

## Set & Interval Notation, Solving Inequalities

Bill Day The Commercial Appeal



\*See printout.

HW:

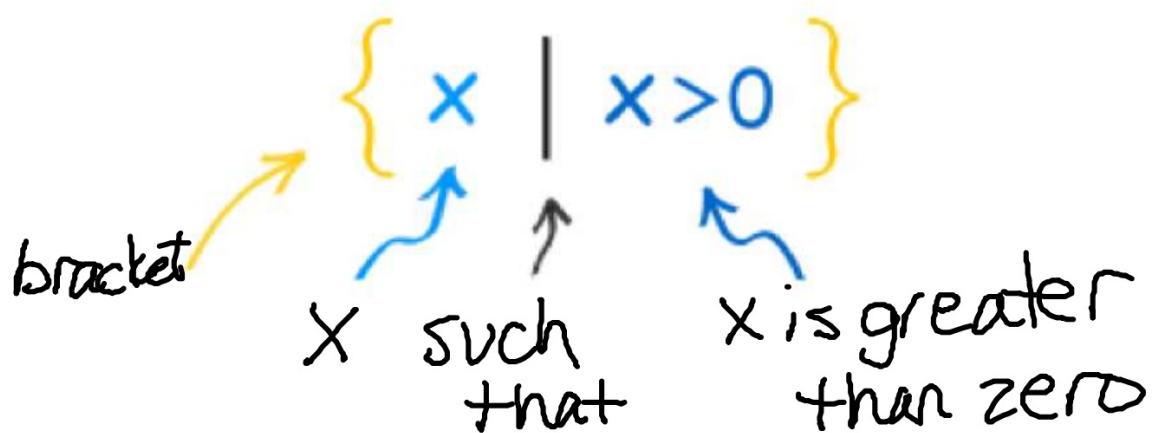
*HW Day 1: Inequalities/Set&Interval Notation*

*Syllabus and Worksheets on my website:*

*[mrsdelvalle.weebly.com](http://mrsdelvalle.weebly.com)*

## Set Notation

Set Notation - A Set is a collection of things (usually numbers). Example:  $\{5, 7, 11\}$  is a set. But we can also "build" a set by describing what is in it. Here is a simple example of set-builder notation:



ex: Express each set of numbers in set notation.

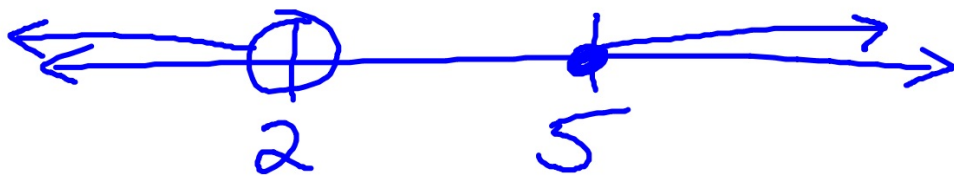
a)  $n \leq 40$

$$\{n \mid n \leq 40\}$$

ex: Express each set of numbers in set notation.

b)  $z < 2$  or  $z \geq 5$

$$\{z \mid z < 2 \text{ or } z \geq 5\}$$



ex: Express each set of numbers in set notation.

c) domain: the set of even numbers from 1 to 10 inclusively

$\{2, 4, 6, 8, 10\}$

or

$\{x \mid x = 2, 4, 6, 8, 10\}$

$x$  (with an arrow pointing to the  $x$  in the set notation)

include (with an arrow pointing to the underlined word "inclusively")

ex: Express each set of numbers in set notation.

d) range: all numbers greater than 5

$\uparrow$   
 $y$

$$\{y \mid y > 5\}$$

or

$$\{y \mid 5 < y\}$$

ex: Express each set of numbers in set notation.

e) all numbers (y) at most 7

$$\{y \mid y \leq 7\}$$

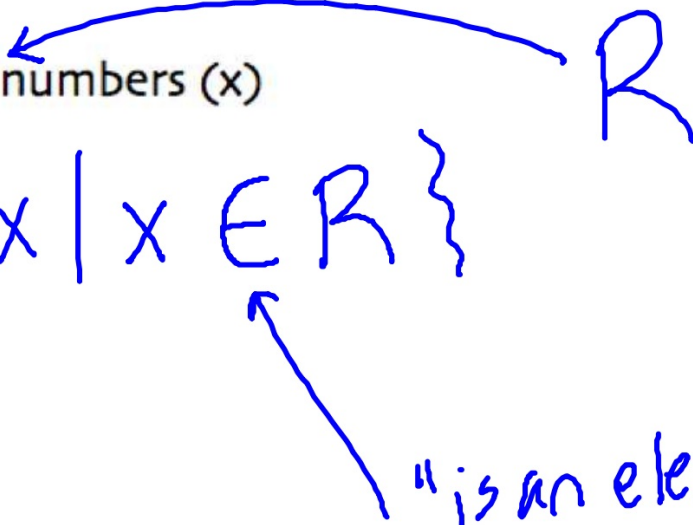
at least 7

$$\{y \mid y \geq 7\}$$



ex: Express each set of numbers in set notation.

f) the set of real numbers (x)

$$\{x \mid x \in \mathbb{R}\}$$


"is an element of"

---

g.)  $\{x \mid x = \underline{\quad}\}$

ex: Express each set of numbers in set notation.

g)  $3x - (5 - 5x) = -13$

$$3x - 1(5 - 5x) = -13$$

$$3x - 5 + 5x = -13$$

$$\begin{array}{r} 8x - 5 = -13 \\ +5 \quad +5 \end{array}$$

$$8x = -8$$

$$x = -1$$

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

or

$$\{-1\}$$

ex: Express each set of numbers in set notation.

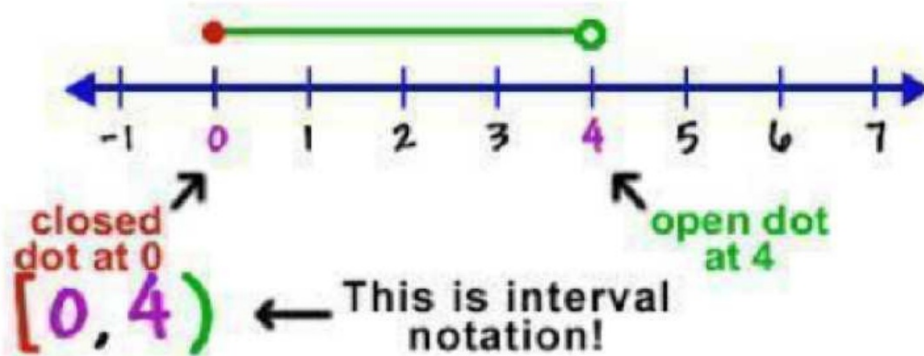
h) Domain: the empty set


$\{ \}$  or  $\emptyset$

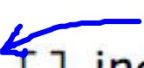
## Interval Notation

Interval Notation - A notation for representing an interval as a pair of numbers. The numbers are the endpoints of the interval.

\*Parentheses and/or brackets are used to show whether the endpoints are excluded or included.



 open circle  
Parentheses,  $()$ , indicate a quantity is excluded.

 closed circle  
Brackets,  $[\ ]$ , indicate a quantity is included.

When using infinity or negative infinity always use  
a parenthesis.

Examples of interval notation:

$$(1, 3)$$

$$[5, 6)$$

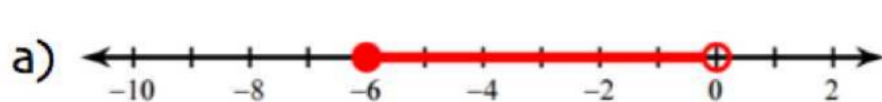
$$\left[-\frac{1}{2}, 0\right]$$

$$(1, \infty)$$

$$(-4, 7]$$

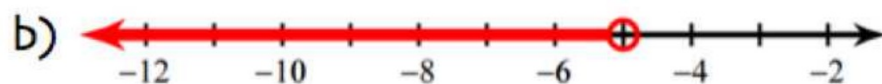
$$(-\infty, 0]$$

ex: Express each set of numbers in interval notation.



$[-6, 0)$

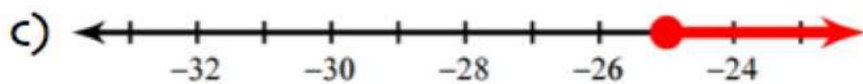
small  
#  
first



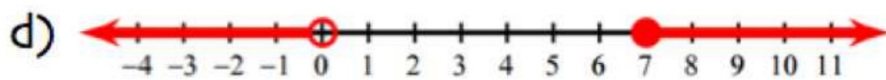
$(-\infty, -5)$

~~$(-5, -\infty)$~~

ex: Express each set of numbers in interval notation.



$$[-25, \infty)$$

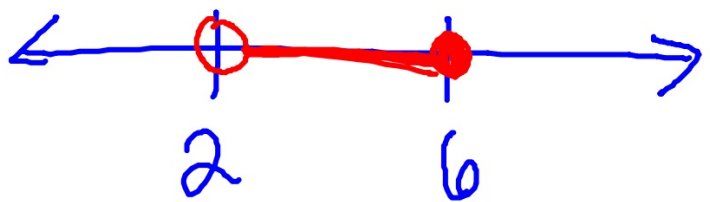


$$(-\infty, 0) \cup [7, \infty)$$

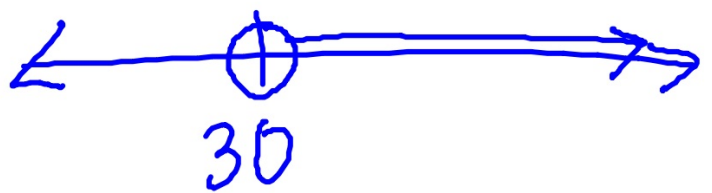
ex: Express each set of numbers in interval notation.

e)  $2 < x \leq 6$

$$(2, 6]$$



f)  $x > 30$

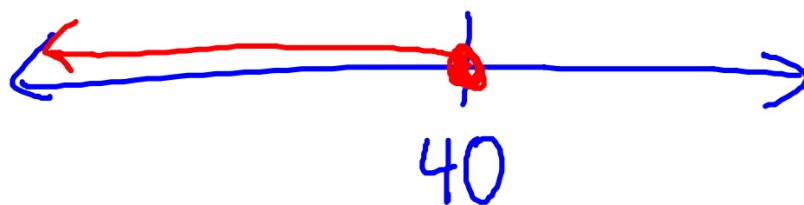


$$(30, \infty)$$



ex: Express each set of numbers in interval notation.

g)  $y \leq 40$



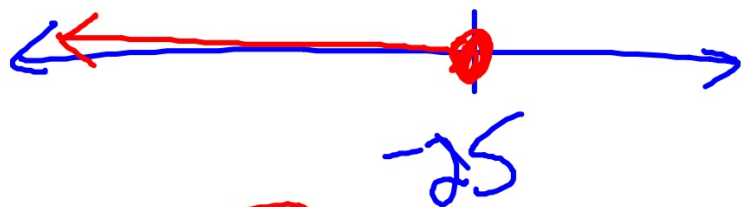
$$(-\infty, 40]$$

h) the set of real numbers

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

ex: Express each set of numbers in interval notation.

i) no greater than -25



$$(-\infty, -25]$$

j)  $z \leq 6$  or  $z > 17$

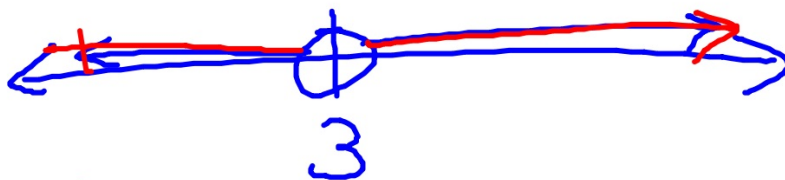
$$(-\infty, 6] \cup (17, \infty)$$

ex: Express each set of numbers in interval notation.

k)  $n = 3$

$$[3]$$

l)  $n \neq 3$

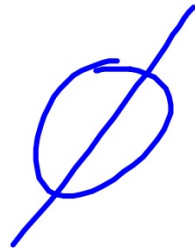


↓  
set  
 $\{n | n \neq 3\}$

$$(-\infty, 3) \cup (3, \infty)$$

ex: Express each set of numbers in interval notation.

m) domain: the empty set



ex: Solve. Express the solution in set and interval notation.

a)  $6 - 4(6x + 7) \geq 122$

$$6 - 24x - 28 \geq 122$$

$$\begin{array}{rcl} -24x - 22 & \geq & 122 \\ +22 & & +22 \end{array}$$

$$\begin{array}{rcl} -24x & \geq & 144 \\ \hline -24 & & -24 \end{array}$$

$$x \leq -6$$



SET	INTERVAL
$\{x   x \leq -6\}$	$(-\infty, -6]$

ex: Solve. Express the solution in set and interval notation.

b)  $-8x + 2x - 16 < -5x + 7x$



SET	INTERVAL

ex: Solve. Express the solution in set and interval notation.

c)  $-5x + 6 \leq -7(5x - 6) - 6x$



SET	INTERVAL

ex: Solve. Express the solution in set and interval notation

d)  $7(5+6x) \leq 6(7x+8) - 5$

$$35 + 42x \leq 42x + 48 - 5$$

$$35 + \cancel{42x} \leq \cancel{42x} + 43$$

$\quad -42x \quad \quad -42x$

$$35 \leq 43$$

(T) or F?  
All reals!

if  
false,  
 $\emptyset$



SET	INTERVAL
$\{x   x \in \mathbb{R}\}$	$(-\infty, \infty)$



ex: Solve. Express the solution in set and interval notation.

e)  $3x + 4 > \frac{1}{2}$



SET	INTERVAL