

Lesson 4-4: Solving Multi-Step Inequalities

Part 1: Solving Inequalities with Variables on One Side

1. 060311a, P.I. A.A.21
Which number is in the solution set of the inequality $5x + 3 > 38$?
[A] 8 [B] 7 [C] 6 [D] 5
2. fall0724ia, P.I. A.A.21
Which value of x is in the solution set of the inequality $-2x + 5 > 17$?
[A] -6 [B] -4 [C] 12 [D] -8
3. 010536a, P.I. A.A.21
Find all negative odd integers that satisfy the following inequality: $-3x + 1 \leq 17$
4. 060118a, P.I. A.A.21
In the set of positive integers, what is the solution set of the inequality $2x - 3 < 5$?
[A] {0, 1, 2, 3, 4} [B] {0, 1, 2, 3}
[C] {1, 2, 3} [D] {1, 2, 3, 4}
5. 010101a, P.I. A.A.6
There are 461 students and 20 teachers taking buses on a trip to a museum. Each bus can seat a maximum of 52. What is the *least* number of buses needed for the trip?
[A] 11 [B] 8 [C] 10 [D] 9
6. 089914a, P.I. A.A.6
In a hockey league, 87 players play on seven different teams. Each team has at least 12 players. What is the largest possible number of players on any one team?
[A] 15 [B] 13 [C] 21 [D] 14

7. 080732a, P.I. A.A.6
Thelma and Laura start a lawn-mowing business and buy a lawnmower for \$225. They plan to charge \$15 to mow one lawn. What is the *minimum* number of lawns they need to mow if they wish to earn a profit of *at least* \$750?
8. fall0735ia, P.I. A.A.6
A prom ticket at Smith High School is \$120. Tom is going to save money for the ticket by walking his neighbor's dog for \$15 per week. If Tom already has saved \$22, what is the minimum number of weeks Tom must walk the dog to earn enough to pay for the prom ticket?
9. 080224a, P.I. A.A.6
A doughnut shop charges \$0.70 for each doughnut and \$0.30 for a carryout box. Shirley has \$5.00 to spend. At most, how many doughnuts can she buy if she also wants them in one carryout box?
10. 069928a, P.I. A.A.6
A swimmer plans to swim at least 100 laps during a 6-day period. During this period, the swimmer will increase the number of laps completed each day by one lap. What is the *least* number of laps the swimmer must complete on the first day?

Part 2: Solving Inequalities with Variables on Both Sides

11. 010425a, P.I. A.A.24
The inequality $\frac{1}{2}x + 3 < 2x - 6$ is equivalent to
[A] $x < 6$ [B] $x > 6$
[C] $x < -\frac{5}{6}$ [D] $x > -\frac{5}{6}$

[1] A

[2] D

[3] -5, -3, -1, and appropriate work is shown, such as solving the inequality or trial and error with at least three trials and appropriate checks.

[2] Appropriate work is shown, but one computational error is made.

or [2] Appropriate work is shown, and the inequality $x \geq -5\frac{1}{3}$ is written, but no further

correct work is shown.

or [2] The trial-and-error method is used to find the correct solutions, but only two trials and appropriate checks are shown.

[1] Appropriate work is shown, but two or more computational errors are made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but the solutions are not found.

or [1] -5, -3, -1, but no work or only one trial with an appropriate check is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

[4] C

[5] C

[6] A

[2] 65, and appropriate work is shown, such as solving the inequality $15x \geq 225 + 750$ or trial and error with at least three trials and appropriate checks.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or [1] 65, but no work or fewer than three trials and appropriate checks are shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[7] incorrect procedure.

[3] 7, and appropriate work is shown, such as solving the inequality $15x + 22 \geq 120$, solving an equation, or trial and error with at least three trials and appropriate checks.

[2] Appropriate work is shown, but one computational or rounding error is made.

or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] An incorrect equation of equal difficulty is solved appropriately.

or [1] A correct inequality or equation is written, but no further correct work is shown.

or [1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or [1] 7, but no work or only one trial with an appropriate check is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[2] 6, and appropriate work is shown, such as $0.70x + 0.30 \leq 5.00$ or trial and error with three trials and appropriate checks.

[1] The inequality is solved correctly, but the number of doughnuts is not found.

or [1] The trial-and-error method is used to find a correct solution, but fewer than three trials are shown.

or [1] 6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[9] incorrect procedure.

[3] 15 and an appropriate method or explanation is shown, such as trial and error or the inequality $6x + 15 \geq 100$.

[2] An appropriate method is shown, but it stops at 14.

[1] An appropriate method is shown, but no answer is found.

or [1] 15 and no explanation is given.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[10] incorrect procedure.

[11] B
