

Page numbers followed by *t* indicate tables.

A

Abbreviation tables, 43–45
Accumulation, drug, 113
Accuracy, 25
Active ingredient in a stock solution when strength of diluted portion is known, 80–81
Actual body weight, 113
Addition of fractions, 6–7
Admixtures, 75–76, 83–86
 reconstitution of intravenous, 123–124
Aliquot method, 27, 28–30, 76
Alligation alternate, 84–86
Alligation medial, 83–84
Amount of solution of a desired strength, 78–79
Apothecaries' system, 17, 22*t*
Arabic numerals, 3, 5
Avoirdupois system, 17

B

Body surface area (BSA), 112–113, 114
 reconstitution and, 122

C

Class A torsion balance, 26, 32
Clinical laboratory test values, 70
Cockcroft-Gault equation, 115
Colloidal solutions, 75
Common fractions, 6–10
Components of a prescription label, 38
Compounding, 37
 abbreviations, 45*t*

 of a commercial product into doses for a patient, 50
Concentration, 14, 15*t*
 admixtures, 75–76, 83–86
 clinical laboratory test values, 70
 converted to mg/mL or mcg/mL, 70–71
 examples of, 91*t*
 importance for medical math and clinical practice, 61–62, 75–76
 liquids, 77–79
 parts per million (PPM) and parts per billion (PPB), 69–70
 percent volume in volume, 64–65
 percent weight in volume, 62–64
 problem solutions, 143
 quantity and strength, 76–77
 ratio strength, 67–69
 solids, 82–83
 of solutes, 99–109
 stock solutions or mixtures, 79–82
 summary and practice problems, 71–73, 86–88
Conversions
 of concentrations to mg/mL or mcg/mL, 70–71
 problem solutions, 129–130
 setting up calculations for, 17–20
cytochrome P450 microsomal (CYP) enzymes, 116

D

Daily dose, 112
DEA number, 37

Decimals, 9–10
Denominate numbers, 4–5
Density
 defined, 54
 importance for medical math and clinical practice, 53–54
 problem solutions, 141
 summary and practice problems, 57–59
Dilution and concentration of mixtures
 admixtures, 75–76, 83–86
 importance for medical math and clinical practice, 75–76
 liquids, 77–79
 problem solutions, 145
 quantity and strength, 76–77
 stock solutions or mixtures, 79–82
 summary and practice problems, 86–88
Dimensional analysis, 19
Directions for patients, 38
Division of fractions, 8–9
Dosage regimen, 112
Dose, 112
Dosing
 based on body surface area, 114
 based on kidney function, 114–115
 based on themometry, 115–116
 based on weight, 113–114
 definitions, 112–113
 frequency abbreviations in, 44*t*
 importance for medical math and clinical practice, 111
 problem solutions, 151
 of warfarin based on genetic testing, 116–117
Drug form and routes of administration
 abbreviations, 43*t*

E

Ease-of-use, patient, 48
Electrolyte solutions, 89–90, 92
Electronic balance, 26
Emulsions, 75
Error, percentage of, 27–28
Exponential notation, 11

F

Flow rate
 of intravenous fluids, 124
 of parenteral solutions, 122–123
 problem solutions, 153–155
Formulas
 importance for medical math and clinical practice, 47–48
 maintaining the proportion of ingredients in, 48–49
 problem solutions, 139
 summary and practice problems, 51–52
 using a commercial product to compound doses for a patient, 50
Formulas method of conversions, 20
Fractions, 4
 common and decimal, 6–10
 expressed as percentages, 10–11
Freeze-drying (lyophilization), 120

G

Genetic testing, dosing of warfarin based on, 116–117
Gravity, specific. *See* specific gravity

H

Handbook on Injectable Drugs, 119–120
Household system of measurement, 17, 22*t*
Hypertonic solutions, 90
Hypotonic solutions, 90

I

Ideal body weight (IBW), 113–114
Improper fractions, 6
Indication for use of drug therapy
 abbreviations, 45*t*
International Normalized Ratio (INR), 116–117
Intravenous admixtures, 123–124
Intravenous fluids, flow rate of, 124
Intuitive/logical methods of conversion, 19
Isotonicity
 basic concepts, 89–90

importance for medical math and clinical practice, 89
 preparation of isotonic solutions and, 91–94
 problem solutions, 147
 summary and practice problems, 95–97
 Isotonic solutions, 90
 preparation of, 91–94

K

Kidney function, dosing based on, 114–115

L

Label, components of prescription, 38
 Length measurement, metric system, 21*t*
 Liquid-liquid aliquots, 29–30
 Liquids, dilution and concentration of, 77–79
 Liver function and dosing, 113
 Lowest common denominators, 6

M

Measurement and calculation
 common and decimal fractions, 6–10
 for conversions, 17–20
 examples for prescription orders, 39–40
 exponential notation, 11
 importance for medical math and clinical practice, 3–4
 importance of place holding in, 12
 numbers and numerals in, 4–5
 percentage, 10–11
 problem solutions, 127
 significant figures, 11–12
 Medical order, 38
 Medication errors, reduction of, 39
 Metric system, 15–17
 measure of length, 21*t*
 measure of volume, 22*t*
 measure of weight, 22*t*
 prefixes and values in, 21*t*
 Milli (prefix), 90
 Milliequivalents (mEq), 101–106

Millimoles (mM), 101
 Minimum measurable quantity (MMQ), 27, 32
 Mixed numbers, 4
 Mixtures, dilution and concentration of
 admixtures, 75–76, 83–86
 importance for medical math and clinical practice, 75–76
 liquids, 77–79
 quantity and strength, 76–77
 stock solutions or mixtures, 79–82
 summary and practice problems, 86–88
 Mole (M), 90–91, 100–101
 Multiplication of fractions, 8

N

Nonelectrolyte solutions, 89
 Numbers and numerals, 4–5
 Numerators, 6

O

Oral solutions, reconstitution of, 121–122
 Osmolality, 90
 Osmolarity, 90, 106–107
 problem solutions, 149
 Osmotic pressure, 89–90

P

Parenteral solutions and flow rate, 122–123
 Parts per billion (PPB), 69–70
 Parts per million (PPM), 69–70
 Patients, directions for, 38
 Percentage, 10–11
 Percentage of error, 27–28
 Percentage strength, 14
 liquids, 77–78
 parts per million (PPM) and parts per billion (PPB), 69–70
 Percent concentrations, 62–67
 Percent volume in volume, 64–65
 Percent weight in volume, 62–64
 Percent weight in weight, 65–67
 Place holding, 12
 Precision, 25–26

Prefixes, metric system, 21 *t*

Prescriptions and drug orders

- abbreviation tables, 43–45
- calculation examples, 39–40
- components of a prescription label, 38
- DEA number, 37
- forms, 37
- importance for medical math and clinical practice, 35–36
- medical order, 38
- problem solutions, 137–138
- reducing medication errors and, 39
- requiring compounding, 37
- summary and practice problems, 40–42

Problem solutions

- concentrating and diluting solutions or mixtures, 145
- concentrations of solutes and osmolarity, 149
- concentration statements, 143
- density, specific gravity, and specific volume, 141
- fundamentals of measurement and calculation, 127
- isotonicity, 147
- prescriptions and drug orders, 137–138
- principles of weighing and measuring, 131–133
- reconstitution of solutions and suspensions and flow rate calculations, 153–155
- reducing and enlarging formulas, 139
- specific dosing calculations, thermometry, and pharmacogenomics, 151
- systems of measurement and conversions, 129–130

Progress tests, 33–34

- answers, 135

Proper fractions, 6

Proportions, 14, 17–19

- of ingredients maintained in formulas, 48–49

Q

Quantity and strength, dilution and concentration, 76–77

Quantity sufficient (q.s.—ing), 30–31

R

Ratios, 14, 17–19

Ratio strength, 67–69

- liquids, 77–78
- parts per million (PPM) and parts per billion (PPB), 69–70

Reconstitution

- flow rate of intravenous fluids and, 124
- importance for medical math and clinical practice, 119–120
- intravenous admixtures, 123–124
- introduction to, 120–121
- oral solutions and suspensions, 121–122
- parenteral solutions and flow rate, 122–123
- problem solutions, 153–155

Reduction in metric system, 16

Roman numerals, 3–4, 5

Routes of administration abbreviations, 43 *t*

S

Sensitivity requirement (SR), 27–28, 32

Serum creatinine, 114

Significant figures, 11–12

Single dose, 112

Solid-liquid aliquots, 30

Solids, concentration of, 82–83

Solid-solid aliquots, 29

Solutes

- importance for medical math and clinical practice, 99–100
- key concepts, 100–101
- milliequivalents (mEq), 101–106
- millimoles (mM), 101
- osmolarity, 90, 106–107
- problem solutions, 149
- summary and practice problems, 107–109

- Solutions, 75
 of a desired strength, determining
 amount of, 78–79
 electrolyte, 89–90, 92
 hypertonic, 90
 hypotonic, 90
 isotonic, 90, 91–94
 nonelectrolyte, 89
 parenteral, 122–123
 stock, 79–82
- Specific gravity
 defined, 54–55
 importance for medical math and
 clinical practice, 53–54
 problem solutions, 141
 summary and practice problems, 57–59
 use in calculations of weight and
 volume, 56–57
- Specific volume
 defined, 55–56
 importance for medical math and
 clinical practice, 53–54
 problem solutions, 141
 summary and practice problems, 57–59
- Stock solutions, 79–82
- Subtraction of fractions, 6–8
- Suspensions, 75
 reconstitution of, 121–122
- Systems of measurement, 20–21
 apothecaries' and avoirdupois, 17, 22*t*
 converting between, 17
 household, 17, 22*t*
 importance for medical math and
 clinical practice, 13–15
 metric, 15–17, 21–22*t*
 problem solutions, 129–130
 setting up calculations for conversions
 between, 17–20
 tables, 21–23*t*
 useful equivalents to memorize, 23*t*
- T**
-
- Thermometry, 115–116
 problem solutions, 151
- Tonicity, 90
- Torsion balance, 26, 32
- Total dose, 112
- Toxic dose, 112–113
- True solutions, 75
- U**
-
- United States Pharmacopeia/National
 Formulary (USP/NF), 47
- Usual adult dose, 112
- V**
-
- Vitamin K epoxide reductase complex
 subunit 1, 116
- Volume
 metric system, 22*t*
 percent volume in, 64–65
 percent weight in, 62–64
 specific (See specific volume)
 use of specific gravity in calculations
 of weight and, 56–57
- W**
-
- Warfarin dosing, 116–117
- Weaker solution from stronger stock
 solution, amount of diluent required to
 prepare, 82
- Weighing and measuring principles
 aliquot method of, 27–28, 28–30
 importance for medical math and
 clinical practice, 25–27, 53–54
 problem solutions, 131–133
 quantity sufficient (q.s.—ing), 30–31
 sensitivity requirement and percentage
 of error in, 27–28, 32
- Weight
 concentration of solids measured by,
 82–83
 dosing based on, 113–114
 metric system, 22*t*
 percent weight in, 65–67
 per volume, 14
 reconstitution based on body, 122
 of solutes, 99–109
 use of specific gravity in calculations
 of volume and, 56–57
- Weighted average, 83
- Whole numbers, 4

