1-6 Solving Multi-Step Inequalities

TEKS FOCUS

TEKS (5)(B) Solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides.

TEKS (1)(A) **Apply** mathematics to problems arising in everyday life, society, and the workplace.

Additional TEKS (1)(D)

VOCABULARY

- **Apply** – use knowledge or information for a specific purpose, such as solving a problem

ESSENTIAL UNDERSTANDING

You solve a multi-step inequality in the same way you solve a one-step inequality. You use the properties of inequality to transform the original inequality into a series of simpler, equivalent inequalities.

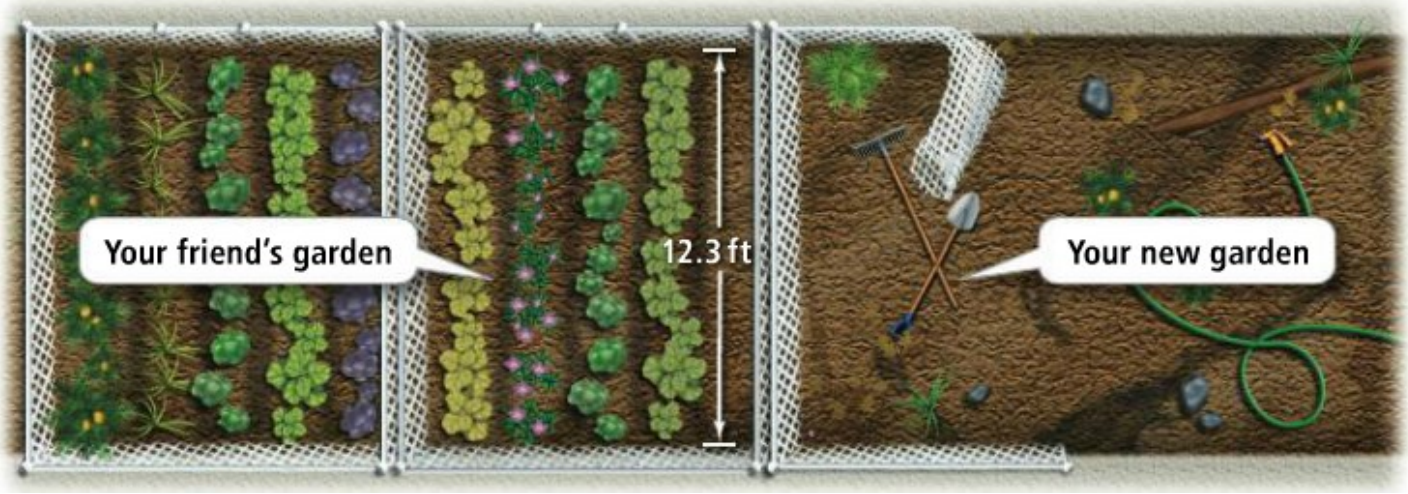
Using More Than One Step

What are the solutions of $9 + 4t > 21$? Check the solutions.

$9 + 4t > 21$

Writing and Solving a Multi-Step Inequality

Geometry **In a community garden, you want to fence in a rectangular garden that is adjacent to your friend's garden. You have at most 42.8 ft of fence. What are the possible lengths of your garden? Check the reasonableness of your answer.**



Using the Distributive Property

Multiple Choice Which is a solution of $3(t + 1) - 4t \geq -5$?

(A) 8 (B) 9 (C) 10 (D) 11

Solving an Inequality With Variables on Both Sides

What are the solutions of $6n - 1 > 3n + 8$?

Inequalities With Special Solutions

A What are the solutions of $10 - 8a \geq 2(5 - 4a)$?

B What are the solutions of $6m - 5 > 7m + 7 - m$?

PRACTICE and APPLICATION EXERCISES

Solve each inequality. Check your solutions.

1. $5f + 7 \leq 22$

2. $6n - 3 > -18$

3. $-5y - 2 < 8$

4. $6 - 3p \geq -9$

5. $9 \leq -12 + 6r$

6. $6 \leq 12 + 4j$

Solve each inequality.

9. $3(k - 5) + 9k \geq -3$

10. $-(7c - 18) - 2c > 0$

11. $-3(j + 3) + 9j < -15$

12. $6 - 3p \leq 4 - p$

13. $3m - 4 \leq 6m + 11$

14. $4t + 17 > 7 + 5t$

Apply Mathematics (1)(A) **Write and solve an inequality.**

7. On a trip from Buffalo, New York, to St. Augustine, Florida, a family wants to travel at least 250 mi in the first 5 h of driving. What should their average speed be in order to meet this goal?

8. An isosceles triangle has at least two congruent sides. The perimeter of a certain isosceles triangle is at most 12 in. The length of each of the two congruent sides is 5 in. What are the possible lengths of the remaining side?

15. **Use a Problem-Solving Model (1)(B)** Your cellphone plan costs $39.99 per month plus $.15 for each text message you send or receive. You have at most $45 to spend on your cellphone bill. What is the maximum number of text messages that you can send or receive next month?

16. **Explain Mathematical Ideas (1)(G)** Suppose a friend is having difficulty solving $3.75(q - 5) > 4(q + 3)$. Explain how to solve the inequality, showing all the necessary steps and identifying the properties you would use.

19. **Display Mathematical Ideas (1)(G)** Write two different inequalities that you can solve by subtracting 3 from each side and then dividing each side by -5. Solve each inequality.

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Solving Inequalities Homework

Select Techniques to Solve Problems (1)(C) Determine whether each inequality is *always true* or *never true.*

a. $5s + 7 \geq 7 + 5s$ **b.** $4t + 6 > 4t - 3$ **c.** $5(m + 2) < 5m - 4$

Solve each inequality, if possible. If the inequality has no solution, write *no solution*. If the solutions are all real numbers, write *all real numbers*.

22. $-3(w - 3) \geq 9 - 3w$ **23.** $-5r + 6 \leq -5(r + 2)$

24. $-2(6 + s) \geq -15 - 2s$ **25.** $9 + 2x < 7 + 2(x - 3)$

28. $\frac{4}{3}s - 3 < s + \frac{2}{3} - \frac{1}{3}s$ **29.** $4 - 2n \leq 5 - n + 1$

32. $4(3n - 1) \geq 2(n + 3)$

33. $17 - (4k - 2) \geq 2(k + 3)$

Explain Mathematical Ideas (1)(G) **Describe and correct the error in each solution.**

35.

$4y + 4 \leq -3y + 6$

$4y \leq -3y + 2$

$y \leq 2$

36.

$5(p + 3) > 4p + 2$

$5p + 3 > 4p + 2$

$5p > 4p - 1$

$p > -1$

Apply Mathematics (1)(A) The base of a triangle is 12 in. Its height is $(x + 6)$ in. Its area is no more than 72 in.^{2}. What are the possible integer values of x?