Solve each of the following. **Name** KEY

Put answers in set building notation and graph the solution.

1. $\frac{d}{5} - 13 < -8$

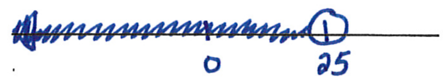
$\frac{d}{5} < -8 + 13$

$\frac{d}{5} < 5$

$5\left[\frac{d}{5} < 5\right]$

$d < 25$

1. $\{ d \mid d < 25 \}$

1. 

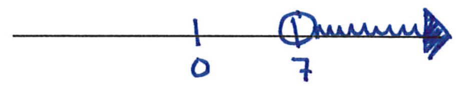
2. $\left[\frac{k+9}{2} > 8\right] 2$

$k + 9 > 16$

$k > 16 - 9$

$k > 7$

2. $\{ k \mid k > 7 \}$

2. 

3. $4p - 5(p - 3) \le 0$

$4p - 5p + 15 \le 0$

$-p + 15 \le 0$

$-p \le -15$

$p \ge 15$

3. $\{ p \mid p \ge 15 \}$

3. 

4. $4(3t - 11) + 9t < -80$

$12t - 44 + 9t < -80$

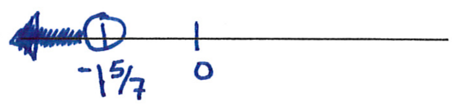
$21t - 44 < -80$

$21t < -80 + 44$

$\frac{21t}{21} < \frac{-36}{21}$

$t < -1\frac{5}{7}$

4. $\{ t \mid t < -1\frac{5}{7} \}$

4. 

5. $\frac{z}{3} + 9 \ge -4$

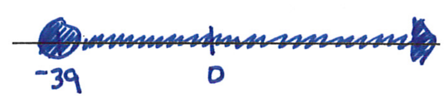
$\frac{z}{3} \ge -4 - 9$

$\frac{z}{3} \ge -13$

$3\left[\frac{z}{3} \ge -13\right]$

$z \ge -39$

5. $\{ z \mid z \ge -39 \}$

5. 

Put answers in set building notation and graph the solution.

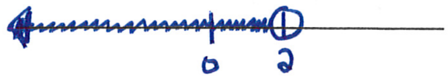
6. $5n - 6 > 12n - 20$

$20 - 6 > 12n - 5n$

$\frac{14}{7} > \frac{7n}{7}$

$2 > n$

6. $\{n \mid n < 2\}$

6. 

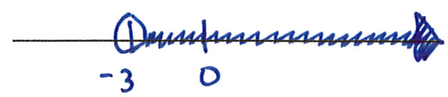
7. $\frac{k+15}{2} > 6$

$k + 15 > 12$

$k > 12 - 15$

$k > -3$

7. $\{k \mid k > -3\}$

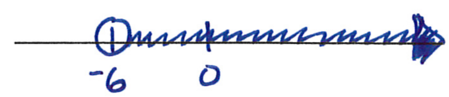
7. 

8. $\left[\frac{1}{2}t - \frac{1}{3}t > -1\right] 6$

$3t - 2t > -6$

$t > -6$

8. $\{t \mid t > -6\}$

8. 

9. $5(3t - 2) + 6t < -53$

$15t - 10 + 6t < -53$

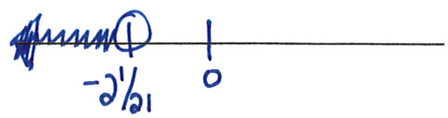
$21t - 10 < -53$

$21t < -53 + 10$

$\frac{21t}{21} < \frac{-43}{21}$

$t < -2\frac{1}{21}$

9. $\{t \mid t < -2\frac{1}{21}\}$

9. 

10. $\left[\frac{2}{3}t - \frac{1}{4} > \frac{1}{2}t + \frac{1}{3}\right] 12$

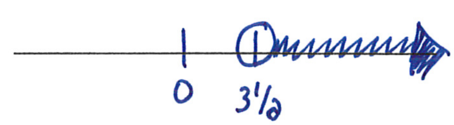
$8t - 3 > 6t + 4$

$8t - 6t > 4 + 3$

$2t > 7$

$t > 3\frac{1}{2}$

10. $\{t \mid t > 3\frac{1}{2}\}$

10. 

Put answers in set building notation and graph the solution.

11. $\frac{4}{5}(15t-30)+5t<\frac{-2}{7}(21t-35)+7$

$12t-24+5t<-6t+10+7$

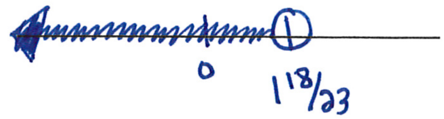
$17t-24<-6t+17$

$17t+6t<17+24$

$\frac{23t}{23}<\frac{41}{23}$

$t<1\frac{18}{23}$

11. $\{t \mid t<1\frac{18}{23}\}$

11. 

12. $5w>4(2w-3)$ and $5(w-3)+2<7$

$5w>8w-12$ $\qquad$ $5w-15+2<7$

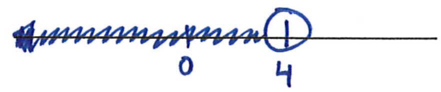
$5w-8w>-12$ $\qquad$ $5w-13<7$

$\frac{-3w}{-3}>\frac{-12}{-3}$ $\qquad$ $5w<7+13$

$\frac{5w}{5}<\frac{20}{5}$

$w<4$ AND $w<4$

12. $\{w \mid w<4$ and $w<4\}$

12. 

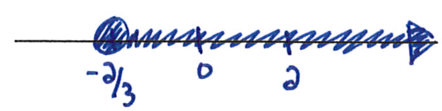
13. $4t+8\geq t+6$ or $7t-14\geq 2t-4$

$4t-t\geq 6-8$ $\qquad$ $7t-2t\geq -4+14$

$3t\geq -2$ $\qquad$ $\frac{5t}{5}\geq\frac{10}{5}$

$t\geq -\frac{2}{3}$ or $t\geq 2$

13. $\{t \mid t\geq -\frac{2}{3}$ or $t\geq 2\}$

13. 

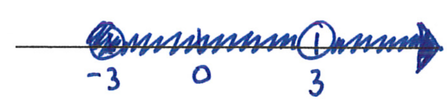
14. $5r-2\geq -17$ and $r\neq 3$

$5r\geq -17+2$

$\frac{5r}{5}\geq\frac{-15}{5}$

$r\geq -3$ AND $r\neq 3$

14. $\{r \mid r\geq -3$ and $r\neq 3\}$

14. 

15. $-15<3a+2\leq 11$

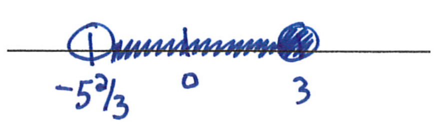
$-15<3A+2$ AND $3A+2\leq 11$

$-15-2<3A$ $\qquad$ $3A\leq 11-2$

$\frac{-17}{3}<\frac{3A}{3}$ $\qquad$ $\frac{3A}{3}\leq\frac{9}{3}$

$-5\frac{2}{3}<A$ $\qquad$ $A\leq 3$

15. $\{A \mid A>-5\frac{2}{3}$ and $A\leq 3\}$

15. 

Put answers in set building notation and graph the solution.

16. $|2x+5|<23$

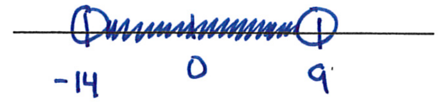
$2x+5<23$ AND $2x+5>-23$

$2x<23-5$ $\qquad$ $2x>-23-5$

$\frac{2x}{2}<\frac{18}{2}$ $\qquad$ $\frac{2x}{2}>\frac{-28}{2}$

$x<9$ AND $x>-14$

16. $\{x \mid x<9$ AND $x>-14\}$

16. 

17. $\left|\frac{3j+2}{4}\right|\geq 7$

$\frac{3j+2}{4}\geq 7$ or $\frac{3j+2}{4}\leq -7$

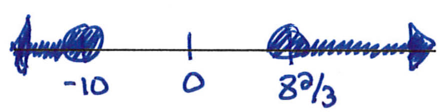
$3j+2\geq 28$ $\qquad$ $3j+2\leq -28$

$3j\geq 28-2$ $\qquad$ $3j\leq -28-2$

$\frac{3j}{3}\geq\frac{26}{3}$ $\qquad$ $\frac{3j}{3}\leq\frac{-30}{3}$

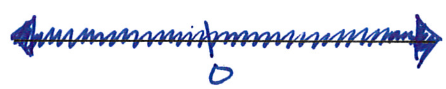
$j\geq 8\,^2/_3$ or $j\leq -10$

17. $\{j \mid j\geq 8\,^2/_3$ or $j\leq -10\}$

17. 

18. $|9x-11|\geq -15$

18. $\{\ \mathbb{R}\ \}$

18. 

19. $|13x+5|<-17$

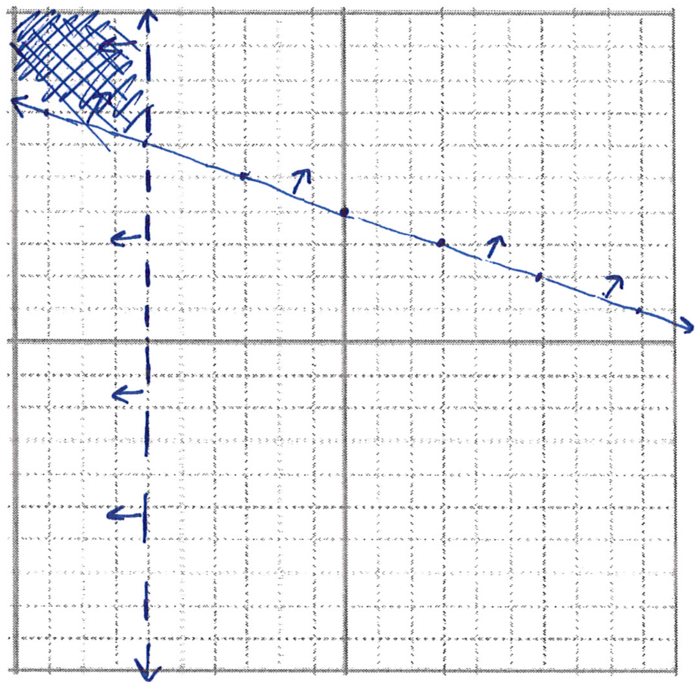
19. $\{\ \{\}\ \}$

19. 

Graph The System of Inequalities

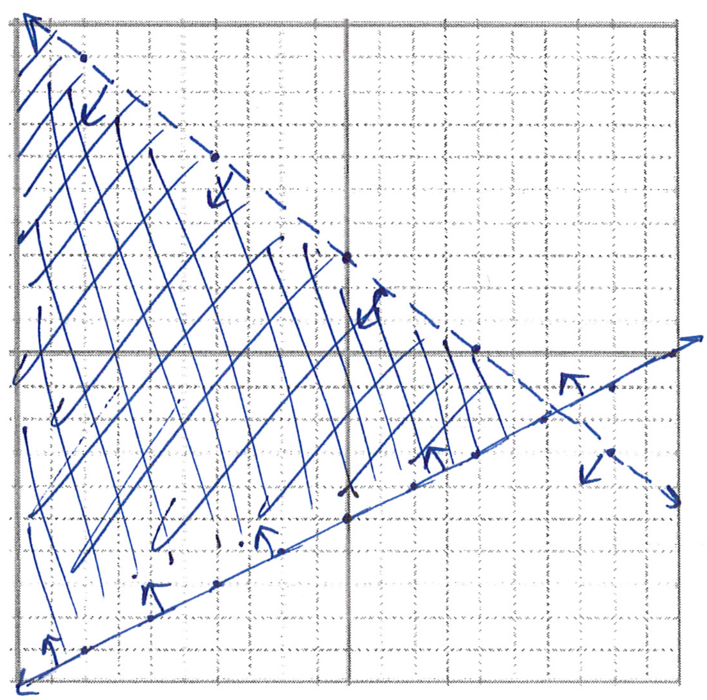
#20. $y \geq \frac{-1}{3}x + 4$ → $m = -1/3$, → $0,4$

$x < -6$



#21. $y \geq \frac{1}{2}x - 5$ → $m = 1/2$, → $(0, -5)$

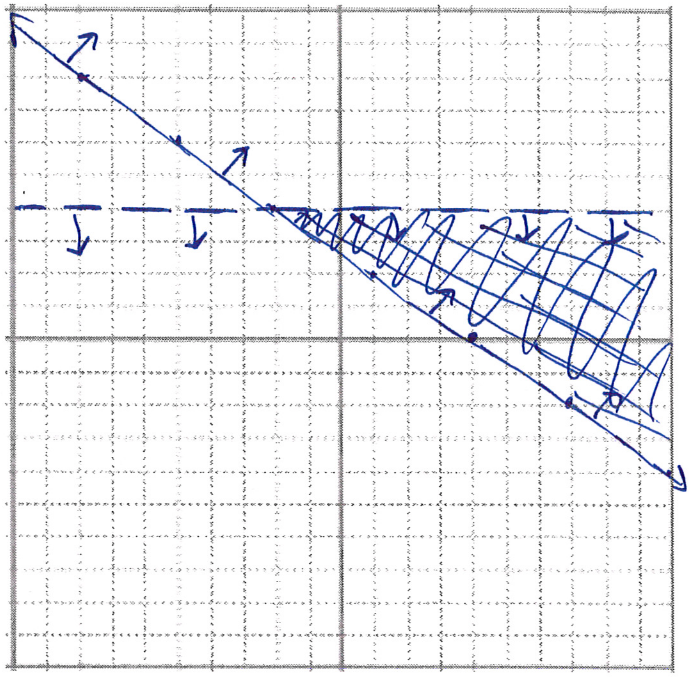
$3x + 4y < 12$ → $m = -3/4$, $(0, 3)$



Graph The System of Inequalities

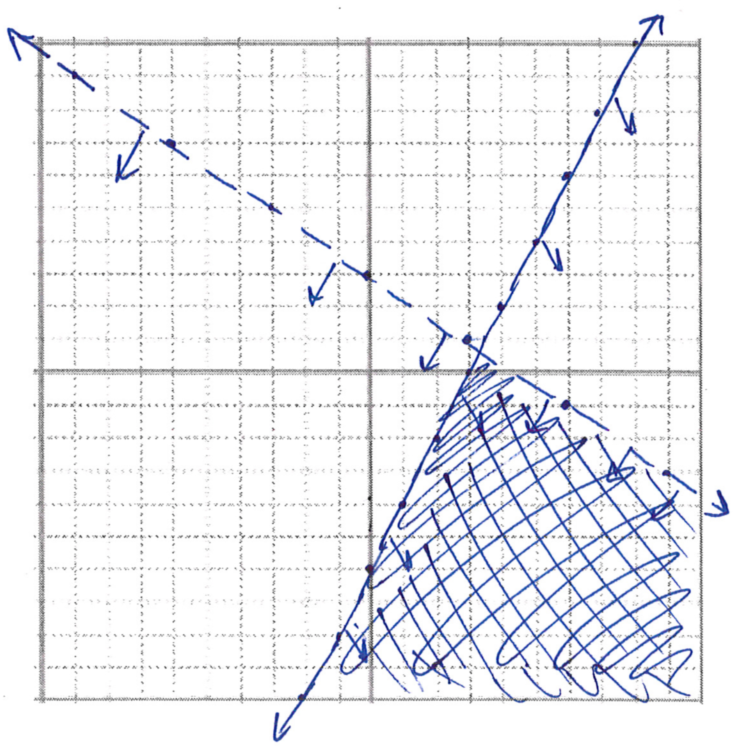
#22. $2x + 3y \geq 8$ → $m = -2/3$ → $(4,0)$

$y < 4$



#23. $y \leq \frac{2}{1}x - 6$ → $m = \frac{2}{1}$ → $(0,-6)$

$2x + 3y < 9$ → $m = -\frac{2}{3}$ → $(0,3)$



Matching - Match the **best** response to each statement.

Statements

1. __C__ The "or" compound inequality C.

2. __J__ $|4x+7| \geq -11$ J.

3. __F__ Changing the direction of an inequality sign F

4. __B__ $|2x-3| < 27$ B.

5. __I__ The "and " compound inequality I.

6. __L__ Absolute value L.

7. __G__ $|9x+1| < -13$ G.

8. __M__ Set Building Notation M.

9. __K__ Significance of shaded region for "or " statements K.

10. __H__ $m \neq 7$ H.

11. __N__ Significance of shaded region for "and" statements N.

12. __Q__ $|5x+43| \geq 67$ Q.

Responses

A. This is the term used to describe a number in front of a variable.

B. Example of absolute value inequality that will be written as a compound "and" statement and will have a traditional answer.

C. Usually has a solution that graphs as tails, on occasion will have an answer as **R**, statement that cannot be crunched together.

D. When solving equations there are numbers with variables and then there are numbers whithout any variable. Those numbers not associated without any variables are called . . .

E. This is the set of numbers that need to be tested in an open sentence

F. This is done anytime multiplication or division by a negative number occurs.

G. Example of absolute value inequality that will have {} - "the empty set" as a solution

H. Restricted value - means that any number other than that particular one can be used.

I. Usually has a solution that graphs as dumb-bell, on occasion will answer as { }, statement that can be crunched together.

J. Example of absolute value inequality that will have **R** - "all reals" as a solution

K. The graphical solution that is interpreted as the only numerical values capable of solving either statement in an "or" compound inequality.

L. Defined as a measure of magnitude, results in non-negative numbers being reported.

M. Used to signify that there are too many solutions to list, but all those solutions will share some notable characteristic, e.g. {x | x > 5}

N. The graphical solution that is interpreted as the only numerical values capable of solving both statements in an "and" compound inequality.

Q. Example of absolute value inequality that will be written as a compound "or" statement and will have a traditional answer.

Bonus II. $\frac{1}{5}(10x+15) < |3x-8| \leq 6(\frac{1}{6}x+5)$

$\frac{1}{5}(10x+15) < |3x-8|$ AND $|3x-8| \leq 6(\frac{1}{6}x+5)$

$|3x-8| > 2x+3$ AND $|3x-8| \leq x+30$

$3x-8 > 2x+3$ or $3x-8 < -2x-3$

$3x-2x > 3+8$ $\quad$ $3x+2x < -3+8$

$5x < 5$

$x > 11$ or $x < 1$

$3x-8 \leq x+30$ AND $3x-8 \geq -x-30$

$3x-x \leq 30+8$ $\quad$ $3x+x \geq -30+8$

$2x \leq 38$ $\quad$ $4x \geq -22$

$x \leq 19$ AND $x \geq -5\frac{1}{2}$

Bonus I: $\frac{3}{4}(2x+5)+4 \le |4x+1|-9$

(hint: arrange the problem so it looks similar to all the other ones we have done in class)

$|4x+1|-9 \ge \frac{3}{4}(2x+5)+4$

$|4x+1| \ge \frac{3}{2}x+\frac{15}{4}+4+9$

$|4x+1| \ge \frac{3}{2}x+16\frac{3}{4}$

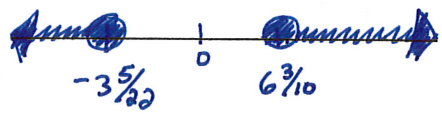
$4x+1 \ge \frac{3}{2}x+16\frac{3}{4}$ or $4x+1 \le -\frac{3}{2}x-16\frac{3}{4}$

$4x-\frac{3}{2}x \ge 16\frac{3}{4}-1$ $\quad$ $4x+\frac{3}{2}x \le -16\frac{3}{4}-1$

$2\frac{1}{2}x \ge 15\frac{3}{4}$ $\quad$ $5\frac{1}{2}x \le -17\frac{3}{4}$

$x \ge 6\frac{3}{10}$ or $x \le -3\frac{5}{22}$

Bonus I. $\{x \mid x \ge 6\frac{3}{10}$ or $x \le -3\frac{5}{22}\}$

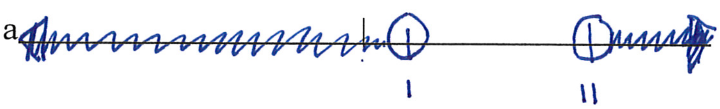
Bonus I.


Bonus II. $\frac{1}{5}(10x+15) < |3x-8| \le 6(\frac{1}{6}x+5)$

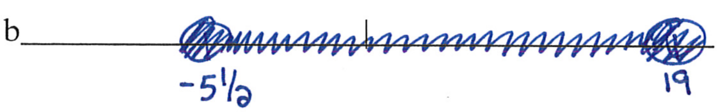
(hint: keep it simple silly, then expand the crunch statement, work the two problems out entirely and graph, finally the graphs for those two answers must be inspected to see where they both exist at the same time, that will be your final graphed answer.)

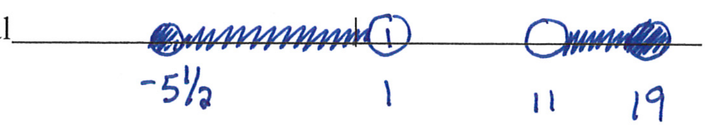
And

a $\{x \mid x > 11$ or $x < 1\}$ **And** b $\{x \mid x \le 19$ AND $x \ge -5\frac{1}{2}\}$

a


And

b


Final


Bonus III. Find the **Shaded Region** that **includes** the shading from **all five inequalities.**

$3x - 2y \geq -21$ → $m = \frac{3}{2}$ → $(-7,0)$

$x + 3y < 15$ → $m = \frac{-1}{3}$ → $(0,5)$

$y < \frac{1}{2}x + 3$ → $m = \frac{1}{2}$ → $(0,3)$

$x \geq -6$

$y \geq -5$