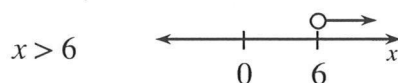### GRAPHING INEQUALITIES

The solutions to an equation can be represented as a point (or points) on the number line. If the expression comparison mat has a range of solutions, the solution is expressed as an inequality represented by a ray or segment with solid or open endpoints. Solid endpoints indicate that the endpoint is included in the solution ($\leq$ or $\geq$), while the open dot indicates that it is not part of the solution ($<$ or $>$).
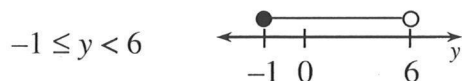
Example 1

$x > 6$

Example 2

$x \leq -1$

Example 3

$-1 \leq y < 6$

Example 4

$y \geq -2$

Problems

Graph each inequality on a number line.

1. $m < 2$
2. $x \leq -1$
3. $y \geq 3$

4. $-1 \leq x \leq 3$
5. $-6 < x < -2$
6. $-1 < x \leq 2$

7. $m > -9$
8. $x \neq 1$
9. $x \leq 3$

Answers

1.

2.

3.

4.

5.

6.

7.

8.

9.

          Core Connections, Course 2

SOLVING INEQUALITIES

To solve an inequality, examine both of the expressions on an expression comparison mat. Use the result as a dividing point on the number line. Then test a value from each side of the dividing point on the number line in the inequality. If the test number is true, then that part of the number line is part of the solution. In addition, if the inequality is ≥ or ≤, then the dividing point is part of the solution and is indicated by a solid dot. If the inequality is > or <, then the dividing point is not part of the solution, indicated by an open dot.
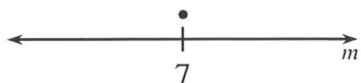
For additional information, see the Math Notes box in Lesson 6.1.4 of the *Core Connections, Course 2* text.
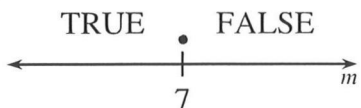
Example 1

$9 \geq m + 2$

Solve the equation: $\quad 9 = m + 2$
$$7 = m$$

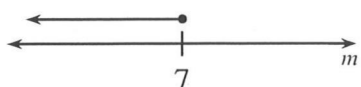Draw a number line. Put a solid dot at 7.

7

Test a number on each side of 7 in the original inequality. We use 10 and 0.

TRUE   FALSE

7

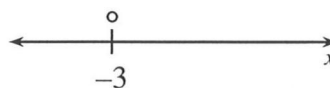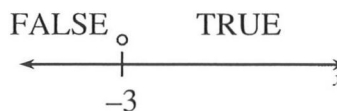| $m = 0$	$m = 10$
$9 > 0 + 2$	$9 > 10 + 2$
$9 > 2$	$9 > 12$
TRUE	FALSE

The solution is $m \leq 7$.

7

Example 2

$-2x - 3 < x + 6$

Solve the equation: $\quad -2x - 3 = x + 6$
$$-2x = x + 9$$
$$-3x = 9$$
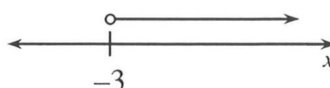$$x = -3$$

Draw a number line. Put an open dot at –3.

–3

Test 0 and –4 in the original inequality.

FALSE   TRUE

–3

$x = -4$	$x = 0$
$-2(-4) - 3 < -4 + 6$	$-2(0) - 3 < 0 + 6$
$8 - 3 < 2$	$-3 < 6$
$5 < 2$	TRUE
FALSE	

The solution is $x > -3$.

–3

Problems

Solve each inequality.

1. $x + 3 > -1$ 2. $y - 3 \leq 5$ 3. $-3x \leq -6$

4. $2m + 1 \geq -7$ 5. $-7 < -2y + 3$ 6. $8 \geq -2m + 2$

7. $2x - 1 < -x + 8$ 8. $2(m + 1) \geq m - 3$ 9. $3m + 1 \leq m + 7$

Answers

1. $x > -4$ 2. $y \leq 8$ 3. $x \geq 2$ 4. $m \geq -4$ 5. $y < 5$

6. $m \geq -3$ 7. $x < 3$ 8. $m \geq -5$ 9. $m \leq 3$

 Core Connections, Course 2