

10. Signs and Symbols

- 10.1.** The increased use of signs and symbols and their importance in technical and scientific work have emphasized the necessity of standardization on a national basis and of the consistent use of the standard forms.
- 10.2.** Certain symbols are standardized—number symbols (the digits, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9); letter symbols (the letters of the alphabet, a, b, c, d, etc.); and graphic symbols (the mathematical signs +, −, ±, ×, ÷).
- 10.3.** The signs +, −, ±, ×, and ÷, etc., are closed against accompanying figures and symbols. When the × is used to indicate “crossed with” (in plant or animal breeding) or magnification, it will be separated from the accompanying words by a space.

i–vii+1–288 pages
The equation A+B
The result is 4×4
20,000±5,000

Early June × Bright (crossed with)
× 4 (magnification)
miles ÷ gallons

Symbols with figures

- 10.4.** In technical publications the degree mark is used in lieu of the word *degree* following a figure denoting measurement.
- 10.5.** Following a figure, the spelled form is preferred. The percent symbol is used in areas where space will not allow the word *percent* to be used.

In that period the price rose 12, 15, and 19 percent.

not In that period the price rose 12 percent, 15 percent, and 19 percent.

- 10.6.** Any symbol set close up to figures, such as the degree mark, number mark, dollar mark, or cent mark, is used before or after each figure in a group or series.

\$5 to \$8 price range
5'–7' long, *not* 5–7' long
3¢ to 5¢ (no spaces)
±2 to ±7; 2°±1°
#61 to #64

but
§ 12 (thin space)
¶ 1951 (thin space)
from 15 to 25 percent
45 to 65 °F *not* 45° to 65° F

Letter symbols

- 10.7.** Letter symbols are set in italic (see rule 10.8) or in roman (see rule 9.56) without periods and are capitalized only if so shown in copy, since the capitalized form may have an entirely different meaning.

Equations

- 10.8.** In mathematical equations, use italic for all letter symbols—capitals, lowercase, small capitals, and superiors and inferiors (exponents and subscripts); use roman for figures, including superiors and inferiors.
- 10.9.** If an equation or a mathematical expression needs to be divided, break before +, −, =, etc. However, the equal sign is to clear on the left of other beginning mathematical signs.
- 10.10.** A short equation in text should not be broken at the end of a line. Space out the line so that the equation will begin on the next line; or better, center the equation on a line by itself.
- 10.11.** An equation too long for one line is set flush left, the second half of the equation is set flush right, and the two parts are balanced as nearly as possible.
- 10.12.** Two or more equations in a series are aligned on the equal signs and centered on the longest equation in the group.
- 10.13.** Connecting words of explanation, such as *hence*, *therefore*, and *similarly*, are set flush left either on the same line with the equation or on a separate line.
- 10.14.** Parentheses, braces, brackets, integral signs, and summation signs should be of the same height as the mathematical expressions they include.
- 10.15.** Inferiors precede superiors if they appear together; but if either inferior or superior is too long, the two are aligned on the left.

Chemical symbols

10.16. The names and symbols listed below are approved by the International Union of Pure and Applied Chemistry. They are set in roman without periods.

Element	Symbol	Atomic No.	Element	Symbol	Atomic No.
Actinium.....	Ac	89	Mendelevium.....	Md	101
Aluminum.....	Al	13	Mercury.....	Hg	80
Americium.....	Am	95	Molybdenum.....	Mo	42
Antimony.....	Sb	51	Neodymium.....	Nd	60
Argon.....	Ar	18	Neon.....	Ne	10
Arsenic.....	As	33	Neptunium.....	Np	93
Astatine.....	At	85	Nickel.....	Ni	28
Barium.....	Ba	56	Niobium.....	Nb	41
Berkelium.....	Bk	97	Nitrogen.....	N	7
Beryllium.....	Be	4	Nobelium.....	No	102
Bismuth.....	Bi	83	Osmium.....	Os	76
Bohrium.....	Bh	107	Oxygen.....	O	8
Boron.....	B	5	Palladium.....	Pd	46
Bromine.....	Br	35	Phosphorus.....	P	15
Cadmium.....	Cd	48	Platinum.....	Pt	78
Calcium.....	Ca	20	Plutonium.....	Pu	94
Californium.....	Cf	98	Polonium.....	Po	84
Carbon.....	C	6	Potassium.....	K	19
Cerium.....	Ce	58	Praseodymium.....	Pr	59
Cesium.....	Cs	55	Promethium.....	Pm	61
Chlorine.....	Cl	17	Protactinium.....	Pa	91
Chromium.....	Cr	24	Radium.....	Ra	88
Cobalt.....	Co	27	Radon.....	Rn	86
Copper.....	Cu	29	Rhenium.....	Re	75
Curium.....	Cm	96	Rhodium.....	Rh	45
Darmstadtium.....	Ds	110	Roentgenium.....	Rg	111
Dubnium.....	Db	105	Rubidium.....	Rb	37
Dysprosium.....	Dy	66	Ruthenium.....	Ru	44
Einsteinium.....	Es	99	Rutherfordium.....	Rf	104
Erbium.....	Er	68	Samarium.....	Sm	62
Europium.....	Eu	63	Scandium.....	Sc	21
Fermium.....	Fm	100	Seaborgium.....	Sg	106
Fluorine.....	F	9	Selenium.....	Se	34
Francium.....	Fr	87	Silicon.....	Si	14
Gadolinium.....	Gd	64	Silver.....	Ag	47
Gallium.....	Ga	31	Sodium.....	Na	11
Germanium.....	Ge	32	Strontium.....	Sr	38
Gold.....	Au	79	Sulfur.....	S	16
Hafnium.....	Hf	72	Tantalum.....	Ta	73
Hassium.....	Hs	108	Technetium.....	Tc	43
Helium.....	He	2	Tellurium.....	Te	52
Holmium.....	Ho	67	Terbium.....	Tb	65
Hydrogen.....	H	1	Thallium.....	Tl	81
Indium.....	In	49	Thorium.....	Th	90
Iodine.....	I	53	Thulium.....	Tm	69
Iridium.....	Ir	77	Tin.....	Sn	50
Iron.....	Fe	26	Titanium.....	Ti	22
Krypton.....	Kr	36	Tungsten.....	W	74
Lanthanum.....	La	57	Uranium.....	U	92
Lawrencium.....	Lr	103	Vanadium.....	V	23
Lead.....	Pb	82	Xenon.....	Xe	54
Lithium.....	Li	3	Ytterbium.....	Yb	70
Lutetium.....	Lu	71	Yttrium.....	Y	39
Magnesium.....	Mg	12	Zinc.....	Zn	30
Manganese.....	Mn	25	Zirconium.....	Zr	40
Meitnerium.....	Mt	109			

Standardized symbols

10.17. Symbols duly standardized by any national scientific, professional, or technical group are accepted as preferred forms within the field of the group. The issuing office desiring or requiring the use of such standardized symbols should see that copy is prepared accordingly.

Signs and symbols

10.18. The following list contains some signs and symbols frequently used in printing. The forms and style of many symbols vary with the method of reproduction employed. It is important that editors and writers clearly identify signs and symbols when they appear within a manuscript.

ACCENTS

- ˊ acute
- ˘ breve
- ˜ cedilla
- ⊆ circumflex
- ¨ dieresis
- ˋ grave
- ˉ macron
- ˘ tilde

- ⊠ dot in triangle in circle
- ⊕ cross in circle
- © copyright
- ♁ Ceres
- ♃ Pallas
- ♄ Juno
- ♁ Vesta

- ⦿ (184 N)
- ⦿ key
- ⦿ (206 N)
- ¶ paragraph

ARROWS

- direction
- ↖ direction
- ↗ direction
- ↘ direction
- ↙ direction
- ↔ bold arrow
- ↷ open arrow
- ⇌ reversible reaction

BULLETS

- solid circle; bullet
- bold center dot
- movable accent

CHEMICAL

- ‰ salinity
- ℥ minim
- ‡ exchange
- ↑ gas

CIRCLED SYMBOLS

- ⊙ angle in circle
- ⊖ circle with parallel rule
- ⊠ triangle in circle
- ⊙ dot in circle

CODE

- No. 1 6 pt. code dot
- No. 2 8 pt. code dot
- No. 3 10 pt. code dot
- No. 4 8 pt. code dot
- No. 4 10 pt. code dot
- No. 1 6 pt. code dash
- No. 2 8 pt. code dash
- No. 3 10 pt. code dash
- No. 4 8 pt. code dash
- No. 4 10 pt. code dash

COMPASS

- ° degree
- degree with period
- ′ minute
- ′ minute with period
- ″ second
- ″ second with period
- ˉ canceled second

DECORATIVE

- ⊕ bold cross
- ⊕ cross patte
- ⊕ cross patte
- ⊕ cross patte

ELECTRICAL

- ℜ reluctance
- ↔ reaction goes both right and left
- ↑ reaction goes both up and down
- ↓ reversible
- direction of flow; yields
- direct current
- ⇌ electrical current
- ⇌ reversible reaction
- ⇌ reversible reaction
- ⇌ alternating current
- ⇌ alternating current
- ⇌ reversible reaction beginning at left
- ⇌ reversible reaction beginning at right
- Ω ohm; omega
- MΩ megohm; omega
- μΩ microohm; mu omega
- ω angular frequency, solid angle; omega
- Φ magnetic flux; phi
- Ψ dielectric flux; electrostatic flux; psi
- γ conductivity; gamma

ELECTRICAL—Con.	MATHEMATICAL—Con.	MATHEMATICAL—Con.
ρ resistivity; rho	\doteq approaches a limit	\parallel double bond
Λ equivalent conductivity	\sphericalangle equal angles	\equiv double bond
HP horsepower	\neq not equal to	\equiv double bond
	\equiv identical with	\bigcirc benzene ring
	$\not\equiv$ not identical with	∂ or δ differential; variation
	$\%/\%$ score	∂ Italian differential
MATHEMATICAL	\approx or \doteq nearly equal to	\rightarrow approaches limit of
— vinculum (above letters)	$=$ equal to	\sim cycle sine
\therefore geometrical proportion	\sim difference	\int horizontal integral
\therefore difference, excess	\cong perspective to	\oint contour integral
\parallel parallel	\cong congruent to approximately equal	\propto variation; varies as
\parallel s parallels	\doteq difference between	Π product
\neq not parallels	\diamond geometrically equivalent to	Σ summation of; sum; sigma
$ $ absolute value	$($ included in	$!$ or \perp factorial product
\cdot multiplied by	$)$ excluded from	
$:$ is to; ratio	\subset is contained in	MEASURE
$+$ divided by	\cup logical sum or union	lb pound
\therefore therefore; hence	\cap logical product or intersection	ʒ dram
\because because	$\sqrt{\quad}$ radical	fʒ fluid dram
\therefore proportion; as	$\sqrt{\quad}$ root	ʒ ounce
\ll is dominated by	$\sqrt{\quad}$ square root	fʒ fluid ounce
\gt greater than	$\sqrt{\quad}$ cube root	O pint
\sqsupset greater than	$\sqrt{\quad}$ fourth root	
\supseteq greater than or equal to	$\sqrt{\quad}$ fifth root	MISCELLANEOUS
\supseteq greater than or equal to	$\sqrt{\quad}$ sixth root	\S section
\supseteq greater than or less than	π pi	\dagger dagger
\nlessgtr is not greater than	ϵ base (2.718) of natural system of logarithms; epsilon	\ddagger double dagger
\lessgtr less than	ϵ is a member of; dielectric constant; mean error; epsilon	$\%$ account of
\sqsubset less than		$\%$ care of
\lessgtr less than or greater than		$\%/\%$ score
\nlessgtr is not less than	$+$ plus	\P paragraph
\lessgtr smaller than	$+$ bold plus	b Anglo-Saxon
\lessgtr less than or equal to	$-$ minus	C center line
\lessgtr less than or equal to	$-$ bold minus	σ conjunction
\supseteq or \geq greater than or equal to	$/$ shill(ing); slash; virgule	\perp perpendicular to
\lessgtr equal to or less than	\pm plus or minus	" or " ditto
\lessgtr equal to or less than	\mp minus or plus	\propto variation
\lessgtr is not greater than equal to or less than	\times multiplied by	R recipe
\lessgtr equal to or greater than	$=$ bold equal	\sqsupset move right
\lessgtr is not less than equal to or greater than	$\#$ number	\sqsubset move left
\perp equilateral	p per	\bigcirc or \odot or $\text{\textcircled{1}}$ annual
\perp perpendicular to	$\%$ percent	$\text{\textcircled{2}}$ or $\text{\textcircled{2}}$ biennial
\vdash assertion sign	\int integral	\in element of
\doteq approaches	$ $ single bond	$\text{\textcircled{D}}$ scruple
	\backslash single bond	f function
	$/$ single bond	$!$ exclamation mark
		\boxplus plus in square
		$\text{\textcircled{2}}$ perennial

MISCELLANEOUS—Con.		PLANETS—Con.			
ϕ	diameter	☾	eclipse of Moon	J	Jurassic
̄	mean value of c	☾	lunar halo	᠖	Triassic
U	mathmodifier	☾	lunar corona	P	Permian
c	mathmodifier	♃	Ceres	P	Pennsylvanian
◻	dot in square	♃	Juno	M	Mississippian
△	dot in triangle			D	Devonian
⊠	station mark			S	Silurian
@	at			O	Ordovician
	MONEY		PUNCTUATION	Є	Cambrian
¢	cent	{ }	braces	pЄ	Precambrian
¥	yen	[]	brackets	C	Carboniferous
£	pound sterling	()	parentheses		VERTICAL
₥	mills	< >	square parentheses; angle brackets		5 unit vertical
	MUSIC	¡	Spanish open quote		8 point vertical
♮	natural	¿	Spanish open quote		9 unit vertical
♭	flat				WEATHER
♯	sharp		SEX	T	thunder
	PLANETS	♂	or ♂ male	⚡	thunderstorm; sheet lightning
♁	Mercury	♀	female	☂	sheet lightning
♀	Venus	♂	hermaphrodite	↓	precipitate
♁	Earth			☉	rain
♂	Mars		SHAPES	←	floating ice crystals
♃	Jupiter	◆	solid diamond	→	ice needles
♄	Saturn	◇	open diamond	▲	hail
♅	Uranus	○	circle	⊗	sleet
♆	Neptune	▲	solid triangle	☁	glazed frost
♇	Pluto	△	triangle	☃	hoarfrost
♁	dragon's head, ascending node	◻	square	√	frostwork
♁	dragon's tail, descending node	◼	solid square	*	snow or sextile
♋	conjunction	▭	parallelogram	☑	snow on ground
♌	opposition	▭	rectangle	⊕	drifting snow (low)
☉	or ☽ Sun	▭	double rectangle	≡	fog
☉	Sun's lower limb	★	solid star	☁	haze
☉	Sun's upper limb	☆	open star	☃	Aurora
☉	solar corona	└	right angle		ZODIAC
☉	solar halo	∠	angle	♈	Aries; Ram
☾	Moon	✓	check	♉	Taurus; Bull
☾	new Moon	✓	check	♊	Gemini; Twins
☾	first quarter	ß	German ss	♋	Cancer; Crab
☾	first quarter	ℓ	italic German ss	♌	Leo; Lion
☾	third quarter	☛	solid index	♍	Virgo; Virgin
☾	last quarter	☛	solid index	♎	Libra; Balance
☾	last quarter	☞	index	♏	Scorpio; Scorpion
☾	last quarter	☞	index	♐	Sagittarius; Archer
☾	last quarter		GEOLOGIC SYSTEMS¹	♑	Capricornus; Goat
☾	full Moon	Q	Quaternary	♒	Aquarius; Water bearer
☾	full Moon	T	Tertiary	♓	Pisces; Fishes
		K	Cretaceous		

¹ Standard letter symbols used by the Geological Survey on geologic maps. Capital letter indicates the system and one or more lowercased letters designate the formation and member where used.