

Dosage Calculation Formulas

The conversions and formulas behind every NCLEX med math question, each with a worked example you can check.

Free · 2 printable pages · Reviewed October 29, 2026

Conversions to know

Conversion	Equals
1 kilogram (kg)	2.2 pounds (lb)
1 gram (g)	1,000 milligrams (mg)
1 milligram (mg)	1,000 micrograms (mcg)
1 liter (L)	1,000 milliliters (mL)
1 teaspoon (tsp)	5 mL
1 tablespoon (tbsp)	15 mL
1 fluid ounce (oz)	30 mL
1 inch	2.54 centimeters (cm)
1 hour	60 minutes

The formulas, with examples

What you need	Formula	Example
Amount to give	$(\text{Desired} \div \text{Have}) \times \text{Quantity}$	Order: 500 mg. On hand: 250 mg per 5 mL. $(500 \div 250) \times 5 = \mathbf{10 \text{ mL}}$
Weight-based dose	$\text{Dose per kg} \times \text{weight in kg}$	Order: 15 mg/kg. Child weighs 44 lb. $44 \div 2.2 = 20 \text{ kg}$. $15 \times 20 = \mathbf{300 \text{ mg}}$
IV pump rate (mL/hr)	$\text{Volume (mL)} \div \text{Time (hr)}$	1,000 mL over 8 hours. $1,000 \div 8 = \mathbf{125 \text{ mL/hr}}$
Gravity drip rate (gtt/min)	$(\text{Volume in mL} \times \text{Drop factor}) \div \text{Time in minutes}$	1,000 mL over 8 hours, 15 gtt/mL tubing. $(1,000 \times 15) \div 480 = 31.25$, so $\mathbf{31 \text{ gtt/min}}$
Infusion time (hr)	$\text{Volume (mL)} \div \text{Rate (mL/hr)}$	500 mL at 125 mL/hr. $500 \div 125 = \mathbf{4 \text{ hours}}$
Heparin (units/hr to mL/hr)	$\text{Units per hour} \div \text{Units per mL}$	25,000 units in 250 mL = 100 units/mL. Order: 1,200 units/hr. $1,200 \div 100 = \mathbf{12 \text{ mL/hr}}$
Titrated drip (mcg/kg/min to mL/hr)	$(\text{Dose} \times \text{kg} \times 60) \div \text{Concentration in mcg/mL}$	Order: 5 mcg/kg/min. Client: 80 kg. Bag: 400 mg in 250 mL = 1,600 mcg/mL. $(5 \times 80 \times 60) \div 1,600 = \mathbf{15 \text{ mL/hr}}$

Rounding and writing rules

- Convert units first, so the dose and the supply match.
- Round only your final answer, not the steps along the way.
- Follow the question's instructions on decimal places. Without them, mL amounts are commonly rounded to the tenths place, and very small amounts (under 1 mL) to the hundredths.
- Drops can't be split: round gtt/min to a whole number.
- Tablets: give a whole or a scored half. If the math says an odd fraction, recheck it.
- Write a leading zero (0.5 mg), never a trailing zero (5 mg, not 5.0 mg). A missing leading zero or an extra trailing zero can cause a tenfold error.

Check your answer

- Does it make sense? A dose of 30 tablets or 50 mL of an IV push is almost always a math error.
- Are the units right? Your answer should be in the unit the question asks for.
- For high-alert drugs such as insulin and heparin, a second nurse often double-checks in practice. Follow your facility's policy.

Sources

1. Institute for Safe Medication Practices (ISMP). List of Error-Prone Abbreviations, Symbols, and Dose Designations.
2. The Joint Commission. Official "Do Not Use" List.
3. Standard dosage calculation and pharmacology textbooks for nursing.

For exam study only. In clinical practice, follow your facility's policies, the prescriber's orders, and current references. Free to print and share for personal and classroom study; not for resale. NCLEX® is a registered trademark of NCSBN, which does not endorse NCLEXSim.