

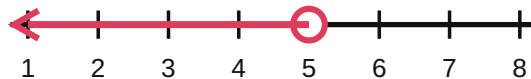
Boost Free Lessons - Year 10 Maths

Lesson 1: Linear Inequalities

Name: _____ Grade: _____ Date: _____

Worked Example 1

Solve $3x + 5 < 20$ and graph the solution.



1. Solve it exactly like an equation. Subtract 5 from both sides: $3x < 15$.
2. Divide both sides by 3: $x < 5$.
3. On the number line use an **open** circle at 5, because 5 itself is not included.
4. The arrow points left, because every value less than 5 works.

$x < 5$

Worked Example 2

Solve $-2x + 7 \geq 15$

1. Subtract 7 from both sides: $-2x \geq 8$.
2. Now divide both sides by -2 .
3. Whenever you multiply or divide by a **negative**, the inequality sign flips over.
4. So $\geq$ becomes $\leq$, giving $x \leq -4$.

$x \leq -4$

Remember: Solve an inequality exactly like an equation, but flip the sign whenever you multiply or divide by a negative. Use an open circle for $<$ and $>$, and a closed circle for $\leq$ and $\geq$.



Question 1: Solve the following inequalities.

1. $x + 4 > 9$

2. $y - 3 < 7$

3. $2a \geq 12$

4. $5k \leq 35$

5. $3n + 2 > 11$

6. $4p - 5 < 15$

7. $\frac{x}{2} \geq 6$

8. $6t + 9 \leq 33$

9. $7w - 14 > 0$

10. $2c + 13 < 5$



Question 2: Solve the following inequalities.

1. $-x > 3$

2. $-2y \leq 10$

3. $-3a + 1 < 10$

4. $5 - x \geq 2$

5. $-4k > -20$

6. $8 - 2p \leq 0$

7. $-\frac{t}{3} < 2$

8. $3 - 5w \geq 18$



Question 3: Answer the following questions.

1. A taxi charges \$4 plus \$2 per kilometre and you have at most \$30. Write an inequality and find the greatest distance you can travel.
2. Solve $2(x - 3) < 8$.
3. Five times a number, less 8, is at most 27. Write an inequality and solve it.
4. Explain why the inequality sign flips when you divide by a negative. Use $-2 < 4$ as your example.
5. Solve $3(2x + 1) \geq 4x + 11$.





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Answers: Linear Inequalities**Question 1**

- | | |
|---------------|----------------|
| 1. $x > 5$ | 6. $p < 5$ |
| 2. $y < 10$ | 7. $x \geq 12$ |
| 3. $a \geq 6$ | 8. $t \leq 4$ |
| 4. $k \leq 7$ | 9. $w > 2$ |
| 5. $n > 3$ | 10. $c < -4$ |

Question 2

- | | |
|----------------|----------------|
| 1. $x < -3$ | 5. $k < 5$ |
| 2. $y \geq -5$ | 6. $p \geq 4$ |
| 3. $a > -3$ | 7. $t > -6$ |
| 4. $x \leq 3$ | 8. $w \leq -3$ |

Question 3

1. $4 + 2k \leq 30$, so $k \leq 13$ km
2. $x < 7$
3. $5n - 8 \leq 27$, so $n \leq 7$
4. Dividing $-2 < 4$ by -2 gives 1 and -2 . Since $1 > -2$, the sign must reverse.
5. $x \geq 4$

