THE SHIP DOCTOR

Emergency Drug Calculations

An Order-to-Pump Workbook for Nurses and Paramedics



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EQUATION 4, WORKED END TO END

Order: noradrenaline 0.08 micrograms/kg/min. Patient 74 kg. Bag: noradrenaline 4 mg in 50 mL.

1. Find the concentration in micrograms per mL.

   `4 mg = 4000 mcg; 4000 ÷ 50 = 80 mcg/mL`

2. Dose per minute.

   `0.08 × 74 = 5.92 mcg/min`

3. Dose per hour.

   `5.92 × 60 = 355 mcg/h`

4. Divide by concentration to get the rate.

   `355 ÷ 80 = 4.44 mL/h`

Set the pump to 4.4 mL/h

Sense check: a 74 kg adult on a low dose of noradrenaline, 4 mg in 50 mL — single figures of mL per hour is exactly what you expect.

Follow the order to the pump

ORDER	SYRINGE LABEL	PUMP SETTING
0.08 mcg/kg/min	**4 mg in 50 mL**	**4.4 mL/h**
Patient weight: 74 kg	Concentration: 80 mcg/mL	Exercise display, rounded

Which number belongs on the pump screen?

Cover the third panel. Work from the order and the syringe label to obtain mL/h. Check your answer against the numbered steps above. The dose and the volume rate describe different quantities.

FOUNDATION

SCENARIO 8

Inheriting three pumps before a transfer

INTENSIVE CARE, PREPARING FOR RETRIEVAL

THE SITUATION

You are taking a 75 kg patient by road. Three infusions are running and the chart is incomplete. Noradrenaline 8 mg in 50 mL at 9 mL/h. Propofol 1% at 14 mL/h. Insulin 50 units in 50 mL at 3 mL/h. The journey is 90 minutes.

1. **What dose of noradrenaline is the patient receiving?**

2. **Propofol 1% is 10 mg/mL. What dose in mg/kg/h is 14 mL/h?**

3. **How many units of insulin per hour?**

4. **The noradrenaline syringe has 14 mL left. Will it last the journey?**

5. **You only have 4 mg in 50 mL bags for the journey. What rate maintains the same dose?**

Scenario 8 · worked answers

1. 0.32 micrograms/kg/min
Concentration = 8000 ÷ 50 = 160 mcg/mL → 9 × 160 = 1,440 mcg/h → ÷ 60 = 24 mcg/min → ÷ 75 = 0.32 mcg/kg/min

2. 1.87 mg/kg/h
14 × 10 = 140 mg/h → ÷ 75 = 1.87 mg/kg/h

3. 3 units/hour
50 units in 50 mL = 1 unit/mL, so mL/h equals units/h

4. It lasts 1.56 hours — about 1 h 33 min, so yes, but with little margin
14 ÷ 9 = 1.56 h = 1 h 33 min for a 90 minute journey → Change it before you leave, or carry a primed spare

5. 18 mL/h
Concentration halves from 160 to 80 mcg/mL → So the rate doubles: 9 × 2 = 18 mL/h

THE TRAP

Leaving with 14 mL in a syringe because the maths "just works". Any delay, and the vasopressor stops in the back of a moving vehicle.

DEBRIEF

Hand over each infusion as drug, concentration, rate and dose — four facts, not one number. Write them on the transfer sheet before you move the patient.