

Calculus 30 - Unit 1 - Interval Notation

1.1 Page 4 1-8

1. a)  $(-2, 3)$



b)  $[1, 4)$



c)  $(-\infty, 2]$



d)  $(-3, \infty)$



e)  $[-3, -1]$



f)  $(-\infty, 0)$



2. Open  $\rightarrow$  a (d + f?) f

Closed  $\rightarrow$  e

3. a)  $[0, 2) \rightarrow \{x : 0 \leq x < 2\}$

b)  $(-\infty, 6) \rightarrow \{x : x < 6\}$

c)  $[1, 11] \rightarrow \{x : 1 \leq x \leq 11\}$

d)  $(-8, -4] \rightarrow \{x : -8 < x \leq -4\}$

e)  $[0, \infty) \rightarrow \{x : x \geq 0\}$

f)  $(-2, 0) \rightarrow \{x : -2 < x < 0\}$

4. a)  $\{x : x > 8\} \Rightarrow \{x : x \in (8, \infty)\}$

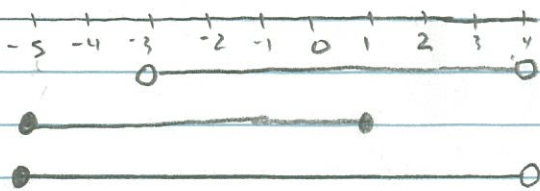
b)  $\{x : x \leq -3\} \Rightarrow \{x : x \in (-\infty, -3]\}$

c)  $\{x : -7 < x \leq -4\} \Rightarrow \{x : x \in (-7, -4]\}$

d)  $\{x : 6 \leq x \leq 10\} \Rightarrow \{x : x \in [6, 10]\}$

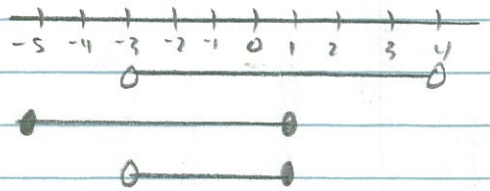
5. a)  $\{x : x \in [-3, 1]\}$  b)  $\{x : x \in [0, \infty)\}$  c)  $\{x : x \in [2, 4]\}$  d)  $\{x : x \in (-\infty, -1]\}$  e)  $\{x : x \in (-1, \infty)\}$

6. a)  $(-3, 4) \cup [-5, 1]$



$[-5, 4)$

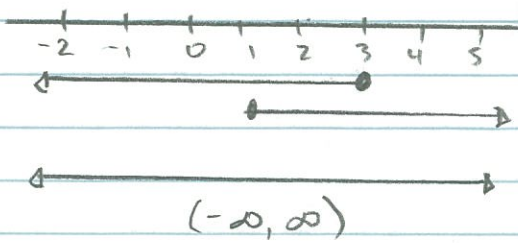
b)  $(-3, 4) \cap [-5, 1]$



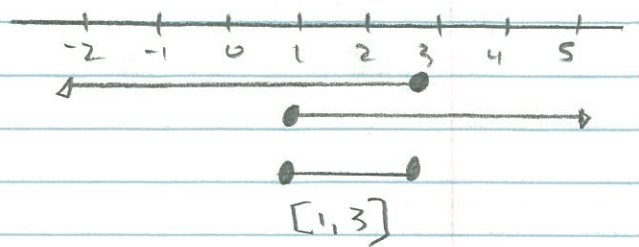
$(-3, 1]$

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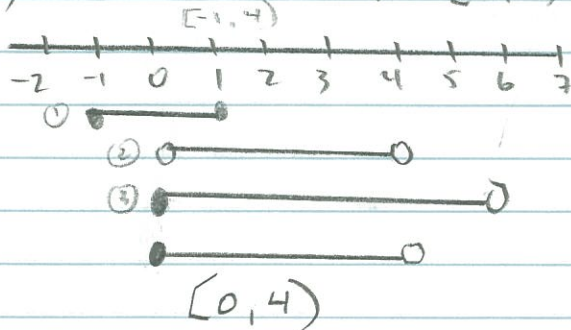
6 c)  $(-\infty, 3] \cup [1, \infty)$



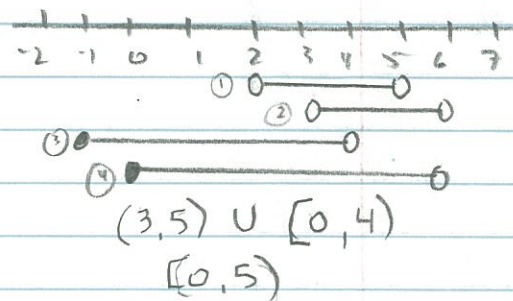
d)  $(-\infty, 3] \cap [1, \infty)$



e)  $([-1, 1] \cup (0, 4)) \cap [0, 6]$



f)  $((2, 5) \cap (3, 6)) \cup ([-1, 4) \cap [0, 6])$



7. a)  $5x \geq 20$   
 $x \geq 4$   
 $[4, \infty)$

b)  $-2x < 100$   
 $x > -50$   
 $(-50, \infty)$

c)  $x^2 < 16$  --- 0+++ x+4  
 $x^2 - 16 < 0$  --- 0+++ x-4  
 $(x+4)(x-4) < 0$  --- 0+++ x-4  
 $(-4, 4)$

d)  $x^4 \geq 16$   
 $(-\infty, -2] \cup [2, \infty)$

e)  $\frac{1}{x} < 0$   
 $(-\infty, 0)$

f)  $|x| < 10$   
 $(-10, 10)$

g)  $|x| \geq 2$   
 $(-\infty, -2] \cup [2, \infty)$

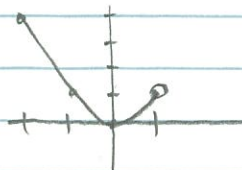
h)  $\sqrt{x} \geq 6$   
 $[36, \infty)$

i)  $\sin x \leq 1$   
 $(-\infty, \infty)$

j)  $1 \leq \log x \leq 2$

$\log_9 x = 1$   $\log_9 x = 2$   $[10, 100]$   
 $10^1 = x$   $10^2 = x$

8  $f(x) = x^2$  if  $x \in [-2, 1)$



why  $\Delta$

$x^4 - 16 = 0$   
 $(x^2 + 4)(x - 2)(x + 2) = 0$   
 + + + + + (x^2 + 4)  
 - - - - - 0 + + + (x - 2)  
 - - - 0 + + + + + (x + 2)  
 + + + - 2 - - 2 + + +