

Answer on Question #45410 – Math - Algebra

Solve for b: $\frac{8}{33} > \frac{8b}{143}$.

Solution:

In the given task we deal with an inequality. Start the explanation from the definition of inequalities.

Inequalities are mathematical expressions involving the symbols $>$, $<$, \geq and \leq . To solve an inequality means to find a range, or ranges, of values that an unknown x or other unknown variable can take and still satisfy the inequality. Inequalities can be mapped on a number line or a coordinate plane.

For convenience, we change the left and right side of the inequality without changing the mathematical meaning.

$$\frac{8b}{143} < \frac{8}{33}$$

To simplify our inequality, we multiply the left and right sides by 143 and 33. We obtained the following result.

$$\frac{143 \cdot 33 \cdot 8b}{143} < \frac{143 \cdot 33 \cdot 8}{33}$$
$$33 \cdot 8b < 143 \cdot 8$$

Simplify the obtained expression.

$$264b < 1144$$

Divide both sides by 264. When we divide by a positive number, then the sign of the inequality does not flip. So we can write the following.

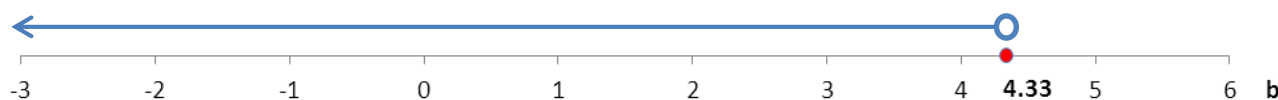
$$\frac{264b}{264} < \frac{1144}{264}$$

Simplify the obtained inequality. Then we reduce the right side of each term of inequality by 88.

$$b < \frac{13}{3} \text{ or } b < 4\frac{1}{3}$$

Since, according to the condition of the problem, we have a sign $<$ the Interval of solution will be open and we noted indicate range of values in round parentheses.

We represent the obtained solution on the coordinate line.



It should be noted that we can check the solution obtained, for example, take the value of $b=3$ found on the coordinate axis in the specified range of values.

This value satisfies a predetermined range of values. Substitute the value of $b=3$ into the original inequality.

$$\frac{8 \cdot (3)}{143} < \frac{8}{33}$$

Simplify by multiplying.

$$\frac{24}{143} < \frac{8}{33}$$

$$0.168 < 0.242$$

As a result of calculations, we have determined that the taken value of b satisfies the find range of values according to the condition of the initial inequality.

The solution set is $b \in (-\infty, 4.33)$ or $(-\infty, 4\frac{1}{3})$.

Answer: The solution set is $b \in (-\infty, 4.33)$ or $(-\infty, 4\frac{1}{3})$.