Math Formula Sheet

Set – builder Notation The set of all x such that x is =, <, > a $\{x|x =, <, > a\}$

Interval Notation Used to write solution sets of inequality $(-\infty, x]$ $[x, \infty)$

A **Linear Equation** is an algebraic equation in which each term is either a constant or the product of a constant and a single variable (with no exponent) $Ax + By = C$

Y – Intercept $(0, b)$ To find the y – intercept: Let x = 0 and solve for y.

X – Intercept $(a, 0)$ To find the x – intercept: Let y = 0 and solve for x.

Slope Intercept Form $y = mx + b$

Slope (m) $m = \frac{rise}{run} = \frac{the\ change\ in\ y}{the\ change\ in\ x} = \frac{y_2 - y_1}{x_2 - x_1}$

Horizontal and Vertical Lines

The graph of $y = b$ is a **horizontal line.** The **y – intercept** is $(0, b)$.

The graph of $x = a$ is a **vertical line.** The **x – intercept** is $(a, 0)$.

Inequality Multiplication Principle

- $a < b$ *is equivalent to* $ac < bc$ *when c is a positive number*
- $a > b$ *is equivalent to* $ac > bc$ *when c is a positive number*
- $a < b$ *is equivalent to* $ac > bc$ *when c is a negative number*
- $a > b$ *is equivalent to* $ac < bc$ *when c is a negative number*

Exponent Rules

$a^1 = a$

$a^0 = 1$ (Where a is any nonzero number)

$a^m \cdot a^n = a^{m+n}$

$\frac{a^m}{a^n} = a^{m-n}$

$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

$a^{-n} = \frac{1}{a^n}$

$\left(\frac{a}{b}\right)^{-n} = \frac{b^n}{a^n}$

$(a^m)^n = a^{m \cdot n}$

$(ab)^n = a^n \cdot b^n$

$a^{1/n} = \sqrt[n]{a}$

$a^{m/n} = \sqrt[n]{a^m}$

Foil Method

$(A + B)(C + D) = AC + AD + BC + BD$

Product of Sum and Difference

$(A + B)(A - B) = A^2 - B^2$

Product of Two Sums

$(A + B)^2 = (A + B)(A + B)$
$= A^2 + 2AB + B^2$

Principle of Zero Products

An equation $ab = 0$ is true if and only if $a = 0$ *is true or* $b = 0$ *is true or both are true.*

Product of Two Differences

$(A - B)^2 = (A - B)(A - B)$
$= A^2 - 2AB + B^2$

GCF: Greatest common factor

Division by zero:

Neither $a/0$ *nor* $a \div 0$ are defined.