Med-Surg Math Practice Fall 2020

This question only addresses hours, not minutes so use 1 hour.

1. A patient is to be given a diltiazem drip at a rate of 5mg/hr. The drug is supplied as 50 mg/100mL. Calculate the flow rate in mL/hr. Enter whole numbers only. No letters.

$$mL/hr = \frac{dose \times time}{concentration}$$

$$Concentration = \frac{50mg}{100mL}$$

$$= 0.5mg/mL$$

$$= \frac{5mg/hr \times 1hr}{0.5\ mg/mL}$$

$$= 10\ mL/hr$$

On test will enter **10**

2. The patient is to receive a continuous infusion of erythromycin at 25 mg/hr. The drug is available as 250 mg/500 mL. How many mL/hr should the nurse infuse? Enter whole numbers only. No letters.

$$mL/hr = \frac{dose \times time}{concentration}$$

$$Concentration = \frac{250mg}{500mL}$$

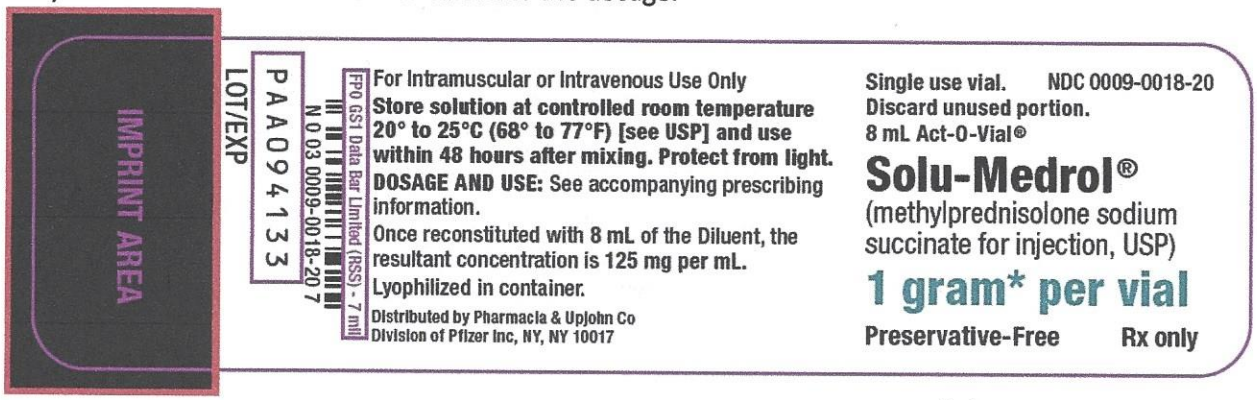
$$= 0.5mg/mL$$

$$= \frac{25mg/hr \times 1hr}{0.5mg/mL}$$

$$= 50mL/hr$$

On test will enter **50**

3. A patient is to receive 40 mg of solumedrol injection daily. How many mL would be injected in a daily dose? Use the label below to calculate the dosage.



We have 125mg/mL. We want 40mg.

$$\frac{\text{Desired}}{\text{Have}} = \frac{40\text{mg}}{125\text{mg/mL}}$$

$$= 0.32\text{mL}$$

Would write [0.3] on test

4. Norepinephrine is infusing at 30 ml/hr. The medication is supplied as 4 mg in 250 mL of D5W. The patient weighs 170 pounds. Calculate the dose in mcg/kg/min. Round to the nearest tenth. Enter numbers only.

$$\text{mcg/kg/min} = \frac{\text{concentration} \times \text{rate}}{\text{wt(kg)} \times 60\text{ min}}$$

Concentration:

4mg = 4000 mcg

$\frac{4000\text{ mcg}}{250\text{mL}} = 16\text{mcg/mL}$

$$= \frac{16\text{mcg/mL} \times 30\text{mL/hr}}{77\text{kg} \times 60\text{min}}$$

Wt in kg $= \frac{170}{2.2}$

$= 77\text{ kg}$

$$= \frac{480\text{ mcg/hr}}{4620\text{ kg/min}}$$

$= 0.1\text{ mcg/kg/min}$

or [0.1] on test

5. The patient is to receive fentanyl 100 mcg now. How many mL should be delivered? (Enter numbers only)

Concentration = $\frac{250 mcg}{5 mL}$ = $\frac{50 mcg}{1 mL}$

$\frac{Desired}{Have} = \frac{100 mcg}{50 mcg/mL} = 2 mL$

Would write [2] on test

6. A patient is receiving nicardipine at a rate of 10 mL/hr. The medication is supplied as 25 mg/250 mL. How many mg/hr are infusing? (Enter numbers only).

What do I have? Rate = 10mL/hr Concentration = $\frac{25 mg}{250 mL}$ = 0.1mg/mL

Looking for mg/hr

We have mg/mL and mL/hr

Will multiply $\frac{0.1 mg}{1 \cancel{mL}} \times \frac{10 \cancel{mL}}{1 hr} = 1 mg/hr$

Will write [1] on the test

7. The patient is to receive levofloxacin 150 mg IV over 1.5 hours. The medication is supplied as 150 mg in 100 mL of D5W. The IV tubing delivers 20 gtts/mL. How many gtt/min will the nurse deliver? Round to the nearest whole number.

$$\text{gtt/min} = \frac{\text{vol} \times \text{gtt/factor}}{\text{time}}$$

$$= \frac{100\,\text{mL} \times 20\,\text{gtt/mL}}{90\,\text{min}}$$

$$= \frac{2000}{90}$$

$$= 22\,\text{gtt/min}$$

or **22** on test

8. A patient is receiving dobutamine at a rate of 30 mL/hr. The drug is supplied as 250mg/500 mL. How many mcg/min are infusing. Round to the nearest tenth.

Concentration =

= convert mg to mcg

250mg = 250,000 mcg

$$= \frac{250{,}000\,\text{mcg}}{50\,\text{mL}}$$

$$= 500\,\text{mcg/mL}$$

$$\frac{500\,\text{mcg/mL} \times 30\,\text{mL/hr}}{60\,\text{min}}$$

$$= \frac{15{,}000\,\text{mcg/hr}}{60\,\text{min}}$$

$$= 250\,\text{mcg/min}$$

or **250** on test

9. A patient is to receive promethazine 12.5 mg IV push now. The medication is supplied as 40 mg/10 mL. How many mL should be delivered? Round to the nearest tenth.

$$\text{Concentration} = \frac{40\text{mg}}{10\text{mL}} = 4\text{mg/mL}$$

$$\frac{\text{Desired}}{\text{Have}} = \frac{25}{4}$$

$$= 3.12$$

$$= 3.1$$

or $\boxed{3.1}$ on test

10. Dopamine is to be give at a rate of 72 mg/hr. The drug is supplied as 400 mg/250 mL. Calculate the flow rate in mL/hr. (Enter numbers only)

$$\text{mL/hr} = \frac{\text{dose}}{\text{concentration}}$$

$$= \frac{72\text{ mg/hr}}{1.6\text{ mg/mL}}$$

$$= 45\text{ mL/hr}$$

or $\boxed{45}$ on test

Concentration =

$$= \frac{400\text{mg}}{250\text{mL}}$$

$$= 1.6\text{ mg/mL}$$

11. A patient is currently receiving nitroglycerin at 10 mL/hr. The concentration of nitroglycerin is 50 mg/250 mL. The nurse receives a new order to increase the infusion rate to 15 mL/hr. How many mcg/min will the patient be receiving? (Round to the nearest whole number. Enter numbers only.)

$$\text{mcg/min} = \frac{\text{mcg/mL} \times \text{mL/hr}}{\text{time}}$$

Convert mg to mcg

50 mg = 50,000 mcg

Concentration = 50,000 mcg / 250 mL = 200 mcg/mL

$$= \frac{200 \text{ mcg/mL} \times 15 \text{ mL/hr}}{60 \text{ min}}$$

$$= \frac{3000 \text{ mcg/hr}}{60 \text{ min}}$$

$$= 50 \text{ mcg/min}$$

or **50** on the test

12. A dehydrated patient is to receive a fluid bolus of 500 mL of NS in four hours. What rate (mL/hr) would you set the IV pump?

$$\text{mL/hr} = \frac{500 \text{ mL}}{4 \text{ hrs}}$$

$$= 125 \text{ mL/hr}$$

or **125** on the test

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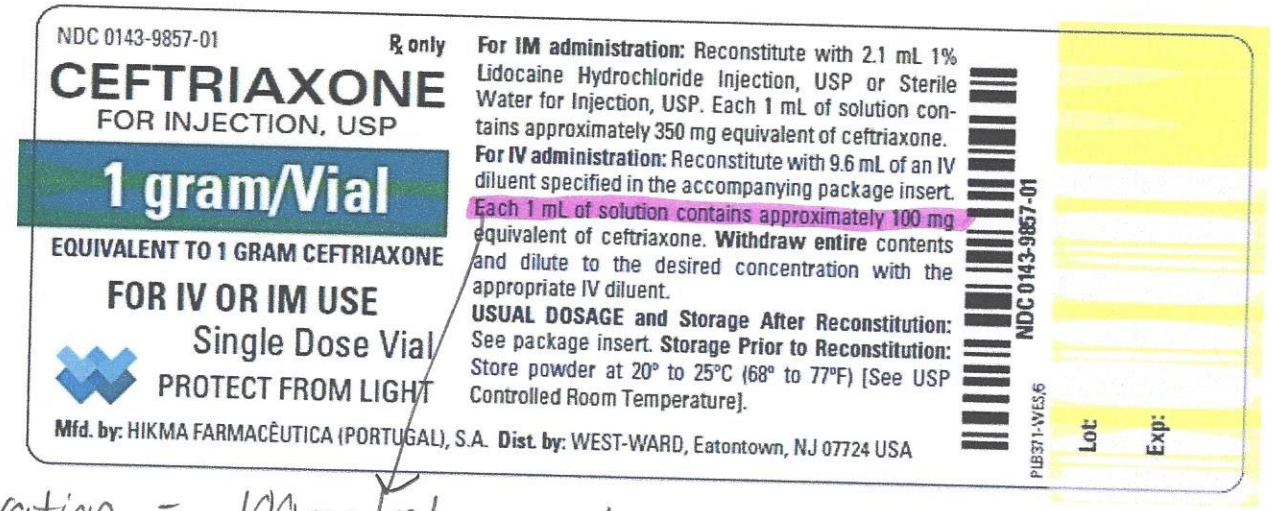
13. A patient is to receive ceftriaxone 250 mg intravenous injection daily. How many mL would be injected in a daily dose? Use the label below to calculate the dosage. Round to the nearest tenth.


NDC 0143-9857-01 ℞ only

CEFTRIAXONE
FOR INJECTION, USP

1 gram/Vial

EQUIVALENT TO 1 GRAM CEFTRIAXONE

FOR IV OR IM USE
Single Dose Vial
PROTECT FROM LIGHT

For IM administration: Reconstitute with 2.1 mL 1% Lidocaine Hydrochloride Injection, USP or Sterile Water for Injection, USP. Each 1 mL of solution contains approximately 350 mg equivalent of ceftriaxone.
For IV administration: Reconstitute with 9.6 mL of an IV diluent specified in the accompanying package insert. Each 1 mL of solution contains approximately 100 mg equivalent of ceftriaxone. **Withdraw entire** contents and dilute to the desired concentration with the appropriate IV diluent.
USUAL DOSAGE and Storage After Reconstitution: See package insert. **Storage Prior to Reconstitution:** Store powder at 20° to 25°C (68° to 77°F) [See USP Controlled Room Temperature].

Mfd. by: HIKMA FARMACÊUTICA (PORTUGAL), S.A. **Dist. by:** WEST-WARD, Eatontown, NJ 07724 USA

NDC 0143-9857-01
PLB371-WES.6
Lot:
Exp:

Concentration = 100mg/mL

$$\frac{\text{desired}}{\text{have}} = \frac{250\text{mg}}{100\text{mg}/1\text{mL}}$$

$$= 2.5\text{mL}$$

or 2.5 on test

14. The patient is to receive ciprofloxacin 500 mg over two hours. It is supplied as 500 mg in 200 mL of D5W. The drip factor for the tubing is 15. How many gtt/min should be delivered? Round to the nearest whole number. Enter numbers only.

$$\text{gtt/min} = \frac{\text{volume} \times \text{gtt factor}}{\text{time}}$$

$$= \frac{200\text{mL} \times 15}{120\text{ min}}$$

$$= \frac{3000}{120}$$

$$= 25\text{ gtt/min} \quad \text{or } 25$$

15. There is an order to give pantoprazole 10 mg IV now. The medication is 20 mg to be diluted in 10 mL of sterile normal saline. How many mL should be delivered? Round to the nearest whole number. Enter numbers only.

$$\text{Concentration} = \frac{20\text{mg}}{10\text{mL}} = \frac{2\text{mg}}{1\text{mL}}$$

$$\frac{\text{Desired}}{\text{Have}} = \frac{10\text{mg}}{2\text{mg}\,/\,1\text{mL}}$$

$$= 5\text{mL}$$

or **5** on test

16. The order is to give morphine 4 mg IV push now. How many mL from this vial should be delivered? (Enter numbers only)

$$\frac{\text{Desired}}{\text{Have}} = \frac{4\text{mg}}{10\text{mg}\,/\,1\text{mL}}$$

$$= 0.4\text{mL}$$

or **0.4**

17. A patient is receiving nitroglycerin at 5 mL/hr. The concentration is 0.2 mg/mL. How many mcg/min is the patient receiving? Enter whole numbers only. No letters.

$$\text{mcg/min} = \frac{\text{mcg/mL} \times \text{mL/hr}}{\text{time}}$$

Convert mg to mcg

0.2 mg = 200 mcg

$$= \frac{200 \text{ mcg/mL} \times 5 \text{ mL/hr}}{60 \text{ min}}$$

$$= \frac{1000 \text{ mcg/hr}}{60 \text{ min}}$$

$$= 16.666666 \text{ or } 17 \text{ mcg/min}$$

[17] on the test

18. There is an order to give hydromorphone 1 mg IV now. The medication is supplied in a vial containing 2 mg of hydromorphone in 1 mL of solution. The nurse dilutes the entire contents of the vial by adding 4 mL of sterile normal saline. How many mL should be delivered in order to give the ordered dose of 1 mg?

Concentration = 2mg/5mL

= 0.4mg/mL

$$\frac{\text{Desired}}{\text{Have}} = \frac{1 \text{mg}}{0.4 \text{mg/mL}}$$

$$= 2.5 \text{mL}$$

or [2.5]

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Convert mg to mcg

19. Dobutamine is ordered to start at 5 mcg/kcg/min. The drug is supplied as 250 mg/50 mL. The patient weighs 97 kg. At what rate in mL/hr should the pump be set? (Round answer to the nearest whole number)

250,000 mcg

$$mL/hr = \frac{wt \times dose \times 60}{concentration}$$

Concentration = $\frac{250{,}000\ mcg}{50\ mL} = 5000\ mcg/mL$

$$= \frac{97\ kg \times 5\ mcg/kg/min \times 60\ min}{5000\ mcg/mL}$$

$$= \frac{29{,}100\ mcg}{5{,}000\ mL}$$

$$= 5.82\ mcg/mL$$

$$= 6\ mcg/mL \text{ or } \boxed{6}$$

20. The patient is to receive lincomycin HCL 3 grams over 3 hours. The drug is supplies as 3 grams/300 mL. The drop factor of the tubing is 20. How many gtt/min should be administered? Round to the nearest whole number.

$$gtt/min = \frac{volume \times gtt\ factor}{time}$$

$$= \frac{300\ mL \times 20\ gtt/mL}{180\ min}$$

$$= 33.33\ gtt/min$$

or $\boxed{33}$

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21. Dexmedetomidine HCL is infusing at 150 mL/hr. The drug is supplied as 0.2 mg/50 mL. The patient weighs 175 pounds. How many mcg/kg/min is the patient receiving? (Round answer to the nearest tenth)

Convert mg to mcg

= 200mcg

Concentration =

$= \frac{200\text{mcg}}{50\text{mL}}$

= 4 mcg/mL

Convert lb to kg

$\div \frac{175}{2.2} = 79.5$

$\text{mcg/kg/min} = \frac{\text{concentration} \times \text{rate}}{\text{weight} \times \text{time}}$

$= \frac{4\text{mcg/mL} \times 150\text{mL/hr}}{79.5\text{kg} \times 60\text{min}}$

$= \frac{600\text{ mcg/hr}}{4,770\text{ kg/min}}$

$= 0.1\text{ mcg/kg/min}$

or $\boxed{0.1}$