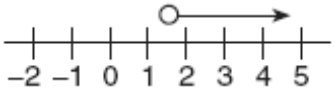
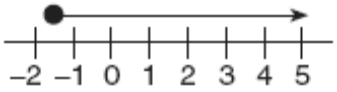
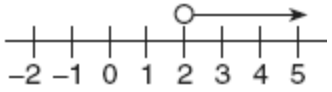
Lesson 4-1: Inequalities and Their Graphs

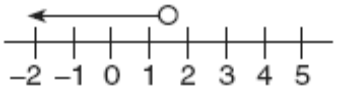
Part 2: Graphing and Writing Inequalities in One Variable

1. 060616a, P.I. 8.G.19
Which graph best represents the solution set for the inequality $x > \sqrt{2}$?

[A] 

[B] 

[C] 

[D] 

Lesson 4-4: Solving Multi-Step Inequalities

Part 1: Solving Inequalities with Variables on One Side

2. 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

3. 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

4. 010536a, P.I. A.A.21
Find all negative odd integers that satisfy the following inequality: $-3x + 1 \leq 17$

5. 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}

6. 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

7. 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

8. 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?

9. 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?

10. 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?

11. 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

12. 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] $x>-\frac{5}{6}$

Lesson 4-5: Compound Inequalities

Part 1: Solving Compound Inequalities Containing *And*

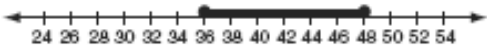
13. 060001a, P.I. 8.G.19
Which inequality is represented in the graph below?

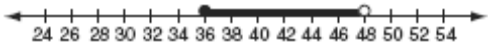
[A] $-4<x\le 2$ [B] $-4\le x<2$
[C] $-4<x<2$ [D] $-4\le x\le 2$

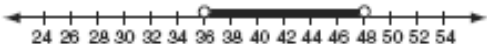
14. 080411a, P.I. 8.G.19
Which inequality is represented in the accompanying graph?

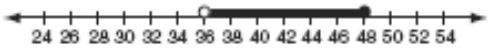
[A] $-3\le x\le 4$ [B] $-3<x<4$
[C] $-3\le x<4$ [D] $-3<x\le 4$

15. 010610a, P.I. 8.G.19
In order to be admitted for a certain ride at an amusement park, a child must be greater than or equal to 36 inches tall and less than 48 inches tall. Which graph represents these conditions?

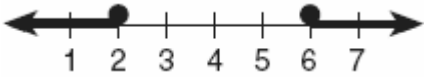
[A] 

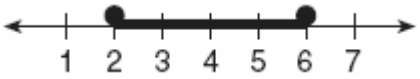
[B] 

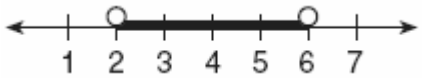
[C] 

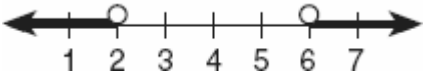
[D] 

16. 010312a, P.I. 8.A.13
Which graph represents the solution set for $2x-4\le 8$ and $x+5\ge 7$?

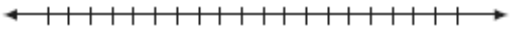
[A] 

[B] 

[C] 

[D] 

17. 060532a, P.I. 8.G.19
The manufacturer of Ron's car recommends that the tire pressure be at least 26 pounds per square inch and less than 35 pounds per square inch. On the accompanying number line, graph the inequality that represents the recommended tire pressure.



18. 089910a
On June 17, the temperature in New York City ranged from 90° to 99°, while the temperature in Niagara Falls ranged from 60° to 69°. The difference in the temperatures in these two cities must be between

[A] 30° and 40° [B] 20° and 40°

[C] 25° and 35° [D] 20° and 30°

Lesson 4-6: Absolute Value Equations and Inequalities

Part 1: Solving Absolute Value Equations

19. 010822b, A2.A.1
Solve for all values of x: $|2x-5|=3$

20. 080616b
What is the solution set of the equation $|x^2-2x|=3x-6$?

[A] $\{2,\pm 3\}$ [B] $\{\pm 3\}$

[C] $\{2\}$ [D] $\{2,3\}$

Part 2: Solving Absolute Value Inequalities

21. 060107b
Which equation states that the temperature, t, in a room is less than 3° from 68°?

[A] $|68 - t| < 3$ [B] $|68 + t| < 3$

[C] $|3 - t| < 68$ [D] $|3 + t| < 68$

22. 080102b, P.I. A2.A.1
The solution set of $|3x+2|<1$ contains

[A] no real numbers

[B] both positive and negative real numbers

[C] only positive real numbers

[D] only negative real numbers

23. 060318b, P.I. A2.A.1
What is the solution set of the inequality $|3-2x|\geq 4$?

[A] $\{x|x\leq -\frac{1}{2} \text{ or } x\geq \frac{7}{2}\}$

[B] $\{x|\frac{7}{2}\leq x\leq -\frac{1}{2}\}$

[C] $\{x|x\leq \frac{7}{2} \text{ or } x\geq \frac{1}{2}\}$

[D] $\{x|-\frac{1}{2}\leq x\leq \frac{7}{2}\}$

24. 080203b, P.I. A2.A.1
What is the solution of the inequality $|x+3|\leq 5$?

[A] $x\leq -8$ *or* $x\geq 2$ [B] $-8\leq x\leq 2$

[C] $x\leq -2$ *or* $x\geq 8$ [D] $-2\leq x\leq 8$

25. 080509b, P.I. A2.A.1
The solution of $|2x-3|<5$ is

[A] $x < -1$ or $x > 4$ [B] $-1 < x < 4$

[C] $x < 4$ [D] $x > -1$

26. 010610b, P.I. A2.A.1
What is the solution of the inequality $|y+8|>3$?

[A] $-11 < y < -5$ [B] $y > -5$ or $y < -11$

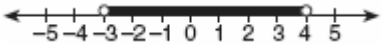
[C] $-5 < y < 11$ [D] $y > -5$

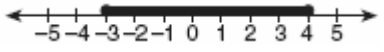
27. 010710b, P.I. A2.A.1
What is the solution set of the inequality $|2x-1|<9$?

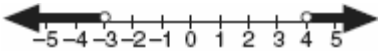
[A] $\{x|x<-4 \text{ or } x>5\}$ [B] $\{x|x<-4\}$

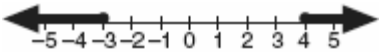
[C] $\{x|x<5\}$ [D] $\{x|-4<x<5\}$

28. 080303b, P.I. A2.A.1
Which graph represents the solution set of $|2x-1|<7$?

[A] 

[B] 

[C] 

[D] 

29. 060505b, P.I. A2.A.1
Which graph represents the solution set for the expression $|2x+3|>7$?

[A] 

[B] 

[C] 

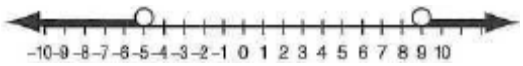
[D] 

30. 060707b, P.I. A2.A.1
Which inequality is represented by the accompanying graph?

[A] $|x-5|\geq 2$ [B] $|x-1|\leq 5$

[C] $|x+2|>5$ [D] $|x+3|\geq 2$

31. 060617b, P.I. A2.A.1
The solution set of which inequality is represented by the accompanying graph?



[A] $|2-x|>-7$ [B] $|x-2|>7$

[C] $|x-2|<7$ [D] $|2-x|<-7$

32. 010326b, P.I. A2.A.1
The inequality $|1.5C-24|\leq 30$ represents the range of monthly average temperatures, *C*, in degrees Celsius, for Toledo, Ohio. Solve for *C*.

33. 010531b, P.I. A2.A.1
The heights, *h*, of the students in the chorus at Central Middle School satisfy the inequality $\left|\frac{h-57.5}{2}\right|\leq 3.25$, when *h* is measured *in inches*. Determine the interval in which these heights lie and express your answer to the *nearest tenth of a foot*. [Only an algebraic solution can receive full credit.]

34. 080427b, P.I. A2.A.1
A depth finder shows that the water in a certain place is 620 feet deep. The difference between *d*, the actual depth of the water, and the reading is $|d-620|$ and must be less than or equal to $0.05d$. Find the minimum and maximum values of *d*, to the *nearest tenth of a foot*.

[1] A

[2] A

[3] 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 incorrect procedure.

[4]

[5] C

[6] C

[7] 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 incorrect procedure.

[8]

[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 incorrect procedure.

[9]

[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 incorrect procedure.

[10]

[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 incorrect procedure.

[11]

[12] B

[13] B

[14] D

[15] B

[16] B

[2] A correct graph is drawn on the number line, with a closed circle at the left end and an open circle at the right end.
[1] Appropriate work is shown, but one graphing error is made, such as writing an incorrect scale on the number line.
or [1] Appropriate work is shown, but one conceptual error is made, such as using a closed circle instead of an open circle.
or [1] A correct inequality is written, but the graph is not drawn.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[17]

[18] B

[21 1 and 4, and appropriate work is shown.
[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] 1 and 4, but no work is shown.
[0] 1 or 4, but no work is shown.
or [01 A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[19]

[20] D

[21] A

[22] D

[23] A

[24] B

[25] B

[26] B

[27] D

[28] A

[29] B

[30] D

[31] B

[32]
[2] $-4 \le C \le 36,$ and appropriate work is shown.
[1] Appropriate work is shown, but one computational error is made.
or [1] Appropriate work is shown, but only one extreme value is found.
or [1] $-4 \le C \le 36,$ 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 incorrect procedure.

[33]
[4] 4.3-5.3, and appropriate work is shown.
[3] Appropriate work is shown, but one computational or rounding error is made.
or [3] Appropriate work is shown, but the answer is not stated as an interval.
or [3] Appropriate work is shown, but the answer is expressed in inches.
[2] Appropriate work is shown, but two or more computational or rounding errors are made.
or [2] Appropriate work is shown, but one conceptual error is made.
or [2] An appropriate inequality, such as $-3.25 \le \left|\frac{h-57.5}{2}\right| \le 3.25,$ is written, but no further correct work is shown.
[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
or [1] Only half of the inequality is solved, but an appropriate answer is found and expressed to the nearest tenth of a foot.
or [1] 4.3-5.3, 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 incorrect procedure.

[34]
[4] 590.5 and 652.6, and appropriate work is shown, such as $|d - 620| \le 0.05d$.
[3] Appropriate work is shown, but one computational or rounding error is made.
[2] Appropriate work is shown, but two or more computational or rounding errors are made.
or [2] Appropriate work is shown, but one conceptual error is made.
or [2] 590.5 or 652.6, and appropriate work is shown.
[1] 590.5 and 652.6, but no work is shown.
[0] 590.5 or 652.6, but no work is shown.
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.