Properties of Inequality Handout

Inequality Symbols :

> **Greater Than**

≥ **Greater Than or Equal To**

(The line underneath the Greater Than sign

indicates also Equal To.)

< **Less Than**

≤ **Less Than or Equal To**

(The line underneath the Less Than sign

indicates also Equal To.)

Graphing Inequality Symbols :

○——▶ **Greater Than**

(The open circle indicates that this is

NOT EQUAL TO the number that is graphed.)

●——▶ **Greater Than or Equal To**

(The closed circle indicates that this is

EQUAL TO the number that is graphed.)

◀——○ **Less Than**

(The open circle indicates that this is

NOT EQUAL TO the number that is graphed.)

◀——● **Less Than or Equal To**

(The closed circle indicates that this is

EQUAL TO the number that is graphed.)

Properties of Inequality Handout

Addition Property :

If x < y , then x + z < y + z

Example :

Tom has three dollars and Bill has six dollars.

They both earned five dollars for mowing the lawn.

Tom still has less money than Bill.

$3 < $6 then $3 + $5 < $6 + $5 then $8 < $11

If x > y , then x + z > y + z

Example :

Jim has ten dollars and Sam has seven dollars.

They both earned twenty dollars shoveling snow.

Jim still has more money than Sam.

$10 > $7 then $10 + $20 > $7 + $20 then $30 > $27

Properties of Inequality Handout

Subtraction Property :

If x < y , then x - z < y - z

Example :

Mark has fourteen dollars and Dan has sixteen dollars.

They both spent five dollars at the mall.

Mark still has less money than Dan.

$14 < $16 then $14 - $5 < $16 - $5 then $9 < $11

If x > y , then x - z > y - z

Example :

Mike has fifteen dollars and Benny has nine dollars.

They both spent six dollars at the fair.

Mike still has more money than Benny.

$15 > $9 then $15 - $6 > $9 - $6 then $9 > $3

Properties of Inequality Handout

Multiplication Property :

If $x < y$, and $z > 0$ then $x * z < y * z$

Example :

Suppose $3 < 6$, and $z = 10$

then $3 * 10 < 6 * 10$ or $30 < 60$

If $x > y$, and $z > 0$, then $x * z > y * z$

Example :

Suppose $20 > 10$, and $z = 5$

then $20 * 5 > 10 * 5$ or $100 > 50$

Whenever you multiply by a negative number, you must reverse the inequality sign.

If $x < y$, and $z < 0$ then $x * z > y * z$

Example :

Suppose $2 < 4$, and $z = -2$

then $2 * -2 > 4 * -2$ or $-4 > -8$

If $x > y$, and $z < 0$, then $x * z < y * z$

Example :

Suppose $6 > 3$, and $z = -8$

then $6 * -8 < 3 * -8$ or $-48 < -24$

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Properties of Inequality Handout

Division Property :

If x < y , and z > 0 then x ÷ z < y ÷ z

Example :

Suppose 15 < 20 , and z = 5

then 15 ÷ 5 < 20 ÷ 5 or 3 < 4

If x > y , and z > 0 , then x ÷ z > y ÷ z

Example :

Suppose 20 > 10 , and z = 5

then 20 ÷ 5 > 10 ÷ 5 or 4 > 2

**Whenever you divide by a negative number,
you must reverse the inequality sign.**

If x < y , and z < 0 then x ÷ z > y ÷ z

Example :

Suppose 12 < 24 , and z = -2

then 12 ÷ -2 > 24 ÷ -2 or -6 > -12

If x > y , and z < 0 , then x ÷ z < y ÷ z

Example :

Suppose 16 > 12 , and z = -4

then 16 ÷ -4 < 12 ÷ -4 or -4 < -3

Properties of Inequality Handout

Transitive Property :

If x > y and y > z, then x > z

Example :

Suppose 18 > 9 and 9 > 3 then 18 > 3

If x < y and y < z, then x < z

Example :

Suppose 4 < 8 and 8 < 15 then 4 < 15

Comparison Property :

If x = y + z and z > 0 then x > y

Example :

Suppose 12 = 7 + 5, then 12 > 7