

East Los Angeles College

Department of Mathematics

Math 125

Test 1

Let $A = \{0,2,4,6,8,10\}$ $B = \{1,3,5,7,9\}$ $C = \{a,b,c,d,e,f,g\}$
 $D = \{0,1,2,3,4,5\}$

Determine the following operations with the indicated sets.

1) $A \cup C$

2) $A \cap C$

3) $B \cup D$

4) $B \cap D$

Solve and graph the following compound inequalities.

5) $2x - 5 > -3$ or $-x + 4 < 11$

6) $3x \leq -24$ and $3x - 2 \geq x + 6$

Solve the following absolute value equations and write your answers in **set notation**.

7) $|x + 7| = 4$

8) $2|x| + 5 = 13$

9) $4|x - 2| - 8 = 4$

10) $-3|x - 5| = -6$

11) $|x + 5| - 2 = 8$

12) $-3|x| - 9 = 12$

Solve and graph the following linear inequalities.

13) $2|x| - 6 < 12$

14) $-4|x + 3| \geq -20$

15) $-3|x| - 7 < 2$

16) $3|x + 1| + 17 \leq 5$

17) $-6 < 2x - 8 < 12$

18) $4 \leq x + 6 \leq 20$

Write your solutions in **interval notation**.

19) Problem 13

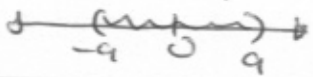

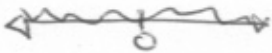
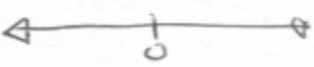
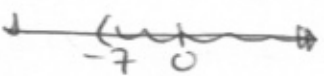
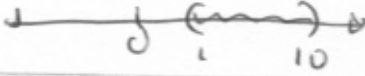
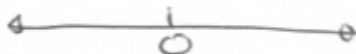
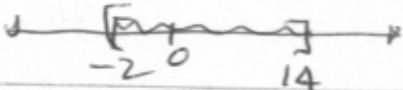
20) Problem 14

21) Problem 15

22) Problem 16

23) Problem 17

24) Problem 18

1	$\{0, 2, 4, 6, 8, 10, a, b, c, d, e, f\}$ ✓ 93	13	$-9 < x < 9$ 	✓ ✓
2	\emptyset ✓	14	$-8 \leq x \leq 2$ 	✓ ✓
3	$\{1, 3, 5, 7, 9, 0, 2, 4\}$ ✓	15	\mathbb{R} 	✓ ✓
4	$\{1, 3, 5\}$ ✓	16	\emptyset 	✓ ✓
5	$x > 1$ or $x < -7$ ✓ 	17	$1 < x < 10$ 	✓ ✓
6	$x \leq -8$ and $x \geq 4$ ✓ 	18	$-2 \leq x \leq 14$ 	✓ ✓
7	$\{-3, -11\}$ ✓	19	$(-9, 9)$ ✓ ✓	
8	$\{4, -4\}$ ✓	20	$[-8, 2]$ ✓ ✓	
9	$\{5, -1\}$ ✓	21	$(-\infty, \infty)$ ✓ ✓	
10	$\{7, 3\}$ ✓	22	\emptyset ✓	
11	$\{5, -15\}$ ✓	23	$(1, 10)$ ✓ ✓	
12	\emptyset ✓	24	$[-2, 14]$ ✓ ✓	

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(1) $A \cup C = \{0, 2, 4, 6, 8, 10, a, b, c, d, e, f, g\}$

(2) $A \cap C = \emptyset$

(3) $B \cup D = \{1, 3, 5, 7, 9\} \cup \{0, 1, 2, 3, 4, 8\}$
 $= \{1, 3, 5, 7, 9, 0, 2, 4\}$

(4) $B \cap D = \{1, 3, 5\}$

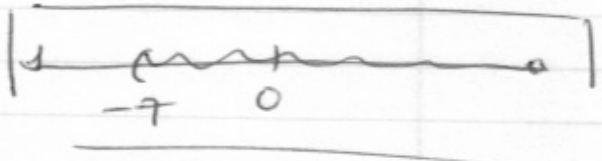
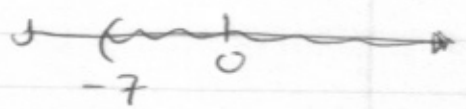
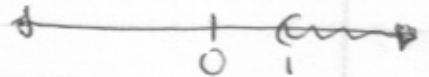
(5) $2x - 5 > -3$ (or) $-x + 4 < 11$
 $\quad \quad \quad +5 \quad +5 \quad \quad \quad -4 \quad -4$

$\frac{2x}{2} > \frac{2}{2}$

$x > 1$

$\frac{-x}{-1} < \frac{7}{-1}$

$x > -7$



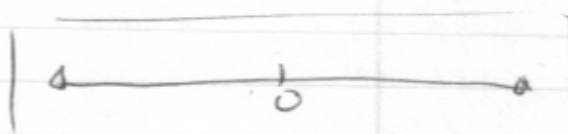
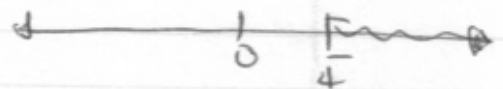
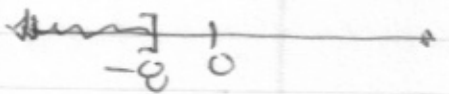
(6) $\frac{3x}{2} \leq \frac{-24}{3}$ and $3x - 2 \geq x + 6$
 $\quad \quad \quad +2 \quad \quad \quad +2$

$x \leq -8$

and $3x \geq x + 8$
 $\quad \quad \quad -x \quad -x$

$\frac{2x}{2} \geq \frac{8}{2}$

$x \geq 4$



$$(7) |x+7| = 4$$

$$\begin{array}{l|l} x+7=4 & x+7=-4 \\ -7 & -7 \end{array}$$

$$\{ -3, -11 \}$$

$$x = -3 \text{ or } x = -11$$

$$(8) 2|x| + 5 = 13$$

$$\frac{2|x|}{2} = \frac{8}{2}$$

$$|x| = 4$$

$$x = 4 \text{ or } x = -4$$

$$\{ 4, -4 \}$$

$$(9) 4|x-2| - 8 = 4$$

$$\frac{4|x-2|}{4} = \frac{12}{4}$$

$$|x-2| = 3$$

$$\begin{array}{l|l} x-2=3 & x-2=-3 \\ +2 & +2 \end{array}$$

$$x = 5 \text{ or } x = -1$$

$$\{ 5, -1 \}$$

$$(10) -3|x-5| = -6$$

$$|x-5| = 2$$

$$\begin{array}{l|l} x-5=2 & x-5=-2 \\ +5 & +5 \end{array}$$

$$x = 7 \text{ or } x = 3$$

$$\{ 7, 3 \}$$

$$(11) \quad |x+5| - 2 = 8$$

$$\quad \quad \quad +2 \quad +2$$

$$|x+5| = 10$$

$x+5 = 10$ $-5 \quad -5$	$x+5 = -10$ $-5 \quad -5$	$\{5, -15\}$
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$$(x=5) \quad \text{or} \quad (x=-15)$$

$$(12) \quad -3|x| - 9 = 12$$

$$\quad \quad \quad +9 \quad +9$$

$$\frac{-3|x|}{-3} = \frac{21}{-3}$$

$$|x| = -7 \quad \text{No Solution } \{ \emptyset \}$$

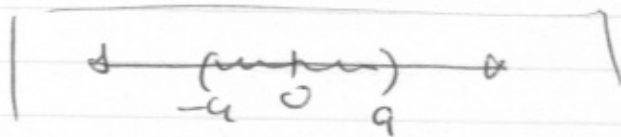
$$(13) \quad 2|x| - 6 < 12$$

$$\quad \quad \quad +6 \quad +6$$

$$\frac{2|x|}{2} < \frac{18}{2}$$

$$|x| < 9$$

$$-9 < x < 9$$

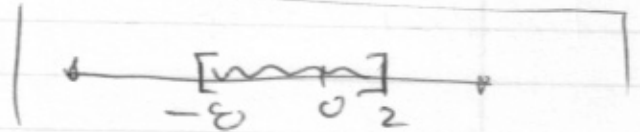


$$(14) \quad \frac{-4|x+3|}{-4} \geq \frac{-20}{-4}$$

$$|x+3| \leq 5$$

$$\begin{array}{ccc} -5 & \leq x+3 & \leq 5 \\ -3 & & -3 \end{array}$$

$$-8 \leq x \leq 2$$

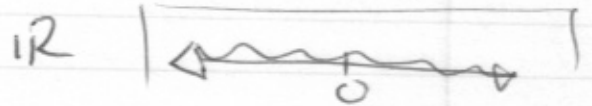


$$(15) \quad \begin{array}{ccc} -3|x-1-7| & < & 2 \\ +7 & & +7 \end{array}$$

$$\frac{-3|x-1|}{-3} < \frac{9}{-3}$$

$$|x-1| > -3$$

always happens!



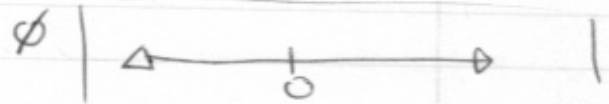
$$(16) \quad \begin{array}{ccc} 3|x+1| + 17 & \leq & 5 \\ -17 & & -17 \end{array}$$

$$\frac{3|x+1|}{3} \leq \frac{-12}{3}$$

$$|x+1| \leq -4$$

$$|x+1| \leq -4$$

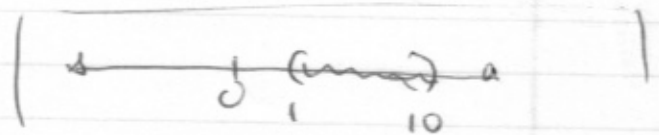
never happens!



$$(17) \quad \begin{array}{ccc} -6 < 2x-8 < 12 \\ +8 & & +8 \end{array}$$

$$\frac{2}{2} < \frac{2x}{2} < \frac{20}{2}$$

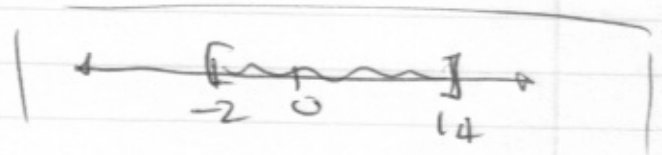
$$1 < x < 10$$



$$\textcircled{18} \quad 4 \leq x+6 \leq 20$$

$\quad -6 \quad \quad -6 \quad -6$

$$\textcircled{-2 \leq x \leq 14}$$



$$\textcircled{19} \quad (-9, 9)$$

$$\textcircled{20} \quad [-8, 2]$$

$$\textcircled{21} \quad (-\infty, \infty)$$

$$\textcircled{22} \quad \emptyset$$

$$\textcircled{23} \quad (1, 10)$$

$$\textcircled{24} \quad [-2, 14]$$