PhyzReference: Symbols

Real Characters, eh?

THE GREEK ALPHABET

Name	*Pronunciation*	*Letter*		*Name*	*Pronunciation*	*Letter*	
Alpha	AL fuh	A	α	*Nu*	NOO	N	ν
Beta	BAY tuh	B	β	Xi	ZI	Ξ	ξ
Gamma	GAM uh	Γ	γ	Omicron	O mih kron	O	o
Delta	DEL tuh	Δ	δ	**Pi**	PI	Π	π
Epsilon	EP sih lon	E	ε	*Rho*	ROE	P	ρ
Zeta	ZAY tuh	Z	ζ	**Sigma**	SIG muh	Σ	σ
Eta	AY tuh	H	η	*Tau*	TAO, TAW	T	τ
Theta	THAY tuh	Θ	θ	Upsilon	UP sih lon	Y	υ
Iota	eye OH tuh	I	ι	**Phi**	FI, FEE	Φ	ϕ
Kappa	KAP uh	K	κ	Chi	KI	X	χ
Lambda	LAM duh	Λ	λ	Psi	SI, SEE	Ψ	ψ
Mu	MYOO	M	μ	**Omega**	o MEH guh	Ω	ω

MATHEMATICAL SYMBOLS

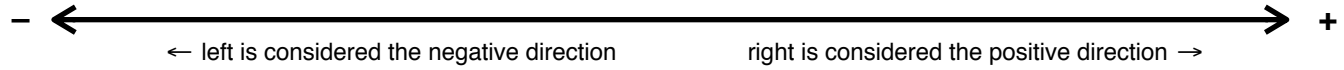
Symbol	*Definition*	*Examples*
$\propto$	proportional to	Time spent studying $\propto$ grade earned in a class
$\approx$	approximately equal to	5,367,831 $\approx$ 5,367,832
$\sim$	about; approximately	The population of the US is $\sim$ 300,000,000.
$\equiv$	defined as; identical to	velocity $\equiv$ change in position per change in time
$\neq$	not equal to	if $a = 3$ and $b = 5$, $a \neq b$
$>$	greater than	$2 + 2 > 3$
$<$	less than	$2 + 2 < 5$
$\geq$	greater than or equal to	If $x + 5 \geq 12$, then $x \geq 7$
$\leq$	less than or equal to	$f \leq \mu N$
$>>$	**much** greater than	5,367,831,729,405 $>>$ 1
$<<$	**much** less than	1 $<<$ 5,367,831,729,405
$\Rightarrow$	leads to; yields	$a + b = c \Rightarrow b = c - a$
$\therefore$	therefore	$a = b$ and $b = c \therefore a = c$
$\sqrt{}$	square root	$\sqrt{(9 + 16)} = 5$
Σ	the sum of	$\Sigma \mathbf{F} = m\mathbf{a}$
Δ	change in	$\mathbf{v} \equiv \Delta\mathbf{d}/\Delta t$
x	the vector "x"	the displacement vector **x** = (4m, 7m)
$\parallel$	parallel to	the ceiling is $\parallel$ to the floor
$\perp$	perpendicular to	the floor is $\perp$ to the wall
$\lvert x \rvert$	absolute value of x	$\lvert -23 \rvert = 23$
$\lvert \mathbf{x} \rvert$, x	the scalar value of **x**	**a** = (7m; 30°) $\therefore$ $\lvert \mathbf{a} \rvert$ = 7m; **c** = (3m, 4m) $\therefore$ c = 5m

PhyzReference: Directions

In physics, we must often be mindful of **direction.** If something is moving, for example, it must be moving in some **direction.** Or if a force is being exerted on an object, that force is being exerted in some **direction.** Below are a few reference diagrams that sort out the various ways scientists and mathematicians specify directions.

One-Dimensional (1D)

A particle that is constrained to motion in one dimension can move only forward or backward along a line. Surely you have fond memories of the "number line." The number line is an example of "one-dimensional space," also known as a "line."



← left is considered the negative direction right is considered the positive direction →

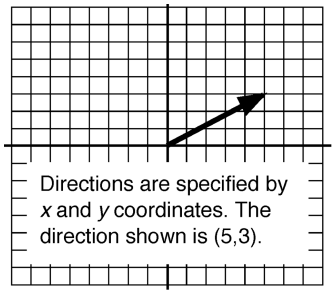
Two-Dimensional (2D)

Two-dimensional space is known as a "plane." Examples of 2D space include a table top, the floor, the glass in a window, or any other flat surface.

Rectangular (Cartesian) Coordinates

"Up" is considered the positive y direction.

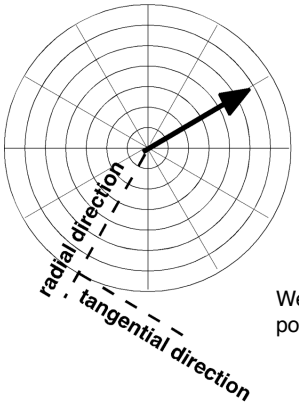
"Left" is considered the negative x direction.



"Right" is considered the positive x direction.

"Down" is considered the negative y direction.

Polar Coordinates



Directions are specified in terms of angles by the radial lines ("spokes"). The concentric circles indicate length. The arrow shown (which is identical to the arrow on the rectangular coordinates) is denoted (5.8; 30˚).

We will discuss further rectangular and polar coordinates later on in the course.

Three-Dimensional (3D)

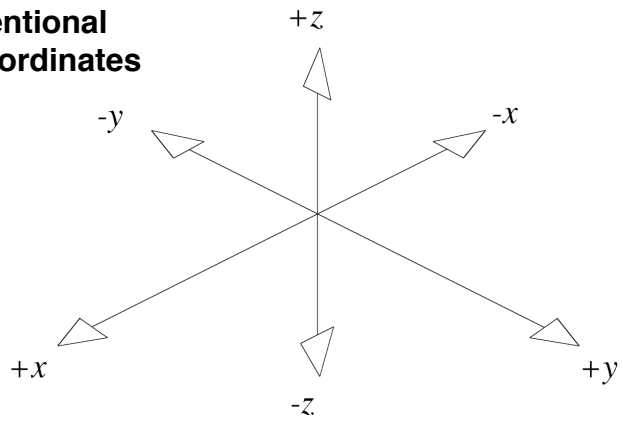
Three-dimensional space is known simply as a "space." Space includes all the familiar geometric directions. All real objects occupy three dimensions. For instance, a rectangular solid (like a shoebox) has dimensions of length, width, and height.

Symbolic Notation

Left	←
Right	→
Up	↑
Down	↓
In	×
Out	·

*IN is away from you: into the paper, into the board
**OUT is toward you: out of the paper, out of the board

Conventional 3D Coordinates



Vocab

Collinear: along the same line
Parallel: in the same direction
Concurrent: at the same point
Antiparallel: in opposite directions