Algebra 1
5.2 Solve inequalities

Solve inequalities by multiplication and division
Write and solve inequalities

opposite
trichotomy

$$-3 \cdot 3 > 1 \cdot 3$$
$$-9 \not< -3$$

$$2 \cdot 3 > 1 \cdot 2$$
$$6 > 2 \quad T$$

activity: triangle puzzles

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These examples demonstrate the Multiplication Property of Inequalities.

KeyConcept Multiplication Property of Inequalities

Words	Symbols	Examples
If both sides of an inequality that is true are multiplied by a positive number, the resulting inequality is also true.	For any real numbers a and b and any positive real number c, if $a > b$, then $ac > bc$. And, if $a < b$, then $ac < bc$.	$6 > 3.5$ $6(2) > 3.5(2)$ $12 > 7$ and $2.1 < 5$ $2.1(0.5) < 5(0.5)$ $1.05 < 2.5$
If both sides of an inequality that is true are multiplied by a negative number, the direction of the inequality sign is reversed to make the resulting inequality also true.	For any real numbers a and b and any negative real number c, if $a > b$, then $ac < bc$. And, if $a < b$, then $ac > bc$.	$7 > 4.5$ $7(-3) < 4.5(-3)$ $-21 < -13.5$ and $3.1 < 5.2$ $3.1(-4) > 5.2(-4)$ $-12.4 > -20.8$

3A. $\dfrac{8p}{8} \leq \dfrac{58}{8}$

$$p \leq 7.25$$

3B. $\dfrac{-42}{6} \geq \dfrac{6r}{6}$

$$^-7 \geq r$$

3C. $-12h > 15$

$$\frac{-12h}{-12} \; \frac{15}{-12}$$

$1h < -1.25$

3D. $-\frac{3}{1} \quad -\frac{1}{2}n \leq 6 \cdot \frac{-2}{7}$

$\frac{-2}{-2}$

$1n \geq -12$

Triangle puzzle

Three options:

$\leq$

Word problems:
"at most"
"at least"
"not more than"
"no less than"

$\geq$

$\leq$

$\geq$

$< \cancel{>} \stackrel{=}{}$

$\cancel{>} > =$

$< \cancel{>} =$

$\cancel{>} > =$

$D = J$ $D > J$ $D < J$

$12 < 15$

$\cancel{*} >=$

Three times a number is (at least) 108.

$\dfrac{3n}{3} \geq \dfrac{108}{3}$ $n \geq 6$

$< > =$

The opposite of four times a number is less than 16.

$\dfrac{-4n}{-4} < \dfrac{16}{-4}$ $n > -4$

$< \cancel{*} =$

Negative 3 times a number is (at most) 99.

$\dfrac{-3n}{-3} \left(\leq\right) \dfrac{99}{-3}$

$n \geq -33$