Name: _____ Date: _____

Mathematical Symbols and Notation

Mathematics has its own language, including abbreviations, symbols, and notation. You have been taught this language while learning various math operations and concepts. However, there is often more than one way to show a particular math concept. Here is a summary of important symbols and notation that are used in math.

Set Builder Notation

• A collection of objects in mathematics can be identified using a variety of methods. The table shows some examples.

Method	Example
verbal description	the set of all positive integers
list	{0, 1, 2, 3, …}
set builder notation	$\{x \mid x \in \mathbb{Z}\}$ (Read as, "the set of all x such that x is an element of integers.")

Question
1. Using set builder notation, what is the domain of $f(x) = \sin x$?

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Common Symbols

• Ellipses (…) are used to indicate that the numbers or symbols continue in a similar pattern or arrangement. For example, the list of all positive whole numbers divisible by 3 can be written as {3, 6, 9, 12, 15, ...}.

• The infinity symbol (∞) is used to indicate that a number pattern continues on forever, or *ad infinitum*. You may see it on a number line. For example, the integers can be represented on a number line in the following way:

$-\infty$ … -3 -2 -1 0 1 2 3 … $+\infty$
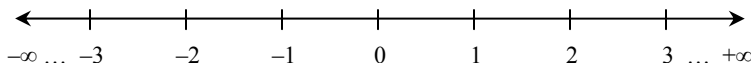
• Symbols commonly used for *approximately equal to* are $\approx$ and $\doteq$.

For example, the exact value of sin 45° is $\dfrac{\sqrt{2}}{2}$ while its approximate value is 0.707. Write this statement as

$\sin\ 45° = \dfrac{\sqrt{2}}{2}$ or $\sin\ 45° = \dfrac{\sqrt{2}}{2}$

≈ 0.707 $\doteq 0.707$

> An approximate value is a numerical value that has been rounded. An exact value is a precise value in which accuracy is preserved.

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Symbols of Equality and Inequality

- Express equality and inequality symbolically using symbols such as $=$, $\neq$, $>$, $<$, $\geq$, and $\leq$.

Example
Write the following sets of numbers in set builder notation.
a) the set of all x such that x is greater than 9, where x is an element of integers
b) the set of all x such that x is greater than -5 and less than or equal to 10, where x is an element of integers

Solution
a) $\{x \mid x > 9, x \in \mathbb{Z}\}$
b) $\{x \mid -5 < x \leq 10, x \in \mathbb{Z}\}$

Question
2. Complete the following table. For each symbolic description of an equality of inequality, provide a verbal description. Then, give an example of each equality or inequality.

Symbolic Description	Verbal Description	Examples
a) $x = y$	x equals y	$\sqrt{49} = \pm 7$
b) $x \neq y$		
c) $x > y$		
d) $x \geq y$		
e) $x < y$		
f) $x \leq y$		

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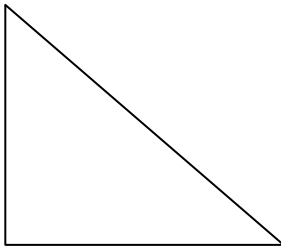Name: _____ Date: _____

Referencing Angles

- Angles can be identified in a variety of ways. The table shows some common notations.

Notation	Example
uppercase letters	A, B, C
lowercase letters	*a, b, c*
Greek letters	α (alpha), β (beta), θ (theta)
subscripts	A_1, A_2, A_3, B_1, B_2, B_3
prime notation	A′, A″, B′, B″

Question

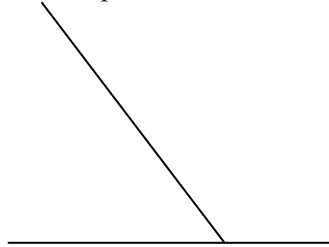**3.** For each diagram, label all angles using the notation indicated. Use letters of your choice.

a) lowercase letters   **b)** subscripts   **c)** prime notation