East Los Angeles College

Department of Mathematics

Math 125

Test 1

Solutions

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

Determine the following operations with the indicated sets.

1) $B \cup C$

2) $B \cap C$

3) $A \cup D$

4) $A \cap D$

5) $A \cup C$

6) $A \cap C$

Solve and graph the following compound inequalities.

7) $2x-1<7$ or $-x+6<1$

8) $-x+6<-18$ and $3x<-9$

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

9) $|x-5|+4=11$

10) $|3x-2|+4=-11$

11) $3|x+2|-9=21$

12) $-2|x|+6=-18$

13) $\left|\frac{x-4}{3}\right|=\frac{1}{2}$

14) $|x-8|-6=10$

Solve and graph the following linear inequalities.

15) $2|x-8|\leq 6$

16) $-3|x+5|<-12$

17) $|x+5|+8>22$

18) $4|2x+5|-3\leq 13$

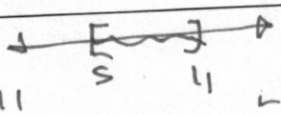
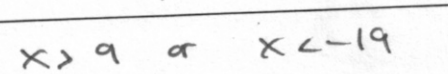
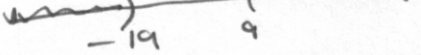
Write your solutions in interval notation

19) Problem 15

20) Problem 16

21) Problem 17

22) Problem 18

| | | | |
|---|---|---|---|
| 1 | $\{1, 2, 3, 5, 7, 9, b, c\}$ | 12 | $\{12, -12\}$ |
| 2 | $\{1, 3\}$ | 13 | $\{\frac{11}{2}, \frac{5}{2}\}$ |
| 3 | $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ | 14 | $\{24, -8\}$ |
| 4 | $\{2, 4, 6, 8\}$ | 15 | $5 \leq x \leq 11$   |
| 5 | $\{0, 1, 2, 4, 6, 8, a, b, c\}$ | 16 | $x > -1$ or $x < -9$   |
| 6 | $\{2\}$ | 17 | $x > 9$ or $x < -19$   |
| 7 | $x < 4$ or $x > 5$   | 18 | $-\frac{9}{2} \leq x \leq -\frac{1}{2}$   |
| 8 | $x > 24$ and $x < -3$   | 19 | $[5, 11]$ ✓ |
| 9 | $\{12, -2\}$ | 20 | $(-\infty, -9) \cup (-1, \infty)$ |
| 10 | $\varnothing$ | 21 | $(-\infty, -19) \cup (9, \infty)$ |
| 11 | $\{8, -12\}$ | 22 | $[-\frac{9}{2}, -\frac{1}{2}]$ |

SQ

Math 125 Test 1

① $B \cup C = \{1, 3, 5, 7, a, b, c, 1, 2, 8\}$

$= \{1, 2, 3, 5, 7, a, b, c\}$

② $B \cap C = \{1, 3\}$

③ $A \cup D = \{0, 2, 4, 6, 8, 0, 1, 7, 3, 4, 5, 4, 7, 8, 9\}$

$= \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$

④ $A \cap D = \{2, 4, 6, 8\}$

⑤ $A \cup C = \{0, 2, 4, 6, 8, a, b, c, 1, 7, 3\}$

$= \{0, 1, 2, 4, 6, 8, a, b, c\}$

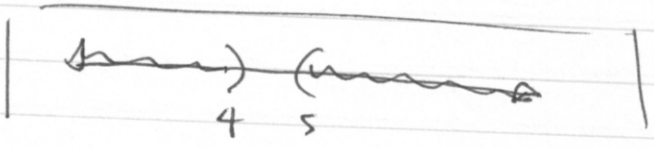
⑥ $A \cap C = \{2\}$

⑦ $2x - 1 < 7$ (or) $-x + 6 < 1$

$+1 \quad +1 \qquad -6 \quad -6$

$\frac{2x}{2} < \frac{8}{2} \qquad \frac{-1x}{-1} < \frac{-5}{-1}$

$x < 4$ or $x > 5$

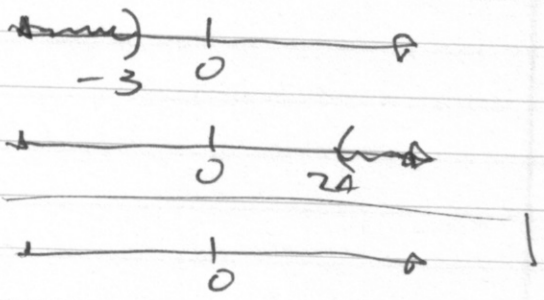


(8) $-x+6 < -18$ and $3x < -9$

$-6 \quad -6$ $\quad$ $\frac{3x}{3} < \frac{-9}{3}$

$\frac{-1x}{-1} < \frac{-24}{-1}$ $\quad$ $x < -3$

$x > 24$




(9) $|x-5| + 4 = 11$

$-4 \quad -4$

$|x-5| = 7$ $\quad$ $\{12, -2\}$

$x-5 = 7$ or $x-5 = -7$

$+5 \quad +5$ $\quad$ $+5 \quad +5$

$x = 12$ $\quad$ $x = -2$

(10) $|3x-21| + 4 = -11$

$-4 \quad -4$

$|3x-21| = -15$ $\quad$ $\emptyset$

No Solution

(11) $3|x+2| - 9 = 21$

$+9 \quad +9$

$\frac{3|x+2|}{3} = \frac{30}{3}$

$|x+2| = 10$

$x+2 = 10$ | OR | $x+2 = -10$

$-2 \quad -2$ | | $-2 \quad -2$

$x = 8$ | | $x = -12$

$\{8, -12\}$

(12) $-2|x| + 6 = -18$

$-6 \quad -6$

$\frac{-2|x|}{-2} = \frac{-24}{-2}$

$|x| = 12$

$x = 12$ or $x = -12$

$\{12, -12\}$

(13) $\left|\frac{x-4}{3}\right| = \frac{1}{2}$

$\frac{x-4}{3} = \frac{1}{2}$ ; $\frac{2x}{2} = \frac{4}{2}$

$2(x-4) = 3$

$2x - 8 = 3$

$+8 \quad +8$

$x = \frac{11}{2}$

$\frac{x-4}{3} = \frac{-1}{2}$ ; $\frac{2x}{2} = \frac{5}{2}$

$2(x-4) = -3$

$2x - 8 = -3$

$+8 \quad +8$

$x = \frac{5}{2}$

(14) $|x-8|-6=10$

$+6 \quad +6$

$|x-8| = 16$

| $x-8=16$ | $x-8=-16$ |
|---|---|
| $+8 \quad +8$ | $+8 \quad +8$ |
| $x=24$ | $x=-8$ |

$\{24, -8\}$

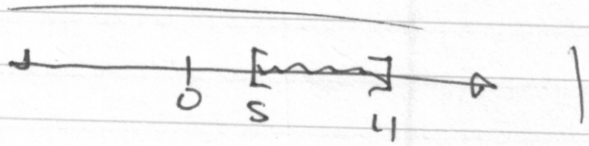
(15) $\frac{2|x-8|}{2} \leq \frac{6}{2}$

$|x-8| \leq 3$

$-3 \leq x-8 \leq 3$

$+8 \quad +8 \quad +8$

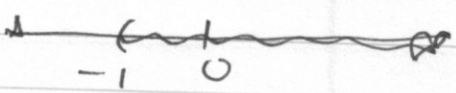
$5 \leq x \leq 11$

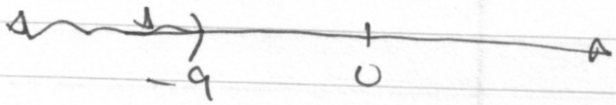



(19) $[5, 11]$

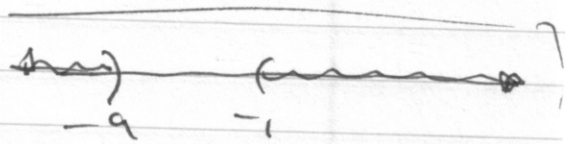
(16) $\frac{-3|x+5|}{-3} < \frac{-12}{-3}$

$|x+5| > 4$




| $x+5 > 4$ | or | $x+5 < -4$ |
|---|---|---|
| $-5 \quad -5$ | | $-5 \quad -5$ |
| $x > -1$ | | $x < -9$ |

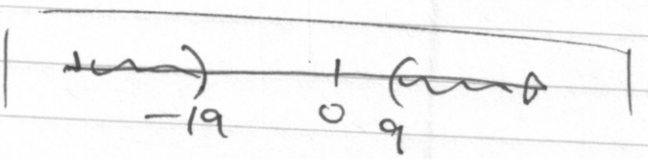



(20) $(-\infty, -9) \cup (-1, \infty)$

(17) $|x+5| + 8 > 22$

$-8 \quad -8$

$|x+5| > 14$




$x+5 > 14$ or $x+5 < -14$

$-5 \quad -5 \qquad -5 \quad -5$

$x > 9$ or $x < -19$

(21) $(-\infty, -19) \cup (9, \infty)$

(18) $4|2x+5| - 3 \leq 13$

$+3 \quad +3$

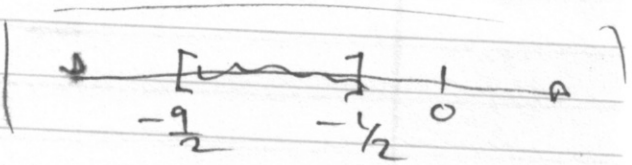
$\frac{4|2x+5|}{4} \leq \frac{16}{4}$

$|2x+5| \leq 4$

$-4 \leq 2x+5 \leq 4$

$-5 \quad -5 \quad -5$

$\frac{-9}{2} \leq \frac{2x}{2} \leq \frac{-1}{2}$




$-\frac{9}{2} \leq x \leq -\frac{1}{2}$

(22) $\left[-\frac{9}{2}, -\frac{1}{2}\right]$