

CHAPTER
2Linear
Inequalities

1) Inequality Signs

	greater than
	less than
	greater than or equal to
	less than or equal to

2) When to flip the inequality sign

a) **Do not flip** when you do the following on both sides of an inequality

_____ a number	_____ a number
Eg: $x > y$ $x+3 \square y+3$	Eg: $a \leq b$ $a-8 \square b-8$
_____ by a _____ number	_____ by a _____ number
Eg: $x \geq y$ $3x \square 3y$	Eg: $a < b$ $\frac{a}{2} \square \frac{b}{2}$

b) **Flip** when you do the following on both sides of an inequality

Multiply by a negative number	Divide by a negative number
Eg: $x > y$ $-2x \square -2y$	Eg: $a \leq b$ $\frac{a}{-5} \square \frac{b}{-5}$
_____ the position of left-hand side and right-hand side	
Eg: $\frac{1}{3} \geq x$ $x \square \frac{1}{3}$	

2) Solving linear inequality

- Solve means to find the _____ that make the inequality true.
- Method: ✓ Make _____ alone on the _____
✓ Leave final answer in _____

a) Without fractions

$$\text{Eg: } -7y + 8 \leq -2(y-6)$$

$$\text{Eg: } 18 > 6f + 10(f-1)$$

b) With fractions

(i) No cross multiply	(ii) Cross multiply (Top left stays _____!)
$\text{Eg: } \frac{x}{2} > -\frac{1}{6}$	$\frac{x}{2} > \frac{-1}{6}$ The denominators are positive, so the inequality sign does not flip when we cross multiply $\frac{x}{2} > \frac{1}{-6}$ The negative sign at the denominator will cause the inequality sign to flip when we cross multiply.

$$\text{Eg: (a) } 4 - \frac{3}{4}(x-3) > -\frac{1}{2}$$

$$\text{Eg: (a) } \frac{2(3m-7)}{-5} \leq 9$$

(b) Hence, write down the largest value of x if x is a perfect cube.

(b) Using your solution in (a), find the smallest integer value of m .

3) Representing solution on a number line

use	for	<	and	>
use	for	$\leq$	and	$\geq$

Solve the following inequalities and represent each solution on a number line.

Eg 1: $-2x + 8 < 7$	Eg 2: $3(e - 8) \geq -2e + \frac{1}{3}$
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4) Word problem involving inequality

- Always _____ if it is not given.

Eg: Let the _____ has be _____.

- Identify _____ to determine the _____.

- Check that your answer makes sense and fits the context of the question.

Eg: Number of items must be a _____.

Common Keywords :

At most / budget	
At least	

Eg: A coach bought some basketballs at \$18 each and some soccer balls at \$16 each.

He bought a total of 20 balls and the cost of basketballs was at least \$40 more than the cost of soccer balls. Form an inequality and find the minimum number of basketballs bought.