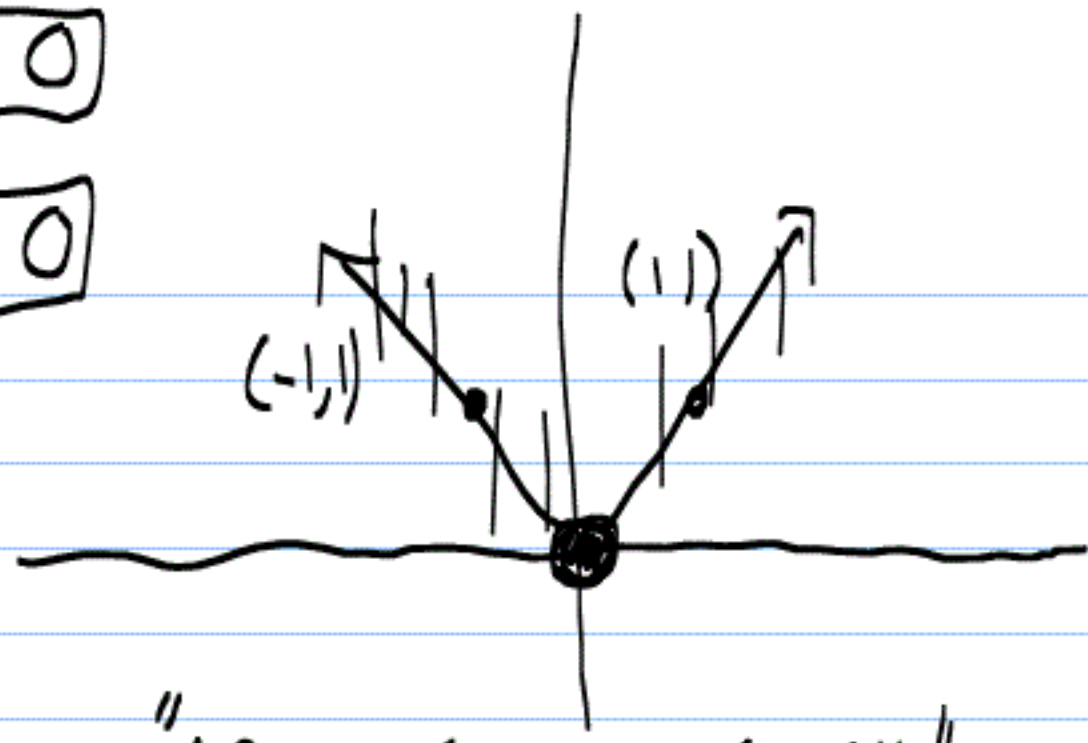
Domain $(-\infty, \infty)$ all real #'s

Range $\{2\}$ only y value of graph.

- $f(x)$ FUNCTION SYMBOL Ex $f(x) = 2x + 1$

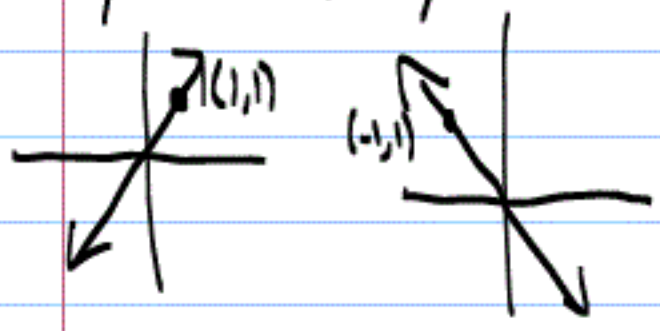
$f(3) = 2(3) + 1 = 7$

Ex: $\underbrace{f(x)}_{y} = \begin{cases} x & \boxed{x > 0} \\ -x & \boxed{x \leq 0} \end{cases}$



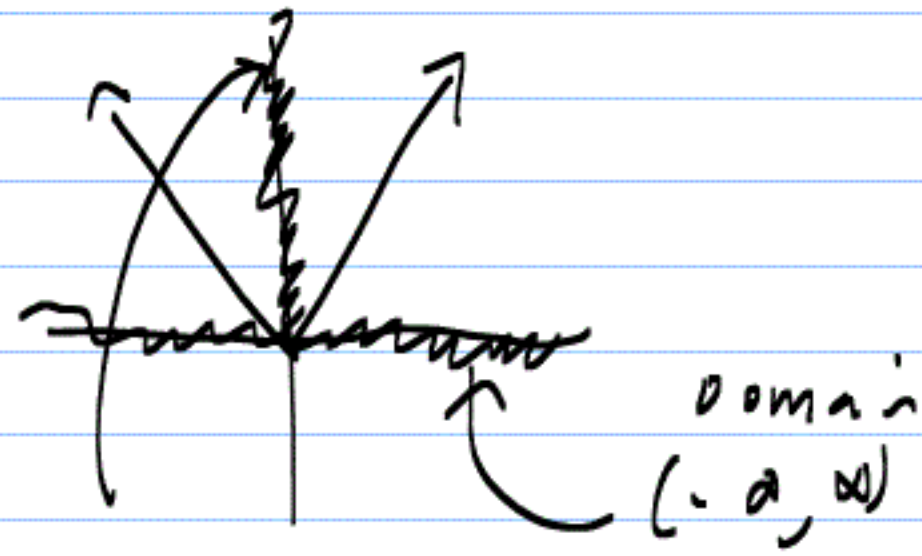
"ABSOLUTE VALUE GRAPH"

$y = x$, $y = -x$



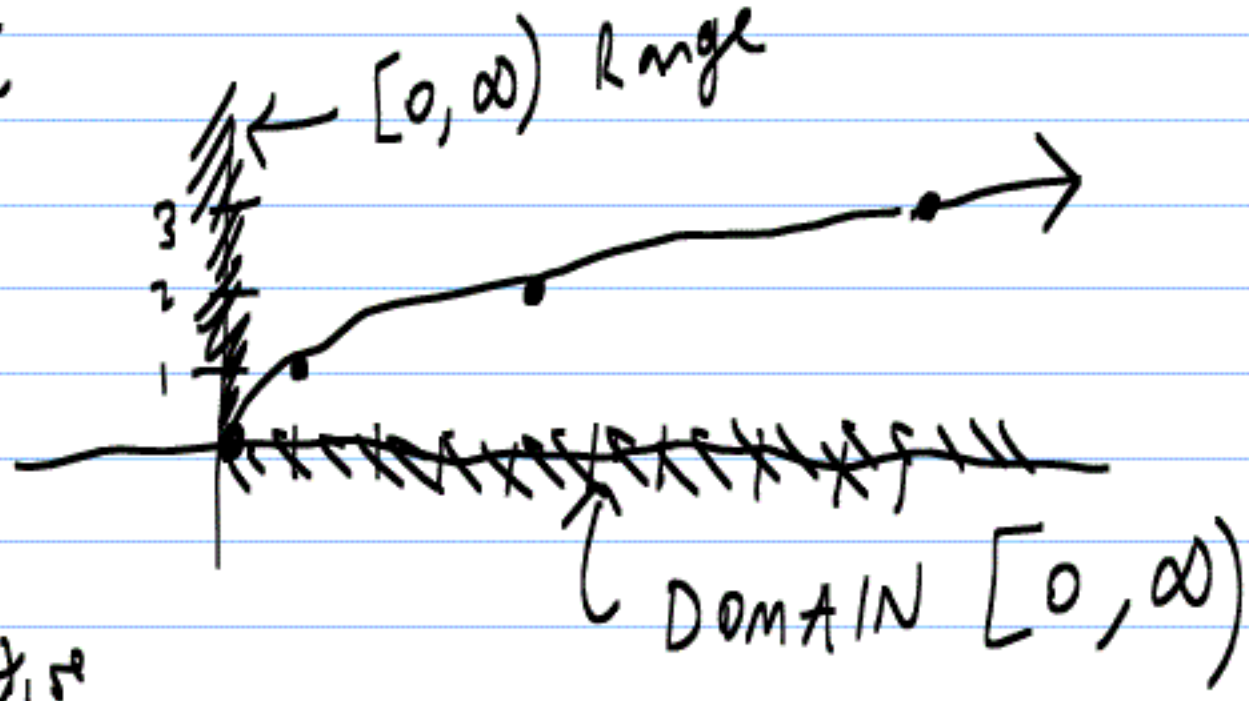
Domain $(-\infty, \infty)$

Range $[0, \infty)$



$f(x) = \sqrt{x}$

x	y
0	0
1	1
4	2
9	3



X can't be negative

$\sqrt{-4}$ undef b/c $(-2)(-2) = +4$

$(2)(2) = +4$

Ex $f(x) = \frac{1}{x-2}$ (CH 7 problem)

domain? all real numbers $\neq 2$

$(-\infty, 2), (2, \infty)$

$w = kr^3$ 8.4 VARIATION

MML #3

when $r = 2$, $w = 1.6$

$1.6 = k(2)^3$ solve for k

$k = .2$

$w = .2r^3$ find w when $r = 3$

$w = .2(3)^3 = 5.4$

TYPES OF VARIATION

DIRECT $y = kx$ JOINT $z = kxy$

INVERSE $y = \frac{k}{x}$

z varies jointly as square of x and square root of y

$$z = kx^2\sqrt{y}$$

9.1 inequalities (compound)

SET SYMBOLS:

A, B are SETS - collections of numbers, etc

$A \cup B$ = all things in A OR B 

$A \cap B$ = all things in A AND B 

Ex $A = \{1, 2, 3\}$ $B = \{3, 4, 5\}$

$A \cup B = \{1, 2, 3, 4, 5\}$ $A \cap B = \{3\}$

Ex
A = {all odd integers} = {... -3, -1, 1, 3, 5 ...}

B = {all even integers} {... -6, -4, -2, 0, 2, 4, ...}

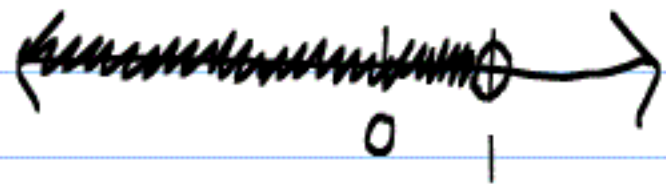
$A \cup B$ = {all integers} = {... -6, -5, -4, -3, -2, -1, 0, 1, 2, ...}

$A \cap B$ = {no elements in set} = empty set = $\emptyset$

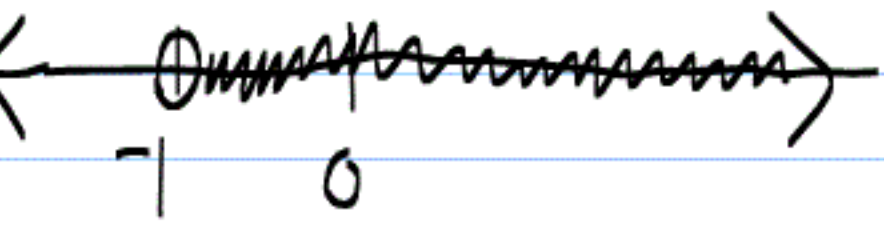
intervals

$A = \{x \mid x < 1\}$

the set of all x — such that

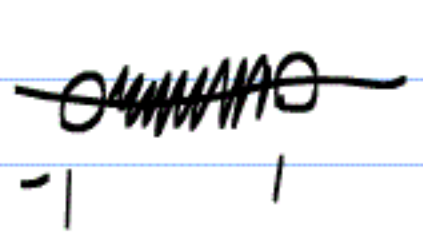


$B = \{x \mid x > -1\}$



$A \cap B$ = where does the shaded part overlap?

=:



$(-1, 1)$

$A \cup B = (-\infty, \infty)$ all real numbers!

Remember AND $= \cap$ INTERSECTION, OR $= \cup$ UNION

Solve $\underbrace{x < 1}_{A} \cap \underbrace{x > -1}_{B}$

what values of x make this true? ANS: $(-1, 1)$!!!

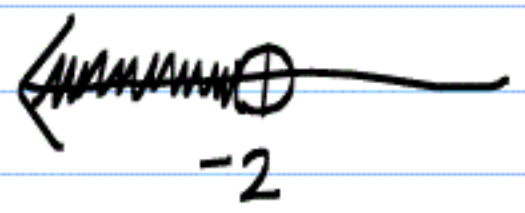
Solve $x < 1$ OR $x > -1$ solution: $(-\infty, \infty)$!!

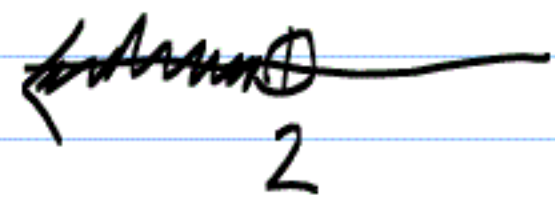
MML 9.1 5, 6, 7, 9, 11, 20

Ex: Solve

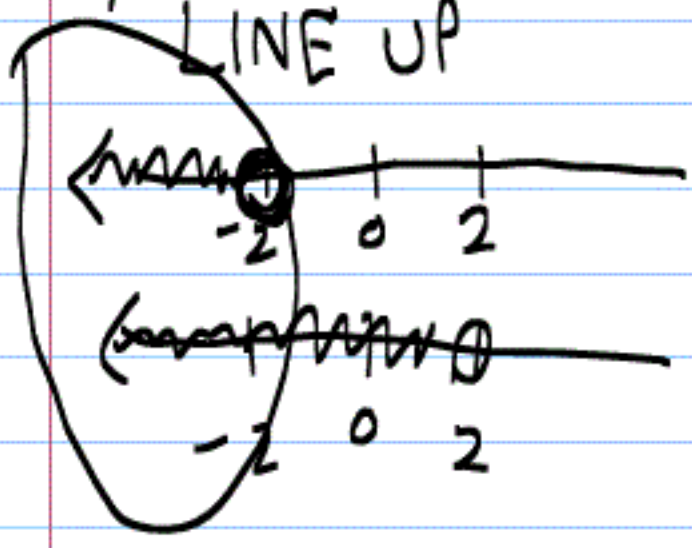
MML (5) $x < -2$ AND $x < 2$

A $\cap$ B

A: 

$\cap$ B: 

SHARED SHADED REGION
LINE UP



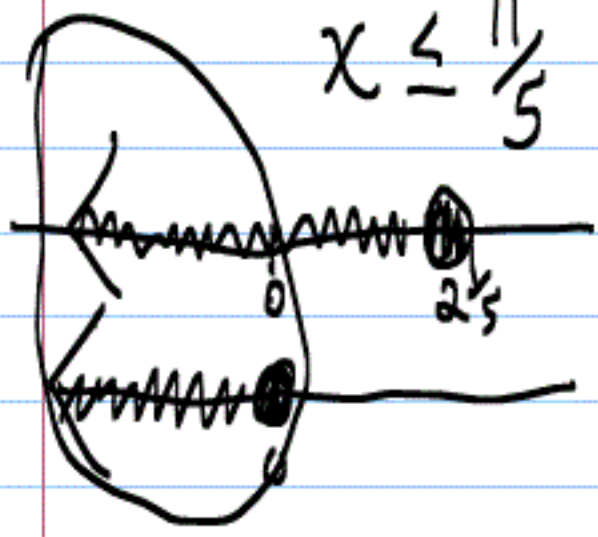
$A \cap B =: (-\infty, -2)$

MML (6) Ex $5x + 2 \leq 13$ AND $2x \leq 0$

$-2 \quad -2$

$5x \leq 11$ AND $\frac{2x}{2} \leq \frac{0}{2}$

$x \leq \frac{11}{5}$ AND $x \leq 0$



Soln $(-\infty, 0]$

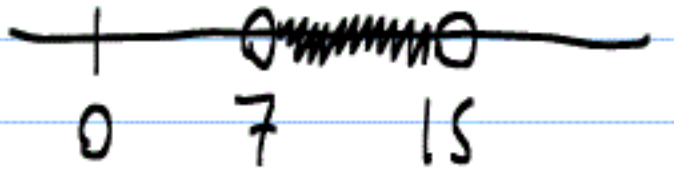
mml

(7) $3 < x-4 < 11$

$+4 \quad +4 \quad +4$

$7 < x < 15$

$(7, 15)$



aside: $A < C < B$

means $A < C$ AND $C < B$

$3 < x-4 < 11$

means

$3 < x-4$ AND $x-4 < 11$

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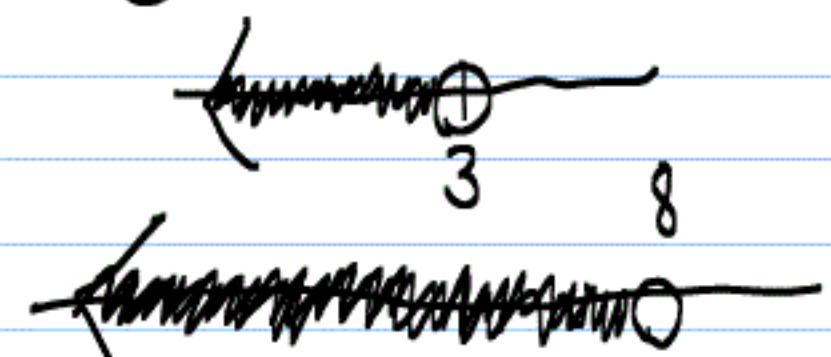
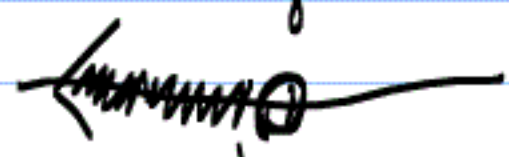
mml (9) $x < 3$ OR $x < 8$

"U"



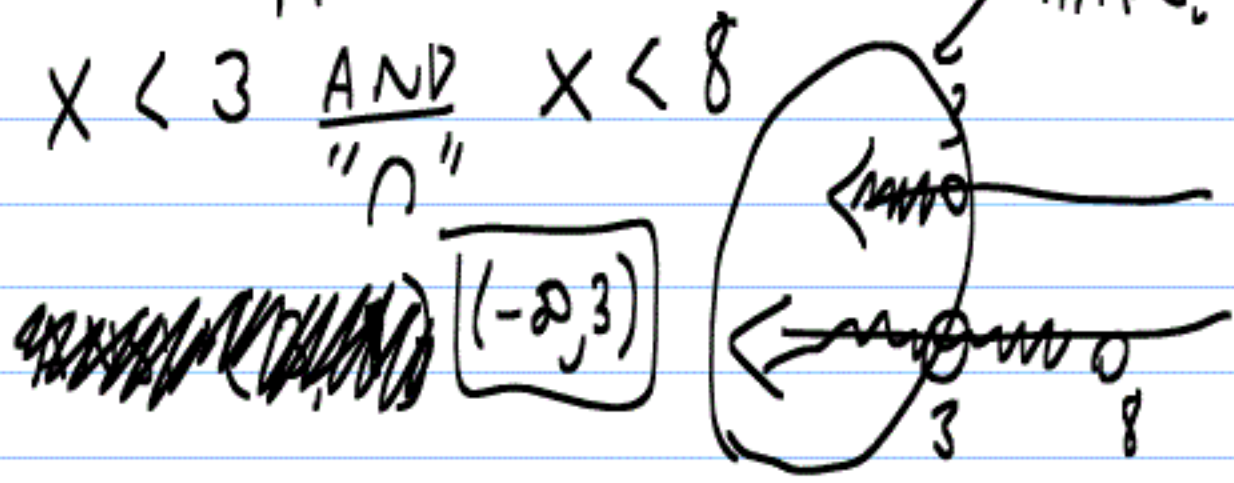
ANS: $(-\infty, 8)$



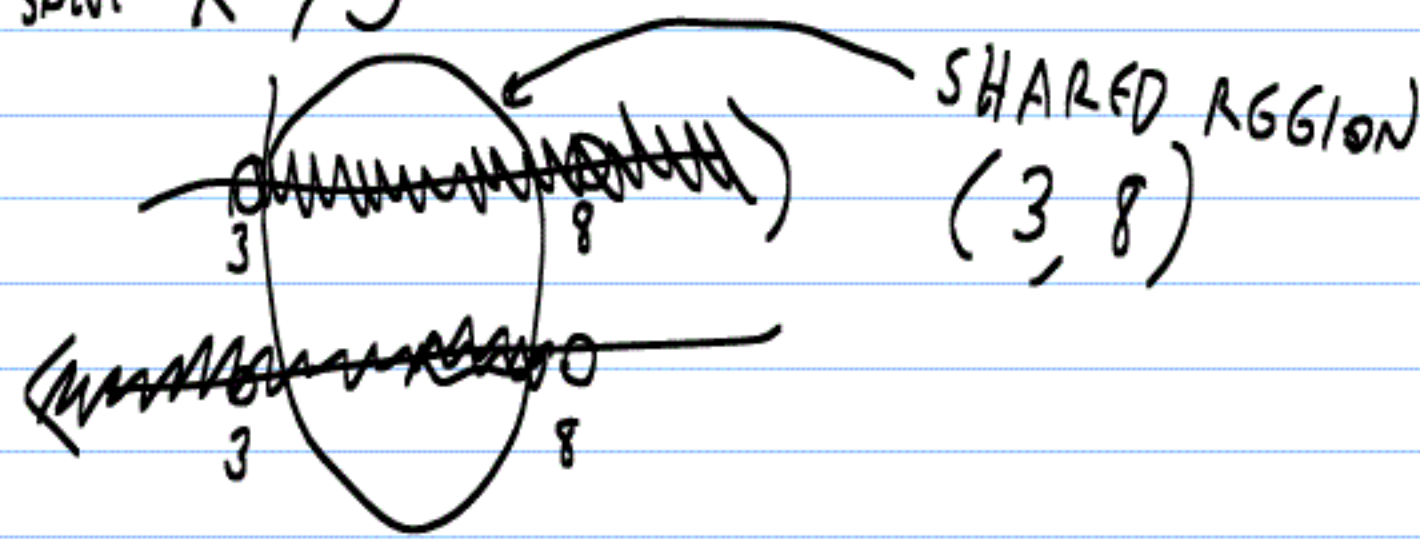
ASIDE: suppose want to solve

$x < 3$ AND $x < 8$

"$\cap$"



ASIDE: solve $x > 3$ AND $x < 8$



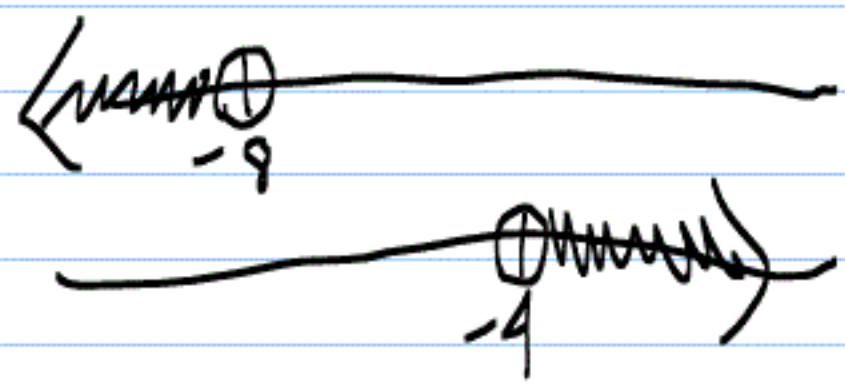
ASIDE: solve $x > 3$ OR $x < 8$

soln $(-\infty, \infty)$

MML 11) $x + 8 < 0$ OR $4x > -16$

$-8 \quad -8$

$x < -8$ OR $x > -4$



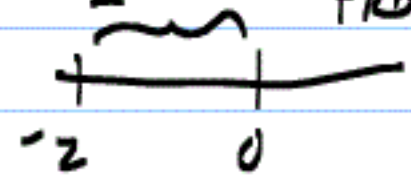
$(-\infty, -8) \cup (-4, \infty)$

Solve $x+8<0$ AND $4x>-16$

Soln $\emptyset$ (NO ELEMENTS SHARED)

ABSOLUTE VALUE EQUATIONS

EX: $|-2|=2$ — 2 UNITS FROM 0



$|-2| \neq 2$ NOT AN INTERVAL IT'S JUST TWO NUMBERS

$|2|=2$

Ex solve $|x|=2$ soln (above) $\{-2, 2\}$

Solve $|x|=a$ where a is a positive number

then solution is $x=-a$, $x=+a$

Ex: $|x|=7$ Soln $x=-7, x=7$

shorthand $x=\pm 7$

mm 29