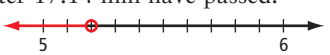
9.2 Solving Single-Step Inequalities, pages 357–359

5. a) $x \geq 29$ **b)** $-7 < x$ **c)** $x > -13.8$ **d)** $35 \leq x$
6. a) $y \geq 9$ **b)** $-14.5 < y$ **c)** $y \leq -4$ **d)** $y > 6.25$
7. a) $x > 150$ **b)** $x \leq 36$ **c)** $2.4 \geq x$ **d)** $x > -30$
8. a)–c) No, the inequality is not changed because there is no multiplication or division by a negative number.
d) Yes, the direction of the inequality is changed because there is division by a negative number.
e) Yes, the direction of the inequality is changed because there is multiplication by a negative number.
f) No, the inequality is not changed because there is no multiplication or division by a negative number.
9. a) yes **b)** yes **c)** yes **d)** no
10. a) yes **b)** no **c)** no **d)** yes
11. a) yes **b)** no **c)** yes **d)** yes
12. a) yes **b)** No; the correct answer is $x > -16$, not $x > 16$.
13. a) No; the correct solution is $-9 \geq x$, not $-11 \geq x$.
b) yes
14. a) $85f \leq 1400$ **b)** $f \leq 16.47$ **c)** No, the boundary value is not a positive integer, which is required when discussing the number of fence sections.
15. a) $6w > 50$ **b)** $w > 8.\overline{3}$. Megan must win 9 or more races to move up to the next racing category. **c)** No, the number of races won will be a non-negative integer.
16. a) Example: Three solutions are -6, -20.2, and -10. Three non-solutions are 0, -4, and 8.6.
b) Example: Three solutions are 0, -2, and 5.5. Three non-solutions are -11, -8, and -16.
17. Example: The inequality sign is reversed because each side was divided by a negative number, -5.
18. a) Example: The single sharpening cost is about \$6. When this is divided by 48, the answer is 8. So, if the skates need to be sharpened more than 8 times, the monthly charge would be a better option.
b) $5.75s > 49$; $s > 8.52$. It would be better to take advantage of the monthly special if the skates were sharpened more than 8 times. The estimate and solution to the inequality are the same.
19. a) $0.03p \geq 250$; $p \geq 8333.\overline{3}$. The owner would need to make a profit of at least \$8333.33 in order to donate at least \$250 to the local charity. **b)** Example: Check the boundary point, $8333.\overline{3}$, and then check that both sides of the inequality are equal: $0.03(8333.\overline{3}) = 250$. Check a number that is larger than the boundary value (9000) and see that it is a solution: $0.03(9000) = 270$. Since 270 is larger than 250, then 9000 is a solution to the inequality.
20. $0.084k \leq 57$; $k \leq 678.57$; They can travel no more than 678.57 km, assuming the car consumes the average amount of fuel.
21. a) Natalie must run 8 laps in order to complete the 3200-m distance: $3200 \div 400 = 8$. The total time of 9 min 23 s is equivalent to 563 s: $9 \times 60 + 23 = 563$. The expression $8x$ represents her total time, where x is her average time per lap. Consequently, her total time must be less than the current record of 563 s: $8x < 563$.
b) $x < 70.375$
22. $\frac{s}{5} \geq 120$; $s \geq 600$. She will have to spend at least \$600 to get at least 120 points.
23. a) $115d \geq 1000$; $4d \leq 50$ **b)** $d \geq 8.70$; $d \leq 12.5$
c) Chris can build between 9 and 12 doghouses and stay within his guidelines.
24. $x > -\frac{5}{6}$
25.

26. The mass of the energy bar must be between 66.67 g and 76.92 g.
27. a) $x \leq 5$ **b)** $x \geq 5$
28. a) $-14 \leq x$ and $x \leq -1$ **b)** $-1 < x$ and $x < 6$
c) $\frac{5}{2} \geq x$ and $x > -\frac{3}{2}$

9.3 Solving Multi-Step Inequalities, pages 365–367

3. a) $x < 11$ **b)** $x > -20$ **c)** $50 \leq x$
4. a) $y \leq 10.4$ **b)** $-2.1 > y$ **c)** $y > -108$ **d)** $x \leq 3\frac{1}{5}$
5. a) Check the boundary value: $3(8) + 11 = 35$. Check another number in the solution set, $x = 10$: $3(10) + 11 = 41$. Since 41 is greater than 35, the solution is correct. **b)** Solve the inequality: $24 - 5x - 24 > 39 - 24$. Finally, simplify $\frac{-5x}{-5} < \frac{15}{-5}$ to get the solution, $x < -3$.
6. a) $x < 6$ **b)** $x \geq 11$ **c)** $x < -\frac{9}{8}$ **d)** $x > 39$
7. a) $y < 2$ **b)** $y \leq 10$ **c)** $y > \frac{28}{9}$ **d)** $y \geq 3$
8. a) Example: Let j represent the number of jerseys; $40j + 80 < 50j$ **b)** Example: Let n represent the number of text messages sent in one month; $0.12n < 0.05n + 15$
9. a) $0.05p + 10 > 0.04p + 15$ **b)** John will have to deliver more than 500 papers to make the *Advance* the better offer.
10. a) Example: ABC Rentals would be a better deal if you travel less than 200 km per day ($30 \div 0.15$).
b) $0.14k + 25 < 55$ **c)** ABC Rentals will be the better option if Kim travels less than 214.3 km per day.
11. Kevin's weekly sales must be at least \$4000 for Dollar Deal to pay more.
12. Print Express would be the better option if more than 236 yearbooks are ordered.
13. The member's plan is a better deal when 22 or more buckets of balls are used per month.
14. Molly must sell at least 72 candles in order to make a profit.
15. The first tank will contain less water after $27\frac{3}{11}$ minutes have passed.
16. a) Example: Estimate: 20 min **b)** Rob will be closer to the top after 17.14 min have passed.
17. $x < 5.2$;

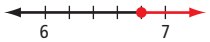


18.

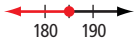
19. Lauren can cut 34, 35, or 36 lawns per month and stay within her guidelines.
20. a) Ella is correct when $x > 0$.
b) Ella is incorrect when $x \leq 0$. Example: Ella is correct when $x = 2$, but she is incorrect when $x = -11.2$.
21. $9 \geq x$ and $x \geq -2$
22. $x > 0$

Chapter 9 Review, pages 368–369

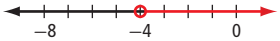
1. inequality
2. graphically; algebraically
3. open circle
4. solution
5. boundary point
6. closed circle
7. a) Example: Savings $\leq 40\%$
b) Example: Free shipping for purchases $\geq \$500$
c) Example: Number of items on sale > 80
8. a) Example: The bicycle must be at least 6.8 kg in mass.



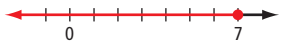
b) Example: The bicycle must be less than or equal to 185 cm.



9. a) $x > 13$; A number greater than 13.
b) $x \leq 8.6$. A number less than or equal to 8.6.
10. a)

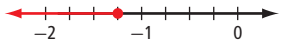


b)



c)

d)



11. Example:

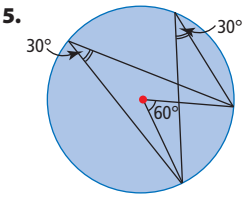
Linear Inequality	One Solution Value	One Non-solution Value
$r > -4$	3	-10
$0 \leq s \leq 7$	3.4	11
$9.5 > t$	8	22
$v \leq -\frac{5}{4}$	-2	0

12. a) $d > -3$ **b)** $5.4 < a$ **c)** $-33 \geq b$ **d)** $c < -16$
13. a) No, the solution is incorrect. The boundary value of 8 is correct but the direction is incorrect.
b) The solution is correct.
14. a) $14.5t \geq 600$ **b)** Tim must work at least 41.4 h per week to achieve his goal.
15. Danielle can buy a maximum of 13 scoops of ice cream and stay within her budget.
16. No, the solution is incorrect. The boundary value is correct but the direction is incorrect.
17. a) Yes, the solution is correct. **b)** Example: First, check that the boundary value creates an equation. Then, check a solution value in the original inequality and see if it results in a true inequality statement.
18. a) $x < 45$ **b)** $7.5 > x$ **c)** $x \geq -1$ **d)** $x < -20$
e) $1.4 \leq x$ **f)** $x < -\frac{9}{8}$
19. The maximum number of people that can attend the banquet is 64.
20. Greg would need to purchase at least 201 tracks per month to make Plan A the better option.

Chapter 10

10.1 Exploring Angles in a Circle, pages 382–385

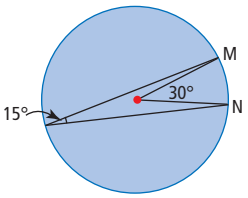
3. ADB and AEB are inscribed angles that are subtended by the same arc as the central ACB. The measure of ACB is 82°. Therefore, ADB and AEB have measures that are half the measure of ACB. Half of 82 is 41. So, the measure of ADB is 41° and the measure of AEB is 41°.
4. a) 23°. Example: The inscribed angles subtended by the same arc of a circle are equal. **b)** 46° Example: A central angle is twice the measure of an inscribed angle subtended by the same arc.
5.



6. a) 90°. Example: ∠ABD is an inscribed angle subtended by the diameter of the circle. **b)** 8 cm
7. a) 90° **b)** 11.3 cm
Example: Since △CFG is a right triangle, by the Pythagorean relationship,

$$\begin{aligned} 8^2 + 8^2 &= FG^2 \\ 64 + 64 &= FG^2 \\ 128 &= FG^2 \\ \sqrt{128} &= FG \\ 11.3 &\approx FG \end{aligned}$$

8. Example: Jacob could place his flashlight anywhere on the major arc MN.



9. Example: In the diagram, X is the ideal location.