Solving Inequalities Using More Than One Step

1. $7a - 5 < 9$

2. $15 < 5 - 8c$

3. $2x + 13 \leq 5x$

4. $\frac{k + 10}{3} > 5$

5. $\frac{4r + 3}{5} > 10$

Solving Inequalities with Variables on Both Sides

6. $\frac{1}{2}t - \frac{1}{3}t > -1$

7. $\frac{2}{5}(5x - 15) \geq 4$

8. $2(3b - 2) < 4b + 8$

9. $\frac{3}{4}k < \frac{3}{4} - \frac{1}{4}k$

Solving Compound Inequalities

10. $5w > 4(2w - 3)$ and $5(w - 3) + 2 < 7$

11. $4t + 8 \geq t + 6$ or $7t - 14 \geq 2t - 4$

12. $3k + 1 > 10$ and $k \neq 6$

13. $2h + 5 \geq 2(3h + 7)$ or $3h + 5 \leq 2h + 9$

14. $9 - 2x \leq 12x - 5 < 3x + 31$

Solving Inequalities involving Absolute Values

15. $|11j + 13| < -5$

16. $\left|\frac{2r + 5}{-7}\right| \geq 3$

17. $|3e + 5| \geq -11$

18. $|3y - 12| \leq 12$

19. $|2w + 11| \geq 1$

Solving Word Problems Involving Inequalities

20. The cost of a coat Emilio would like to buy is $20 more than three times the cost of a pair of pants. He plans to spend less than $105 for both items. What is the greatest amount he can spend on the pants?

21. Marla scored 58, 67, 72, and 83 on four of the five math tests. She needs at least a 72% average to be allowed to participate in volleyball. What is the least she can score on the next test?

22. Twice a number decreased by five times the sum of that number and three is at most 42. Solve this inequality, put your answer in set building notation.

23. Nine times the sum of two and twice a number is at least five times the number minus three. Solve this inequality and put your answer in set building notation.

Graphing inequalities in two variables

1. $y \geq \frac{2}{3}x - 4$
$2x + y < 4$

2. $y \geq \frac{-1}{4}x + 3$
$3x - 2y < 10$

3. $y \geq -3$
$x + 4y < 12$

4. $y \geq \frac{2}{3}x - 4$
$x < 7$

Concepts to Know

Set Building Notation. – Used to signify that there are too many solutions to list, but all those solutions will share some notable characteristic, e.g. $\{x \mid x > 5\}$

Changing the direction of an inequalitiy sign. – This is done anytime multiplication or division by a negative number occurs.

J ≠ 11. – Restricted value - means that any number other "and" statements than that particular one can be used.

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

Significance of shaded region for "and" statements. – The graphical solution that is interpreted as the only numerical values capable of solving both statements in an "and" compound inequality.

Significance of shaded region for "or" statements. The graphical solution that is interpreted as the only numerical values capable of solving either statement in an "or" compound inequality.

| 7x – 2 | > – 35. – Example of absolute value inequality that will have **R** - "all reals" as a solution

| 9x – 1 | ≤ – 25. – Example of absolute value inequality that will have {} - "the empty set" as a solution

| 4x + 9 | < 22. – Example of absolute value inequality that will be written as a compound "and" statement
and will have a traditional answer.

| 3x – 9 | ≥ 22. – Example of absolute value inequality that "or " statements will be written as a compound "or" statement and will have a traditional answer.

The "or " compound inequality. – Usually has a solution that graphs as diverging inequality sign arrows, on occasion will have an answer as **R**, statement that cannot be crunched together.

The "and " compound inequality. – Usually has a solution that graphs as dumb-bell, on occasion will answer as **{ }**, statement that can be crunched together.