

Questions

1. Replace the ? with either $<$ or $>$ in $-3? - 6$.
2. Replace the ? with either $<$ or $>$ in $-\frac{5}{8}? - \frac{3}{5}$.
3. Graph the inequality on a number line $x \leq -5.3$.
4. Graph the inequality on a number line $x > -3.5$.
5. Translate the graph to an inequality:



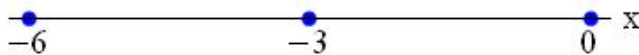
6. Suppose that the variable x must satisfy all of these conditions: $x \leq 2$, $x > -3$, $x < \frac{5}{2}$, $x \geq -\frac{5}{2}$.

Graph on a number line the region that satisfies all these conditions.

7. Solve and graph the result $-4 + 5x < -3x + 8$.
8. Solve and graph the result $\frac{5x}{6} - 5 > \frac{x}{6} - 9$.
9. To pass a course with a B grade, a student must have an average of 80 or greater. A student's grade on three tests are 75, 83, and 86. Solve the inequality $\frac{75 + 83 + 86 + x}{4} \geq 80$ to find out what score the student must get on the final test to get a B average or better.
10. A computer hard drive is typically rated to work for temperatures between 30C and 50C. Write this condition as an inequality using both interval notation and set notation. Then, using the fact that $T_C = \frac{5}{9}(T_F - 32)$, find the temperature range the drive will work under in degrees Fahrenheit.

Solutions

1. $-3 > -6$



2. To compare fractions, we need a common denominator. The common denominator is 40.

$$-\frac{5}{8} = -\frac{25}{40}$$

$$-\frac{3}{5} = -\frac{24}{40}$$



So we see $-\frac{5}{8} < -\frac{3}{5}$

3.

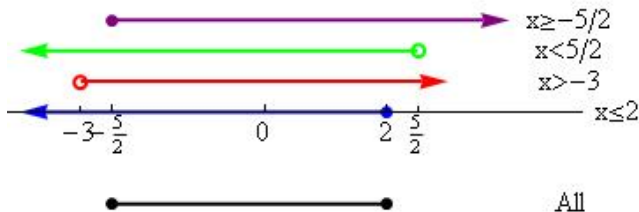


4.



5. $x \leq 35$.

6. The best way to solve this is to stack the graphs of the inequalities and identify the region of overlap. From the sketch below we see that all the inequalities are satisfied if $-\frac{5}{2} \leq x \leq 2$.



7.

$$-4 + 5x < -3x + 8 \text{ add 4 to each side}$$

$$-4 + 5x + 4 < -3x + 8 + 4 \text{ simplify}$$

$$5x + 3x < -3x + 12 + 3x \text{ add } 3x \text{ to each side}$$

$$8x < 12 \text{ simplify}$$

$$8x < 12 \text{ multiply both sides by } 1/8, \text{ direction does not change since we multiplied by positive number}$$

$$x < \frac{12}{8}$$

$$x < \frac{3}{2}$$



8.

$$\frac{5x}{6} - 5 > \frac{x}{6} - 9$$

$$\frac{5x}{6} - 5 + 9 - \frac{5x}{6} > \frac{x}{6} - 9 + 9 - \frac{5x}{6}$$

$$4 > \frac{x - 5x}{6}$$

$$4 > \frac{-2x}{3}$$

$$\frac{-3}{2} \cdot 4 < \frac{-3}{2} \cdot \frac{-2x}{3} \text{ since we are multiplying by a negative number, change direction of inequality.}$$

$$-6 < x$$



9.

$$\frac{75 + 83 + 86 + x}{4} \geq 80$$

$$244 + x \geq 320$$

$$x \geq 320 - 244$$

$$x \geq 76$$

10. Interval notation: $30 \leq T_C \leq 50$. Set notation: $T_C \in [30, 50]$. Note: \in can be read as “is a member of the following set”.

$$30 \leq T_C \leq 50$$

$$30 \leq \frac{5}{9}(T_F - 32) \leq 50$$

$$\frac{9}{5} \cdot 30 \leq \frac{9}{5} \cdot \frac{5}{9}(T_F - 32) \leq \frac{9}{5} \cdot 50$$

$$54 \leq T_F - 32 \leq 90$$

$$54 + 32 \leq T_F - 32 + 32 \leq 90 + 32$$

$$86 \leq T_F \leq 122$$

It is safe to operate your hard drive between temperatures of 86F and 122F.