Dosage Calculation for the Exam

Core formulas, IV rates, safe-dose checks, NCLEX rounding and conversions

RN Basics
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TWO WAYS TO SET IT UP

Study formulas with practice numbers, not a clinical tool; follow your institution's protocols.

D = desired dose, H = dose on hand, Q = quantity that holds H.

METHOD	SETUP
Desired over have	D ÷ H × Q
Dimensional analysis	Chain factors until only the answer unit is left

- D/H: order 375 mg; have 250 mg/5 mL. 375 ÷ 250 × 5 = 7.5 mL.
- DA: order 0.25 mg; have 125 mcg tabs. 0.25 mg × 1,000 mcg/mg × 1 tab/125 mcg = 2 tabs.
- Sense check: many tablets or a large injection volume means recheck the math.

EXAM TIP Convert first so order and supply share a unit. Mixing mg with mcg is a 1,000-fold error.

WEIGHT-BASED DOSE AND PEDIATRIC SAFE RANGE

1. kg = lb ÷ 2.2: 66 lb = 30 kg.
2. Dose = mg/kg × kg: 15 × 30 = 450 mg.
3. Volume = dose ÷ concentration: 450 mg ÷ 50 mg/mL = 9 mL.

Safe range 20–40 mg/kg/day in 3 doses; child 44 lb (20 kg); order 250 mg every 8 h.

1. Daily: 20 × 20 = 400 mg to 40 × 20 = 800 mg.
2. Per dose (÷ 3): 133 to 267 mg.
3. Ordered 250 mg/dose (750 mg/day) is in range; calculate the volume.

SAFETY Outside the safe range: hold the dose and clarify with the prescriber.

IV RATES: PUMP AND GRAVITY

Drip example: 500 mL over 4 h (240 min) on 20 gtt/mL tubing.

FIND	FORMULA	EXAMPLE
Pump rate	Total mL ÷ total h	1,000 mL over 8 h = 125 mL/h
IVPB (short infusion)	mL ÷ min × 60	50 mL over 20 min = 150 mL/h
Drip rate	mL × drop factor ÷ min	500 × 20 ÷ 240 = 41.67 → 42 gtt/min
Infusion time	Total mL ÷ mL/h	1,000 ÷ 80 = 12.5 h; 0900 → 2130

Drop factor is printed on the tubing package. Pumps run mL/h; gravity, gtt/min.

DROP FACTOR	TUBING	GTT/MIN FROM ML/H
10 gtt/mL	Macrodrip	mL/h ÷ 6
15 gtt/mL	Macrodrip	mL/h ÷ 4
20 gtt/mL	Macrodrip	mL/h ÷ 3
60 gtt/mL	Microdrip	Same as mL/h

EXAM TIP Decimal hours × 60 = minutes: 12.5 h is 12 h 30 min, not 12 h 50 min.

TITRATION MATH

Mainly RN content. Order 10 mcg/kg/min; 60 kg; 250 mg in 250 mL = 1,000 mcg/mL.

1. Per min: 10 × 60 kg = 600 mcg/min.
2. Per h: 600 × 60 = 36,000 mcg/h.
3. Rate: 36,000 ÷ 1,000 = 36 mL/h.

Reverse: 36 × 1,000 ÷ 60 ÷ 60 = 10 mcg/kg/min. Hourly orders skip the × 60: 15 units/kg/h × 80 kg ÷ 100 units/mL = 12 mL/h.

FIND	FORMULA
mL/h	mcg/kg/min × kg × 60 ÷ mcg/mL
mcg/kg/min	mL/h × mcg/mL ÷ 60 ÷ kg
mL/h for units/kg/h	units/kg/h × kg ÷ units/mL

RECONSTITUTION

- Add the diluent and volume the label names.
- Use the label's final concentration, not the diluent volume; the powder adds volume.
- 1 g vial + 4.8 mL diluent = 5 mL of 200 mg/mL. Order 300 mg: 1.5 mL.
- Label with date, time, concentration and initials; observe its storage limit.

ROUNDING, NOTATION AND CONVERSIONS

- NCLEX: round once, at the end.
- Give the whole number or decimal places asked, decimal point included (7 to one place is 7.0).
- Nothing stated (common teaching): over 1 mL to tenths, under 1 mL to hundredths; drops and capsules whole.
- Split only scored tablets; never split or crush extended-release or enteric-coated.
- Orders and charting: leading zero (0.5 mg, not .5 mg); no trailing zero (5 mg, not 5.0 mg).
- Commas from 1,000 up. Write mcg, not µg; units, not U or IU.

SAFETY A missed decimal point is a tenfold error: .5 read as 5, or 5.0 read as 50.

Exam values; exact ones differ slightly (1 fl oz is 29.57 mL). Infant: 7 lb 8 oz = 7.5 lb = 3.4 kg.

UNIT	EQUALS
1 kg	2.2 lb = 1,000 g
1 lb	16 oz
1 g	1,000 mg
1 mg	1,000 mcg
1 L	1,000 mL
1 tsp	5 mL
1 tbsp	15 mL (3 tsp)
1 fl oz	30 mL
1 cup	240 mL (8 fl oz)

EXAM TIP Memorize these. NCLEX provides an on-screen calculator but prohibits handheld calculators and conversion tables.

Sources (19) are listed with links at rnbasics.com/sheets/med-math.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. RN Basics is an independent study aid not affiliated with any certifying body.