

# Set & Interval Notation, Solving Inequalities

**Bill Day** The Commercial Appeal  
8/16



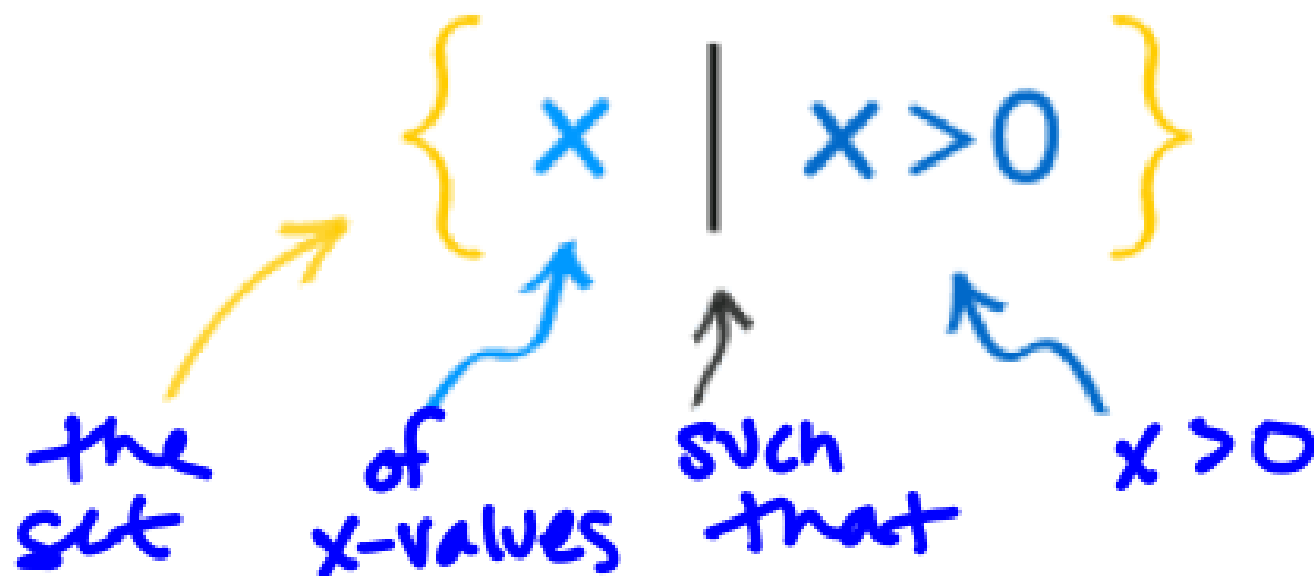
\*See printout.

HW:

|

## Set Notation "Squiggly brackets"

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

↓  
use  $x$

↓  
2, 4, 6, 8, 10

(range - use  $y$ )

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

ex: Express each set of numbers in set notation.

d) range: all numbers greater than 5

↓  
y

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

ex: Express each set of numbers in set notation.

e) all numbers ( $y$ ) at most 7

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



ex: Express each set of numbers in set notation.

f) the set of real numbers (x)

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

x is within  
the set of  
real numbers

ex: Express each set of numbers in set notation.

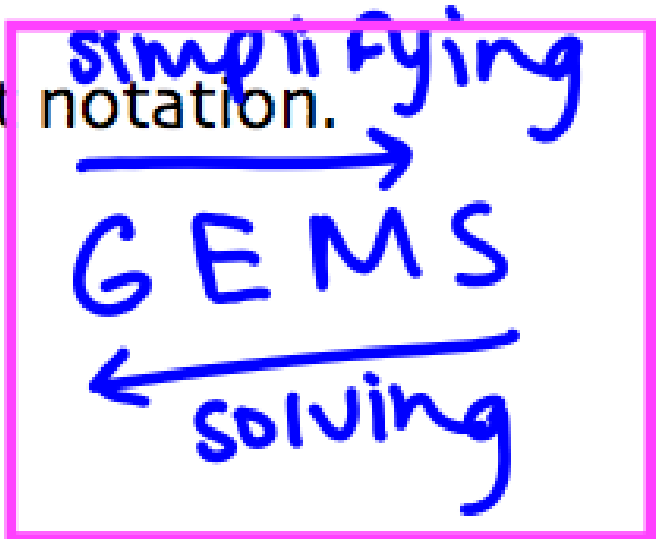
$$g) 3x - (5 - 5x) = -13$$

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

$$8x - 5 = -13$$

$$8x = -8$$

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



ex: Express each set of numbers in set notation.

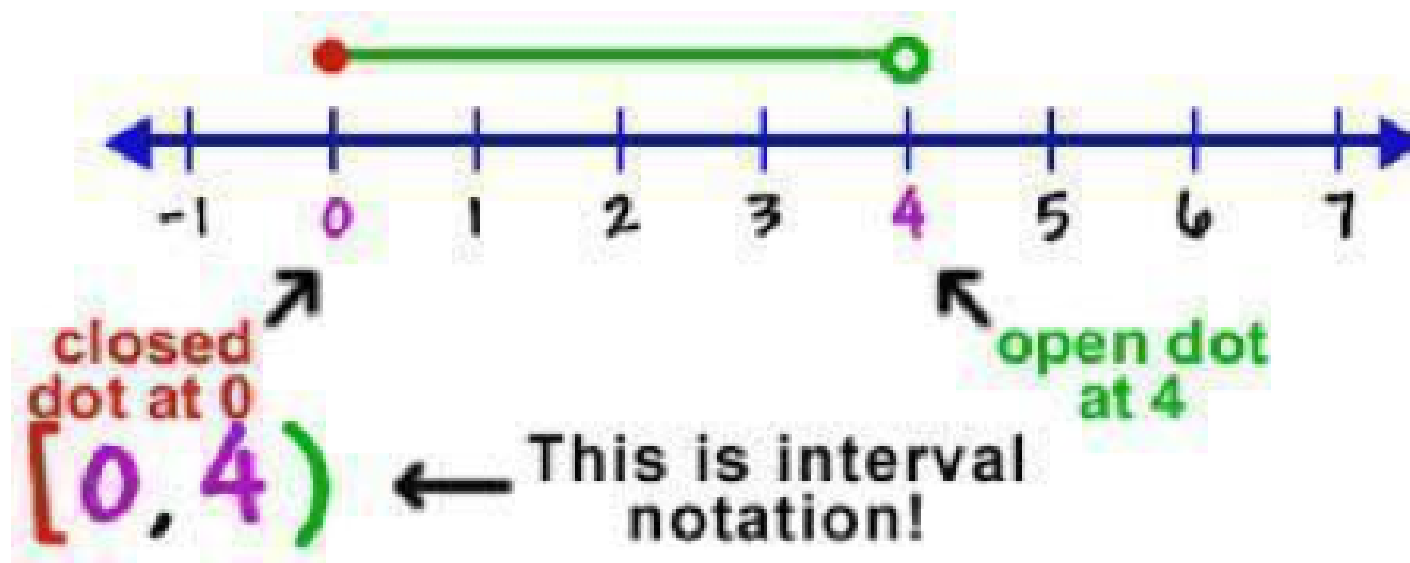
h) Domain: the empty set



## 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.



Parentheses, ( ), indicate a quantity is NOT included.

Brackets, [ ], indicate a quantity is Included.

When using infinity or negative infinity always use parentheses.

Examples of interval notation:

$$(1, 3)$$

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

$$(-4, 7]$$

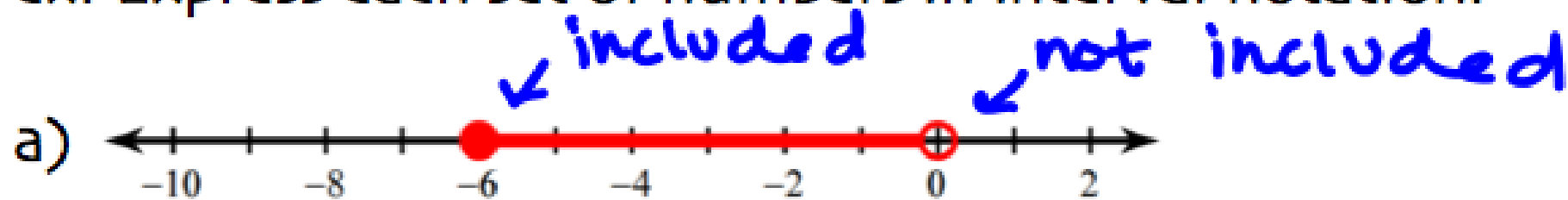
smaller  
↓  
larger

$$[5, 6)$$

$$(1, \infty)$$

$$(-\infty, 0]$$

ex: Express each set of numbers in interval notation.

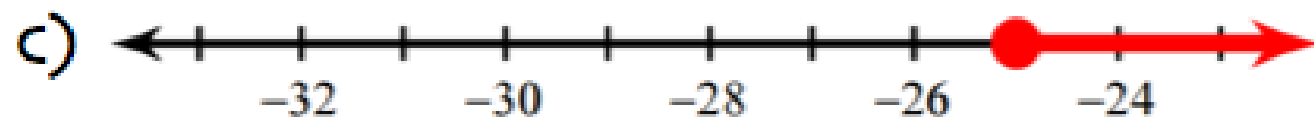


$$[-6, 0)$$

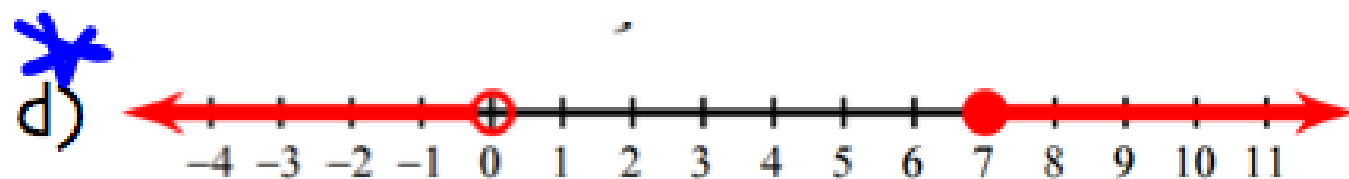


$$(-\infty, -5)$$

ex: Express each set of numbers in interval notation.



$$[-25, \infty)$$



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

↓  
union (interval notation only)

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



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

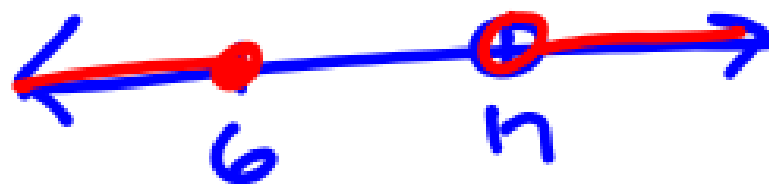
ex: Express each set of numbers in interval notation.

i) no greater than -25



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

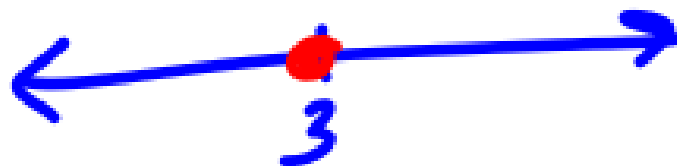
j)  $z \leq 6$  or  $z > 17$



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

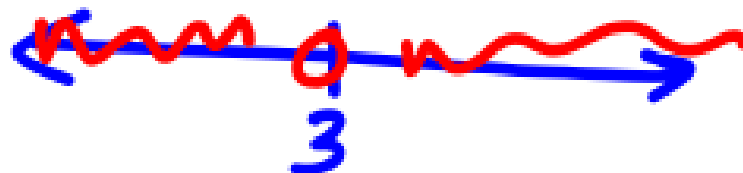
ex: Express each set of numbers in interval notation.

k)  $n = 3$



$[3, 3]$

\*  
l)  $n \neq 3$



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

ex: Express each set of numbers in interval notation.

m) domain: the empty set



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

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

$$\underline{6} - 24x - \underline{28} \geq 122$$

$$\begin{array}{r} -24x - 22 \geq 122 \\ +22 \qquad +22 \end{array}$$

$$\begin{array}{r} -24x \geq 144 \\ \hline -24 \qquad -24 \end{array}$$

$$x \leq -6$$

\* When dividing  
by a  $-$ ,  
flip inequality



SET

$$\{x \mid x \leq -6\}$$

INTERVAL

$$(-\infty, -6]$$

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.

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



SET	INTERVAL



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

$$2) \text{ e) } (3x + 4) > \left(\frac{1}{2}\right)^2$$

$$6x + 8 > 1$$

$-8 \quad -8$

$$\frac{6x}{6} > \frac{-7}{6}$$

$$x > -\frac{7}{6}$$



SET

$$\{x \mid x > -7/6\}$$

INTERVAL

$$(-7/6, \infty)$$