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**CRMA 0372**
**College Readiness Algebra II**
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## Linear Inequalities in One Variables
(or first degree)

$<$ less than

$\leq$ less than or equal to

$>$ greater than

$\geq$ greater than or equal to

$Ax + B < C$

where $A, B$ & $C$ are real numbers with $A \neq 0$

$x < 5$



interval notation
$(-\infty, 5)$

- ○ same as parentheses
- ● same as bracket

$x \leq 5$



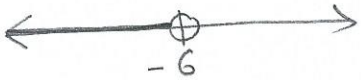
$(-\infty, 5]$

### Addition Property of Inequalities

If $A, B$ and $C$ are real numbers,
then the inequalities
$A < B$ and $A + C < B + C$ are equivalent

$x - 3 < -9$
$+3 \quad +3$

$x < -6$




$(-\infty, -6)$

check
$-7 - 3 < -9$
$-10 < -9$
true

## Multiplication property of Inequality

If $A, B$ and $C$ are real numbers with $C \neq 0$, then the inequalities

$A < B$ and $AC < BC$

are equivalent if $C > 0$

$A < B$ and $AC > BC$

are equivalent if $C < 0$

$3 < 4$

$(-1)(3) \quad 4(-1)$

$-3 > -4$

$\frac{5}{5}x \leq \frac{-10}{5}$

$x \leq -2$


interval notation : $(-\infty, -2]$

flip

$\frac{-9}{-9}x \; \textcircled{<} \; \frac{-81}{-9}$

$x > 9$

interval notation : $(9, \infty)$

Five times $x$ is greater than or equal to $-23$.

$5x \geq -23$

To solve: $\frac{5x}{5} \geq \frac{-23}{5}$

$x \geq \frac{-23}{5}$

The difference of twice a number and 6 is greater than $-27$

$2n - 6 > -27$

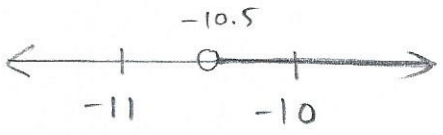
To solve: $2n - 6 > -27$

$+6 \quad +6$

$\frac{2n}{2} > \frac{-21}{2}$

$n > -\frac{21}{2}$

$n > -10.5$




$(-10.5, \infty)$

Compound inequality (or 3-part inequality)

$3 < x \leq 8$

$3 < x$

$x > 3$

Read as:

$x > 3$ and $x \leq 8$

$x > 3$ and $x \leq 8$


simple way to write $(3,8]$

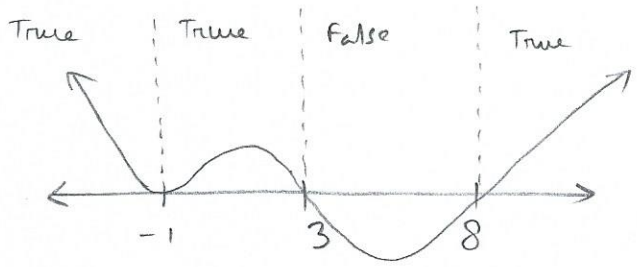
For pre-cal

$(x+1)^2(x-3)(x-8) \geq 0$

Boundary points

$x=-1$ $x=3$ $x=8$

$x=-1$ Bounces




Test $x=-2$

$(+)(-)(-) \geq 0$

$+ \geq 0$

True

Test $x=0$

$(+)(-)(-) \geq 0$

$+ \geq 0$

True

Test $x=4$

$(+)(+)(-) \geq 0$

$- \geq 0$

False

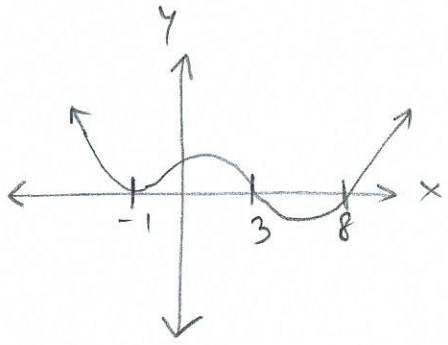
Test $x=9$

$(+)(+)(+) \geq 0$

$+ \geq 0$

True

Solution: $(-\infty, 3] \cup [8, \infty)$



Graph

$x < 6$ and $x > -1$

$(-1, 6)$


Solve the compound inequality:

$3x + 4 \geq -14$ and $2x + 3 \leq 7$

$-4 \quad -4$ $\quad -3 \quad -3$

$\frac{3x}{3} \geq \frac{-18}{3}$ $\quad \frac{2x}{2} \leq \frac{4}{2}$

$x \geq -6$ $\quad x \leq 2$


$[-6, 2]$