An inequality says that two values are not equal.

a ≠ b says that a is not equal to b

There are other special symbols that show in *what way* things are not equal.

a < b says that a is less than b
a > b says that a is greater than b
(those two are known as strict inequality)

a ≤ b means that a is less than or equal to b
a ≥ b means that a is greater than or equal to b.

An *inequality* is like an equation that uses symbols for "less than"(<) and "greater than"(>) where an equation uses a symbol for "is equal to" (=).
So where the equation:

X = Y + 5 says that "X is equal to Y plus 5",

X < Y + 5 says that "X is less than Y plus 5", and

X > Y + 5 says that "X is greater than Y plus 5".

Now problem :

Substitute the ? in the following expression for the correct inequality symbol:

5 ? 4 Ans- >

Symbol Words Example

> greater than x + 9 >2

< smaller than 5x + 4 < 3

**≥ Greater than equal to 5 ≥ x – 7**

**≤ Less than equal to 3x -7≤34**

Many simple inequalities can be solved by adding, subtracting, multiplying or dividing both sides.

But these things will change direction of the inequality:

 Multiplying or dividing both sides by a negative number.

Swapping left and right hand side.

Example: x + 62 > 126

Ans- Subtract 62 in left hand side and right hand side

Hence x + 62 – 62 > 126 – 62

* X > 64(solved)

Adding (or subtracting) a number in both sides and Multipling (or dividing) both sides by a **positive** number

Example: 13x < 7+32

* 13x < 39(Adding in right)
* X < 3(Dividing 13 in both sides)
* Important-When we multiply or divide by a **negative number**we must **reverse** the inequality.
* Example- 6 > 4 but -6< -4

Solve- -5x < -55

* 5x > 55(multiplying (-) in LHS and RHS equality changes)
* X > 11(Dividing 5 in both the sides)

**Solve:**$\frac{x-15}{4}$**< −6**

* $\frac{x-15}{4}$$×$ **4 < -6** $×4$
* $x-15< -24$
* **x-15+15 < -24 + 15**
* **x < -9(Solved)**

**Sample questions in Inequalities, Some questions have included Some questions that are repeatedly asked in competitive examinations.**

1. **Statements:**

**P < Q ≤ S = T, R = Q < U, V > U**

**Conclusions:**

**I. P > U**
**II. V > T**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans-4 : if neither conclusion I nor conclusion II follows.**

1. **Statements :**

**U ≥ X = Y, Y ≤ Z ≤ S, T = W > Z**

**Conclusions:**

**I. T ≤ U**
**II. S > U**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans-4 : if neither conclusion I nor conclusion II follows.**

1. **Statements :**

**A ≥ P = S > T, V < B = T ≥ X**

**Conclusions:**

**I. A > X**
**II. P < B**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans. 1 : if only conclusion I follows.**

1. **Statements :**

**S > U > V, Y < U < Z, Z < X > W**

**Conclusions:**

* 1. **S < Z**
	2. **X > Y**
	1 : if only conclusion I follows.
	2 : if only conclusion II follows.
	3 : if either conclusion I or conclusion II follows.
	4 : if neither conclusion I nor conclusion II follows.
	5 : if both conclusions I and II follow.

**Answer 2 : if only conclusion II follows.**

1. **Statements :**

**P < X ≤ Y < Q, S > Y < T, P = V > R**

**Conclusions:**

**I. V < S II. T > R**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans-5 : if both conclusions I and II follow.**

1. **Statements :**

**B ≥ C = D ≥ E ; A ≤ F ≤ P = D**

**Conclusions :**

**I. D ≥ A**
**II. B ≥ F**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans-5 : if both conclusions I and II follow.**

1. **Statements :**

**P = S < T ≤ U ; Q ≤ U = A ≥ B**

**Conclusions :**

**I. Q = B**
**II. S ≤ A**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans-4 : if neither conclusion I nor conclusion II follows.**

1. **Statements :**

**A ≥ C > B > D; P < F ≥ C > E**

**Conclusions :**

**I. A ≥ E**
**II. F > D**
1 : if only conclusion I follows.
2 : if only conclusion II follows.
3 : if either conclusion I or conclusion II follows.
4 : if neither conclusion I nor conclusion II follows.
5 : if both conclusions I and II follow.

**Ans-2 : if only conclusion II follows.**

1. **Statements :**

**M = N ≤ O ≤ R; P < O ≤ S < T**

**Conclusions :**

* 1. **N = S**
	2. **N < S**
	1 : if only conclusion I follows.
	2 : if only conclusion II follows.
	3 : if either conclusion I or conclusion II follows.
	4 : if neither conclusion I nor conclusion II follows.
	5 : if both conclusions I and II follow.

**Ans 3 : if either conclusion I or conclusion II follows.**

1. **Statements :**

**J ≤ K = M, N ≥ P > K, Q > N = R**

**Conclusions :**

* 1. **R > J**
	2. **Q ≥ M**
	1 : if only conclusion I follows.
	2 : if only conclusion II follows.
	3 : if either conclusion I or conclusion II follows.
	4 : if neither conclusion I nor conclusion II follows.
	5 : if both conclusions I and II follow

**Ans : if only conclusion I follows.**