EQUATIONS TYPICALLY HAVE 1 SOLUTION.
INEQUALITIES HAVE AN INFINITE (∞) NUMBER OF
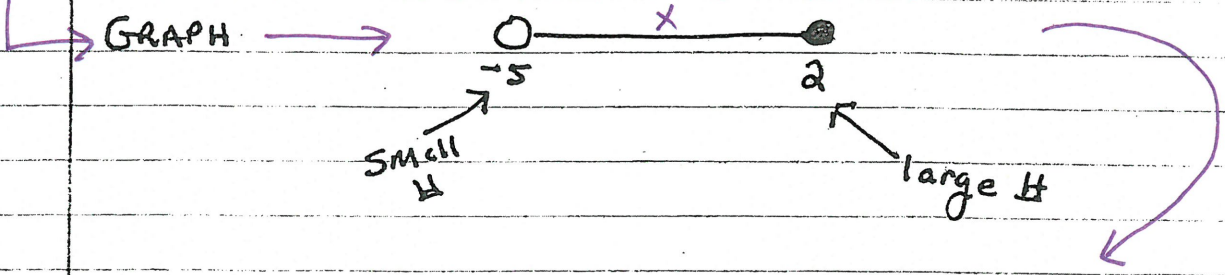SOLUTIONS; THEREFORE WE GRAPH THEM TO
VISUALLY SEE ALL SOLUTIONS

4.2B NOTES   REVIEW INEQUALITIES

① SINGLE INEQUALITIES WE WRITE:

VARIABLE SYMBOL NUMBER

● CLOSED DOT $=, \leq, \geq$ SO THE SYMBOL
○ OPEN DOT $\neq, \geq, \leq$ AND ARROW GO
IN THE SAME
DIRECTION

EX A] $X > 5$ GRAPH $\longrightarrow$ $\underset{5}{\text{O}} \longrightarrow$

EX B] $X \leq 3$ GRAPH $\longrightarrow$ $\longleftarrow \underset{3}{●}$

↑ THIS LINE MEANS $=$'s

② COMPOUND [AND] INEQUALITY

$$-5 < X \leq 2$$

Read "$x > -5$ AND $x \leq 2$"

GRAPH $\longrightarrow$ $\underset{-5}{\text{O}} \overset{\times}{\rule{4cm}{0.4pt}} \underset{2}{●}$

Small #   large #

SOLUTIONS: ALL NUMBERS GREATER THAN -5
AND LESS THAN OR EQUAL TO 2.

$$-5 < X < 2$$

Small #   (OVER)   LARGE #

ALWAYS
USE $<$ OR $\leq$ SYMBOLS
FOR "AND"

TRY THESE

FOR EACH INEQUALITY GRAPH AND STATE IF ANY OF THE FOLLOWING NUMBERS ARE SOLUTIONS: $-3, -2, -1, 0, 1, 2, 3$

① $x > 2$

S: 3

② $x \leq -1$

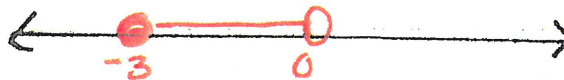

S: $-3, -2, -1$

③ $-1 \leq x \leq 1$
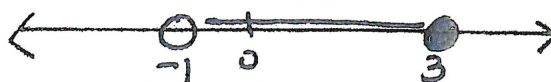

S: $-1, 0, 1$

④ $-2 < x < 2$

S: $-1, 0, 1$

⑤ $-3 \leq x < 0$

S: $-3, -2, -1$

⑥ $-1 < x \leq 3$

S: $0, 1, 2, 3$

Your Notes

CLOSED DOTS

$=, \leq, \geq$

OPEN DOT

$>, <$

because

$D: x \geq 0$ the point $(0,2)$ is a solution.

Example 4 *Graph a linear function* ^ WITH DOMAIN RESTRICTIONS

Graph the function $y = 2x + 2$ with domain $x \geq 0$. Then identify the range of the function.

FUNCTION $y = 2x + 2$ Domain $D: x \geq 0$

Solution

Step 1 Make a Table starting at 0.0

x	0	1	2	3	4
y	2	4	6	8	10

Step 2 Plot the POINTS

D: x≥0
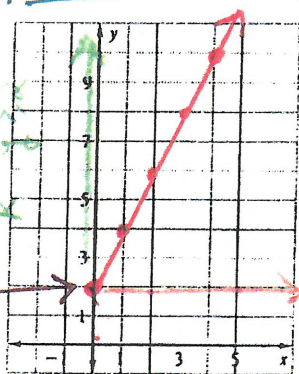
Step 3 Connect the points with a RAY because the domain is $x \geq 0$ and is restricted.

Step 4 Identify the range. From the graph, you can see that all points have a y-coordinate of 2 OR MORE so the range of the function is ⌐

R: $y \geq 2$

✓ **Checkpoint** Complete the following exercise.

5. Graph the function $y = -x + 4$ with domain $0 \leq x \leq 3$. Then identify the range of the function.

$y = -x + 4$ D: $0 \leq x \leq 3$
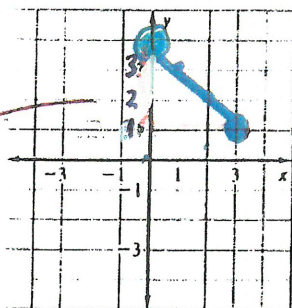
↑ ALL the numbers greater than 0 and less than or EQUAL to 3.

X	Y
0	4
1	3
2	2
3	1

$(0,4)$ and $(3,1)$ are solutions because

$\leq$ it is a solution + use a closed dot

Homework

Range:

R: $1 \leq y \leq 4$
↑ small #   ↑ big #