

**OBJECTIVE 3:** Solving Compound Inequalities

Inequalities containing one inequality symbol are called simple inequalities, while inequalities containing two inequality symbols are called compound inequalities.

$3 < x < 5$  means  $3 < x$  AND  $x < 5$   
 Greater ( $> \geq$ ) means or      Less Than ( $< \leq$ ) means AND

**Task 1:** Graph the solution and write your answer in interval notation.

a)  $2 < x \leq 4$

$(2, 4]$



b)  $-3 \leq x < 1$

$[-3, 1)$



**Task 2:** Solve the solution and write your answer in interval notation.

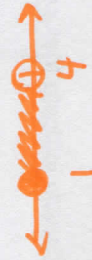
Remember that compound inequalities get separated into two different equations, similar to absolute value.

a)  $-1 \leq 2x - 3 < 5$

$-1 \leq 2x - 3$        $2x - 3 < 5$   
 $2 \leq 2x$              $2x < 8$   
 $1 \leq x$                  $x < 4$

$1 \leq x < 4$

$[1, 4)$



b)  $-4 < 3x + 2 \leq 8$

$-4 < 3x + 2$        $3x + 2 \leq 8$   
 $-6 < 3x$              $3x \leq 6$   
 $-2 < x$                  $x \leq 2$

$-2 < x \leq 2$

$(-2, 2]$

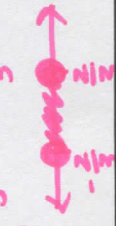


c)  $3 \leq \frac{3x}{2} + 4 \leq 5$

$3 \leq \frac{3x}{2} + 4$        $\frac{3x}{2} + 4 \leq 5$   
 $-1 \leq \frac{3x}{2}$              $\frac{3x}{2} \leq 1$   
 $-2 \leq 3x$              $3x \leq 2$   
 $-\frac{2}{3} \leq x$              $x \leq \frac{2}{3}$

$-\frac{2}{3} \leq x \leq \frac{2}{3}$

$[-\frac{2}{3}, \frac{2}{3}]$

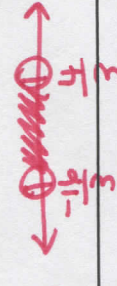


d)  $1 < \frac{3}{4}x + 5 < 6$

$1 < \frac{3}{4}x + 5$        $\frac{3}{4}x + 5 < 6$   
 $-4 < \frac{3}{4}x$              $\frac{3}{4}x < 1$   
 $-16 < 3x$              $3x < 4$   
 $-\frac{16}{3} < x$              $x < \frac{4}{3}$

$-\frac{16}{3} < x < \frac{4}{3}$

$(-\frac{16}{3}, \frac{4}{3})$



### OBJECTIVE 4: Solving Inequality Applications

Problems that contain words such as:

At least, At most, Between, No more than, No less than

Usually indicate that an inequality should be used to solve instead of an =.


Some Inequality Translations			
$\geq$	$\leq$	$<$	$>$
At least	At most	Is less than	Is greater than
No less than	No more than		

**Task 3:** Translate and solve the inequality. Then graph your solution and write your answer in interval notation.

- a) Twelve subtracted from three times a number is less than twenty-one. Find all numbers that make this statement true.

$$3x - 12 < 21$$
$$3x < 33$$
$$x < 11 \rightarrow (-\infty, 11)$$


- b) Twice a number, subtracted from thirty-five, is greater than fifteen. Find all numbers that make this true.

$$35 - 2x > 15$$
$$-2x > -20$$
$$x < 10 \rightarrow (-\infty, 10)$$


**Task 4:** Staying within Budget

- a) Marie Chase and Jonathan Edwards are having their wedding reception at the Gallery Reception Hall. They may spend at most \$2,000 for the reception. If the reception hall charges a \$100 cleanup fee plus \$36 per person, find the greatest number of people that they can invite and still stay within their budget.

$$100 + 36x \leq 2000$$
$$36x \leq 1900$$
$$x \leq 52.778$$
$$x \leq 52 \text{ people}$$

- b) Kasonga is eager to begin his education at his local community college. He has budgeted \$1,500 for college this semester. His local college charges a \$300 matriculation fee and costs an average of \$375 for tuition, fees, and books for each three-credit course. Find the greatest number of classes Kasonga can afford to take this semester.

$$300 + 375x \leq 1500$$
$$375x \leq 1200$$
$$x \leq 3.2$$
$$x \leq 3 \text{ classes}$$

Still need help with: