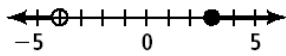


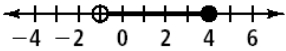
3-6 Reteaching

Compound Inequalities

A compound inequality with the word *or* means one or both inequalities must be true. The graph of the compound inequality $a < -4$ or $a \geq 3$ is shown below.



A compound inequality with the word *and* means both inequalities must be true. The graph of the compound inequality $b \leq 4$ and $b > -1$ is shown below.



To solve a compound inequality, solve the simple inequalities from which it is made.

Problem

What are the solutions of $17 \leq 2x + 7 \leq 29$? Graph the solutions.

$17 \leq 2x + 7 \leq 29$ is the same as $17 \leq 2x + 7$ and $2x + 7 \leq 29$. You can solve it as two inequalities.

$$17 \leq 2x + 7 \quad \text{and} \quad 2x + 7 \leq 29$$

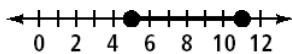
$$17 - 7 \leq 2x + 7 - 7 \quad \text{and} \quad 2x + 7 - 7 \leq 29 - 7$$

$$10 \leq 2x \quad \text{and} \quad 2x \leq 22$$

$$\frac{10}{2} \leq \frac{2x}{2} \quad \text{and} \quad \frac{2x}{2} \leq \frac{22}{2}$$

$$5 \leq x \quad \text{and} \quad x \leq 11$$

To graph the compound inequality, place closed circles at 5 and 11. Shade between the two circles.



Problem

What are the solutions of $3t - 5 < -8$ or $2t + 5 > 17$? Graph the solutions.

Solve each inequality.

$$3t - 5 < -8 \quad \text{or} \quad 2t + 5 > 17$$

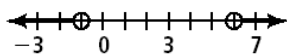
$$3t - 5 + 5 < -8 + 5 \quad \text{or} \quad 2t + 5 - 5 > 17 - 5$$

$$3t < -3 \quad \text{or} \quad 2t > 12$$

$$\frac{3t}{3} < \frac{-3}{3} \quad \text{or} \quad \frac{2t}{2} > \frac{12}{2}$$

$$t < -1 \quad \text{or} \quad t > 6$$

To graph the compound inequality, place open circles at -1 and at 6 . Shade to the left of -1 and to the right of 6 .



Exercises

Solve each compound inequality. Graph the solutions.

1. $h - 7 \geq -5$ and $h + 4 < 10$

2. $r - 2 \leq -1$ or $r - 3 > 2$

3. $-7 < w - 4 < 2$

4. $-2 \leq \frac{y}{2} \leq 1$

5. $5p + 3 \leq -2$ or $3p - 6 \geq 3$

6. $-2n - 5 \geq 1$ or $5n + 7 > 2$

7. $\frac{3}{4}a - 6 < 0$ and $\frac{2}{3}a + 4 > 2$

8. $-4 \leq 4d + 24 \leq 4$

9. $5m - 2 < 8$ or $6m - 2 > 6 + 5m$

10. $\frac{w}{2} + 1 \geq 2$ and $w - 5 \leq 1$

Write a compound inequality for each situation. Graph your solution.

11. Water will not be in liquid form when it is colder than 32°F or warmer than 212°F .

12. The width of a parking space needs to be at least 8 feet and no more than 11 feet.

13. A car salesman has been told to sell a particular car for more than \$14,500 and up to the sticker price of \$15,755.