

Examples 1-3 Solve each inequality. Then graph the solution set on a number line.

1. $x - 3 > 7$

3. $g + 6 < 2$

5. $10 > n - 1$

7. $8r + 6 < 9r$

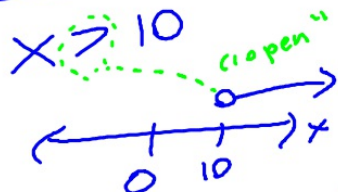
2. $5 \geq 7 + y$

4. $11 \leq p + 4$

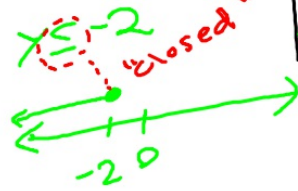
6. $k + 24 > -5$

8. $8n \geq 7n - 3$

①
$$\begin{array}{r} x - 3 > 7 \\ + 3 \quad + 3 \\ \hline \end{array}$$



②
$$\begin{array}{r} 5 \geq 7 + y \\ - 7 \quad - 7 \\ \hline - 2 \geq y \end{array}$$



③
$$\begin{array}{r} 8r + 6 < 9r \\ - 8r \quad - 8r \\ \hline 6 < r \\ r > 6 \end{array}$$

$$\begin{array}{r} 8r + 6 < 9r \\ - 6 \quad - 6 \\ \hline 8r < 9r - 6 \\ - 8r \quad - 8r \\ \hline - 6 < -r \\ \cdot \quad \cdot \\ 6 > r \end{array}$$

④
$$\begin{array}{r} 8n \geq 7n - 3 \\ - 7n \quad - 7n \\ \hline n \geq - 3 \end{array}$$

Concept Summary Phrases for Inequalities

$<$	$>$	\leq	\geq
less than fewer than	greater than more than	at most, no more than, less than or equal to	<u>at least</u> , no less than, greater than or equal to

Define a variable, write an inequality, and solve each problem. Check your solution.

9. Twice a number increased by 4 is at least 10 more than the number.

10. Three more than a number is less than twice the number.

9 $2x + 4 \geq x + 10$

30. Twice a number is more than the sum of that number and 9.

31. The sum of twice a number and 5 is at most 3 less than the number.

32. The sum of three times a number and -4 is at least twice the number plus 8.

33. Six times a number decreased by 8 is less than five times the number plus 21.

Examples 1-3 Solve each inequality. Then graph the solution set on a number line.

1. $x - 3 > 7$

3. $g + 6 < 2$

5. $10 > n - 1$

7. $8r + 6 < 9r$

2. $5 \geq 7 + y$ $-2 \geq y$

4. $11 \leq p + 4$

6. $k + 24 > -5$ $y \leq -2$

8. $8n \geq 7n - 3$

Handwritten solutions and graphs:

- For problem 1: $x - 3 > 7$ → $x > 10$. Number line graph shows an open circle at 10 and an arrow pointing to the right.
- For problem 3: $g + 6 < 2$ → $g < -4$. Number line graph shows an open circle at -4 and an arrow pointing to the left.
- For problem 5: $10 > n - 1$ → $n < 11$. Number line graph shows an open circle at 11 and an arrow pointing to the left.
- For problem 7: $8r + 6 < 9r$ → $6 < r$ → $r > 6$. Number line graph shows an open circle at 6 and an arrow pointing to the right.
- For problem 2: $5 \geq 7 + y$ → $-2 \geq y$ → $y \leq -2$. Number line graph shows a closed circle at -2 and an arrow pointing to the left.
- For problem 4: $11 \leq p + 4$ → $7 \leq p$ → $p \geq 7$. Number line graph shows a closed circle at 7 and an arrow pointing to the right.
- For problem 6: $k + 24 > -5$ → $k > -29$. Number line graph shows an open circle at -29 and an arrow pointing to the right.
- For problem 8: $8n \geq 7n - 3$ → $n \geq -3$. Number line graph shows a closed circle at -3 and an arrow pointing to the right.

Solve each inequality. Then graph the solution set on a number line.

12. $m - 4 < 3$

15. $t - 3 > -8$

18. $5 + c \leq 1$

21. $h - 26 < 4$

24. $2a \leq -4 + a$

27. $3y + 6 \leq 2y$

13. $p - 6 \geq 3$

16. $b + 2 \geq 4$

19. $-23 \geq q - 30$

22. $8 \leq r - 14$

25. $z + 4 \geq 2z$

28. $6x + 5 \geq 7x$

14. $r - 8 \leq 7$

17. $13 > 18 + r$

20. $11 + m \geq 15$

23. $-7 > 20 + c$

26. $w - 5 \leq 2w$

29. $-9 + 2a < 3a$



Check Your Understanding



= Step-by-Step Solutions begin on page R13.



Examples 1–3 Solve each inequality. Then graph the solution set on a number line. **1–8. See margin.**

1. $x - 3 > 7$

2. $5 \geq 7 + y$

3. $g + 6 < 2$

4. $11 \leq p + 4$

5. $10 > n - 1$

6. $k + 24 > -5$

7. $8r + 6 < 9r$

8. $8n \geq 7n - 3$

10. Sample answer:

Let $n =$ the number, $3 + n < 2n$; $\{n \mid n > 3\}$.

$-7n -7n \} n \geq -3$

Example 4 Define a variable, write an inequality, and solve each problem. Check your solution.

9. Twice a number increased by 4 is at least 10 more than the number.

Sample answer: Let $n =$

10. Three more than a number is less than twice the number.

the number, $2n + 4 \geq$

$n + 10$; $\{n \mid n \geq 6\}$.

11. **AMUSEMENT** A thrill ride swings passengers back and forth, a little higher each time up to 137 feet. Suppose the height of the swing after 30 seconds is 45 feet. How much higher will the ride swing? **no more than 92 ft**

$-2 \geq y$
 $y \leq -2$

Practice and Problem Solving

Extra Practice is on page R5.

12–29. See Ch. 5 Answer Appendix.

Examples 1–3 Solve each inequality. Then graph the solution set on a number line.

12. $m - 4 < 3$

15. $t - 3 > -8$

18. $5 + c \leq 1$

21. $h - 26 < 4$

24. $2a \leq -4 + a$

27. $3y + 6 \leq 2y$

13. $p - 6 \geq 3$

16. $b + 2 \geq 4$

19. $-23 \geq q - 30$

22. $8 \leq r - 14$

25. $z + 4 \geq 2z$

28. $6x + 5 \geq 7x$

14. $r - 8 \leq 7$

17. $13 > 18 + r$

20. $11 + m \geq 15$

23. $-7 > 20 + c$

26. $w - 5 \leq 2w$

29. $-9 + 2a < 3a$

34. Sample answer: Let b = the amount of money that Keisha still needs;
 $b + 1300 \geq 5440$;
($b \mid b \geq 4140$);
Keisha needs to earn at least \$4140.

Example 4 Define a variable, write an inequality, and solve each problem. Check your solution.

30. Twice a number is more than the sum of that number and 9.

Let n = the number, $2n > n + 9$; ($n \mid n > 9$).

31. The sum of twice a number and 5 is at most 3 less than the number.

Let n = the number, $2n + 5 \leq n - 3$; ($n \mid n \leq -8$).

32. The sum of three times a number and -4 is at least twice the number plus 8.

Let n = the number, $3n + (-4) \geq 2n + 8$; ($n \mid n \geq 12$).

33. Six times a number decreased by 8 is less than five times the number plus 21.

Let n = the number, $6n - 8 < 5n + 21$; ($n \mid n < 29$).

30–33. Sample answers given.