

Jo Beth Nichols Dosage Calc Remediation

$\text{dose} = \frac{\text{Conc} \times \text{Rate}}{\text{mass} \times 60 \text{ min/hr}}$
 $\text{Rate} = \frac{\text{mass} \times 60 \text{ min/hr} \times \text{dose}}{\text{Conc}}$
 $\text{Conc} = \frac{\text{mass} \times 60 \text{ min/hr} \times \text{Rate}}{\text{Rate}}$

Additional Math Practice 1

Rate Given
 1. A patient is to receive dobutamine at a rate of 10 mL/hr. The drug is labeled 250 mg/250 mL. The patient weighs 82 kg. How many mcg/kg/min are infusing?
 Formula = $\frac{\text{mass (kg)} \times \text{dose} \times \text{med Conc} \times \text{Rate}}{\text{WT} \times 60 \text{ min/hr}}$
 Known: $\text{Conc} = 1000 \text{ mcg/mL}$ unknown: dose
 $\text{Rate} = 10 \text{ mL/hr}$
 $\text{Weight of PT} = 82 \text{ kg}$
 $\text{dose} = \frac{(\text{Conc})(\text{Rate})}{\text{WT} \times 60 \text{ min/hr}} = \frac{(1000 \text{ mcg/mL})(10 \text{ mL/hr})}{82 \text{ kg} \times (60 \text{ min/hr})} = \frac{10000}{4920} = 2.0 \text{ mcg/kg/min}$

Rate Given
 2. If norepinephrine is infusing at 13 mL/hr, what would the nurse expect the dose to be in mcg/min? The bag is labeled norepinephrine 4 mg/250 mL. The patient weighs 94 kg. Round to the nearest tenth.
 Known: $\text{Rate} = 13 \text{ mL/hr}$ unknown: dose in mcg/min
 $\text{Conc} = 4 \text{ mg}/250 \text{ mL}$
 $4 \text{ mg} \times \frac{1000 \text{ mcg}}{1 \text{ mg}} = 4000 \text{ mcg}/250 \text{ mL} = 16 \text{ mcg/mL}$
 Formula = $\frac{\text{Conc} \times \text{Rate}}{60 \text{ min/hr}} = \frac{16 \text{ mcg/mL} \times 13 \text{ mL/hr}}{60 \text{ min/hr}} = 3.5 \text{ mcg/min}$

Rate = mL/hr
 3. A patient's blood pressure has decreased to 70/48 mmHg following a significant head injury. The primary healthcare provider writes an order to start a Dopamine infusion at 10 mcg/kg/min. Pharmacy sends a bag labeled Dopamine 400 mg/250 mL. The patient weighs 68 kg. What rate will the pump need to be set on to achieve the desired dose?
 Formula = $\frac{\text{pt mass} \times \text{dose} \times (60 \text{ min/hr})}{\text{medication Conc}} = \frac{(68 \text{ kg})(10 \text{ mcg/kg/min})(60 \text{ min/hr})}{400000 \text{ mcg/mL}} = \frac{40800}{400000} = 0.102 \text{ mL/hr}$

Rate mL/hr
 4. The nurse receives an order to titrate propofol for sedation. The patient is currently receiving 8 mcg/kg/min. Determine the rate that is currently infusing in mL/hr. The bottle is labeled propofol 1 GM/100mL. The patient weighs 90 kg.
 Known: $\text{dose} = 8 \text{ mcg/kg/min}$ unknown: Rate in mL/hr
 Concentration = 10,000 mcg/mL
 Formula = $\frac{\text{pt mass} \times \text{dose} \times 60 \text{ min/hr}}{\text{Conc}} = \frac{(90 \text{ kg})(8 \text{ mcg/kg/min})(60 \text{ min/hr})}{10000 \text{ mcg/mL}} = \frac{43200}{10000} = 4.32 \text{ mL/hr}$

Rate mL/hr
 5. The nurse receives an order to initiate a Cordarone infusion at 0.5 mg/min. The drug is labeled 450 mg/250mL. How many mL/hr should the pump be set on to deliver the correct dose?
 Known: $\text{Rate} = 0.5 \text{ mg/min}$ unknown: Rate mL/hr
 $\text{Conc} = 450 \text{ mg}/250 \text{ mL}$
 Formula = $\frac{D}{H} \times V = \frac{0.5 \text{ mg/min} \times 250 \text{ mL}}{450 \text{ mg}} = \frac{125}{450} \text{ mL/min} = 0.28 \text{ mL/min} \times 60 \text{ min/hr} = 16.7 \text{ mL/hr}$

$$\checkmark \frac{d}{H} \times V = \frac{\text{desired mg/hr}}{\text{have mg}} \times V = \frac{0.5 \text{ mg/min}}{450 \text{ mg}} \times 250 \text{ ml} =$$

$$= 0.28 \frac{\text{ml}}{\text{min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 16.8 \text{ ml/hr}$$

- ✗ Nicardipine is to be given at a rate of 5 mg/hr. The drug is supplied as 50 mg/250 mL. How many mL/hr should the pump be set on to deliver the correct dose?

✓ Rate

$$\text{Formula} = \frac{\text{dose} \times 60 \text{ min/hr}}{\text{Conc}} = \frac{5 \text{ mg/hr}}{50 \text{ mg}} \times 250 \text{ ml} = 125 \text{ ml/hr}$$

7. Heparin is ordered at 800 units/hr. The drug is supplied as 25000 units/500 mL. What rate should the pump be set at?

✓

$$\frac{\text{order}}{\text{Conc}} = \frac{800 \text{ units/hr}}{25000 \text{ units} / 500 \text{ ml}} = \frac{800}{50} = 16 \text{ ml/hr}$$

8. The patient is to receive 10 mcg/min of norepinephrine. The drug is supplied as 16 mg/250 mL. The patient weighs 83 kg. How many mL/hr will you place the pump on?

✓

$$\text{dose} = 10 \text{ mcg/min}$$

$$\text{Conc} = \frac{16 \text{ mg}}{250 \text{ ml}} = 16000 \text{ mcg} / 250 \text{ ml} = 64 \text{ mcg/ml}$$

$$= \frac{(10 \text{ mcg/min})}{64 \text{ mcg/ml}} \times (60 \text{ min/hr}) = 9.375 \text{ ml/hr} = 9.4 \text{ ml/hr}$$

9. The patient is to receive Rocephin 1 GM over 90 minutes. The drug is supplied as 1 GM/100 mL. The drop factor is 20. How many gtt/min should be delivered?

✓

$$\frac{V}{T} \times \text{drop factor} = \frac{100}{90 \text{ min}} \times 20 \text{ gtt/ml} = 22.2 \text{ gtt/min} = 22 \text{ gtt/min}$$

10. The patient is to receive Cipro 400 mg IV over 1 hour. The bag of Cipro comes from the pharmacy labeled Cipro 400 mg in 100 mL D5W. The IV tubing delivers 12 gtt/mL. How many drops per minute (gtt/mL) will you deliver?

✓

$$\frac{V}{T} \times \text{drop factor} = \frac{100 \text{ ml}}{60 \text{ min}} \times 12 \frac{\text{gtt}}{\text{ml}} = 20 \text{ gtt/min}$$

11. The patient is on a dopamine drip infusing at 35 mL/hr. The label reads 400 mg Dopamine is 500 mL D5W. The client weights 62 kg. How many mcg/kg/min is the client receiving? Round to the nearest tenth.

$$\text{dose} = \frac{(R)(C)}{m(\text{60 min/hr})} = (35 \text{ mL/hr}) \left(\frac{400 \text{ mg}}{500 \text{ mL}} \right) = \frac{(35)(800)}{(62 \text{ kg})(60 \text{ min/hr})} = \frac{28000}{3720} = 7.5 \text{ mcg/kg/min}$$

12. The nurse receives an order to infuse Nitroglycerin at 60 mcg/min. It is supplied as 25 mg in 250 mL of normal saline. What rate (mL/hr) would the rate need to be set at?

$$R = \frac{(m)(d)(60 \text{ min/hr})}{C} = \frac{(100 \text{ mL})(60 \text{ min/hr})}{25 \text{ mg}} = \frac{3600}{25} = 144 \text{ mL/hr}$$

13. The patient is on an insulin drip. The current dose is 6 units/hr. The pharmacy sends a bag with 50 units regular insulin in 100 mL normal saline. At what rate (mL/hr) would you set the IV pump?

$$1 \text{ unit} = 0.01$$

$$R = \frac{(m)(d)(60 \text{ min/hr})}{C} = \frac{(100 \text{ mL})(60 \text{ min/hr})}{50 \text{ units}} = \frac{3600}{50} = 72 \text{ mL/hr}$$

14. The patient is to receive 3 units of blood over 5 hours. Each unit contains 250 mL of blood. How many drops per minute (gtt/min) is needed to give the blood over the required time? The IV tubing drop factor is 20 gtt/mL.

$$\frac{750 \text{ mL}}{5 \text{ hrs}}$$

$$\frac{750 \text{ mL}}{300 \text{ min}} \times \frac{20 \text{ gtt}}{\text{mL}} = 50 \text{ gtt/min}$$

$$R = \frac{(m)(\text{dose})(60 \text{ min/hr})}{C} = \frac{(3 \text{ units})(250 \text{ mL})(60 \text{ min/hr})}{1 \text{ unit}/250 \text{ mL}} = \frac{3600}{0.004} = 9000 \text{ gtt/min}$$

$$\text{Rate} = \frac{V}{T} \times \text{drop Factor}$$

$$\frac{750 \text{ mL}}{300 \text{ min}} \times 20 \text{ gtt/mL} = \frac{3000 \text{ gtt}}{300 \text{ min}} = 10 \text{ gtt/min}$$

Math Practice 2

1. The order is to infuse Cordarone 0.5 mg/min. Supplied is 450 mg/250 mL. What rate would you place on the pump? Round to the nearest tenth.

$$\frac{0.5 \text{ mg}}{\text{min}} \times \frac{250 \text{ mL}}{450 \text{ mg}} = 16.7 \text{ mL/hr}$$

2. The order is for Cordarone 16.7 mL/hr. Supplied is 450mg/250mL. How many mg/min are infusing?

$$\frac{16.7 \text{ mL/hr}}{250 \text{ mL}} \times 450 \text{ mg} = 30.06 \text{ mg/hr} \times \frac{1 \text{ hr}}{60 \text{ min}} = 0.5 \text{ mg/min}$$

3. Dobutamine is infusing at 15 mL/hr. The client weighs 203 lbs. The concentration is 500mg/250mL. Calculate the dose in mcg/kg/min.

$$\frac{500 \text{ mg}}{250 \text{ mL}} \times \frac{1 \text{ mL}}{1 \text{ mg}} = 2 \text{ mg/mL}$$

$$\frac{203 \text{ lbs}}{2.2} = 92.27 \text{ kg}$$

$$\frac{(15 \text{ mL/hr}) (200)}{(92.27) (60)} = \frac{3000}{5536.2} = 5.4 \text{ mcg/kg/min}$$

4. Heparin is ordered at 1200 units/hr. The drug is supplied as 25000 units/500mL. What rate should be placed on the pump?

$$\frac{1200 \text{ units/hr}}{25000 \text{ units}} \times 500 \text{ mL} = 24 \text{ mL/hr}$$

5. The client is receiving Levophed 10 mcg/min. The client weighs 83 kg. The drug is supplied as 8mg/250mL. Calculate the appropriate rate for the pump. Round to the nearest whole number.

$$\frac{10 \text{ mcg}}{\text{min}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 600 \text{ mcg/hr}$$

$$\frac{8 \text{ mg}}{250 \text{ mL}} \times \frac{1000 \text{ mcg}}{1 \text{ mg}} = 32 \text{ mcg/mL}$$

$$R = \frac{md}{L} = \frac{600 \text{ mcg/hr}}{32} = 18.75 = 19 \text{ mL/hr}$$

6. Infuse propofol at 17 mL/hr. The drug is supplied as 1 GM/100mL. The client weighs 80 kg. Calculate the dose in mcg/kg/min. Round to the nearest tenth.

$$d = \frac{RL}{m(bd)} = \frac{(17)(10000)}{(80)(60)} \times \frac{1000}{1000} = 35.4 \text{ mcg/kg/min}$$

7. The client is on an Insulin drip. The current dose is 8 units/hr. The bag is labeled 50 units/100 mL. What rate should you set on the pump to achieve the appropriate dose?

$$\frac{8 \text{ units/hr}}{50} \times 100 \text{ mL} = 16 \text{ mL/hr}$$

8. Heparin is infusing at 10 mL/hr. The bag is labeled 25,000 units/500 mL. How many unit/hr are infusing?

$$\frac{10 \text{ mL/hr}}{500 \text{ mL}} \times 25000 = 500 \text{ units/hr}$$

9. Lidocaine 2 GM/500mL is infusing at 30 mL/hr. How many mg/min are infusing?

$$\frac{2 \text{ g}}{500 \text{ mL}} \times 1000 \text{ mg/g} = \frac{2000 \text{ mg}}{500 \text{ mL}} \left\{ \frac{30 \text{ mL/hr}}{60 \text{ min/hr}} = 0.5 \text{ mL/min} \right\} \times \frac{2000 \text{ mg}}{500 \text{ mL}} = 2 \text{ mg/min}$$

10. The order is to infuse Fentanyl 100 mcg/hr. The bag is labeled 1 mg/250mL. How many mL/hr should you infuse?

$$\frac{100 \text{ mcg/hr}}{1 \text{ mg}} \times \frac{1 \text{ mg}}{1000 \text{ mcg}} = 0.1 \frac{\text{mg}}{\text{hr}} \times 250 \text{ mL} = 25 \text{ mL/hr}$$

11. Labetalol is infusing at 30 mL/hr. The bag is labeled 100mg/100mL. How many mg/min is infusing?

$$\frac{30 \text{ mL/hr}}{100 \text{ mL}} \times 100 \text{ mg} = 0.5 \text{ mg/min}$$

12. Heparin is infusing at 24 mL/hr. The bag is labeled 25,000 units/500mL. How many units/hr are infusing?

$$\frac{24 \text{ mL/hr}}{500 \text{ mL}} \times 25000 \text{ units} = 1200 \text{ units/hr}$$

Insulin drip

$$R = \frac{m(\text{units/hr}) (d)}{c}$$

$$d = \frac{(R)(c)}{m(\text{units/hr})}$$

Math Practice 3

1. The patient is on an Insulin drip infusing at 5 units/hr. The bag is labeled 100 units insulin in 250 ml normal saline. At what rate should the pump be set?

$$\frac{5 \text{ units/hr}}{100 \text{ units}} \times 250 \text{ ml} = 12.5 \text{ ml/hr}$$

2. Heparin is ordered to be given at 800 units/hr. The drug is supplied as 25000 units/500ml. At what rate should the pump be set?

$$\frac{800 \text{ units/hr}}{25000 \text{ units}} \times 500 \text{ ml} = 16 \text{ ml/hr}$$

3. The patient is receiving norepinephrine (Levophed) at 23 ml/hr to maintain a mean arterial pressure greater than 90. The drug is supplied as 4 mg/250ml. The patient weighs 87kg. How many mcg/min are infusing?

$$R = \frac{(m)(d)(w)}{c}$$

$$= \frac{(87)(23 \text{ ml/hr})(60 \text{ min/hr})}{4 \text{ mg} / 250 \text{ ml}} = 2.1 \text{ mcg/min}$$

4. The patient is to receive ceftriaxone (Rocephin) 500mg over 40 minutes. The drug is supplied as 1GM/50ml. The drop factor is 60. How many gtt/min should you deliver?

$$\text{gtt/min} = \frac{V}{T} \times \text{drop factor} = \frac{25 \text{ ml}}{40 \text{ min}} \times 60 \text{ gtt/min} = 38 \text{ gtt/min}$$

5. Give promethazine (Phenergan) 12.5mg IV now. The drug is supplied as 40mg/10ml. How many mLs will you deliver?

$$\frac{d}{w} \times v$$

$$\frac{12.5}{40} \times 10 = 3.1 \text{ ml}$$

$$\text{dose} = \frac{(R)(C)}{m(60/\text{hr})} = \frac{(15)(1000000)}{12.27(60)} = 7500000 / 736.2 = 10199.72$$

6. Dobutrex (Dobutamine) is infusing at 15 ml/hr. Calculate the dose in mcg/kg/min. The

concentration is 500mg/250ml. The patient weighs 203 lbs. $203 \div 2.2 = 92.27$

$$\frac{500 \text{ mg}}{1 \text{ mg}} \left| \frac{1000 \text{ mcg}}{250} = \frac{500000}{250} = 2000 \text{ mcg/ml}$$

$$\frac{2 \text{ mg}}{1 \text{ ml}} \left| \frac{1000}{1 \text{ mg}} = 2000$$

$$\frac{1000}{200} = 5.4$$

Rate given

7. The order is to infuse amiodarone (Cordarone) 0.5 mg/min. The drug is supplied as

450mg/250 ml of D5W. At what rate should the pump be set at?

pump
Rate
ml/hr

$$\text{ml/hr} = \frac{\text{dose}}{\text{conc}} = \frac{0.5 \text{ mg/min}}{1.8 \text{ mg/ml}} = 0.28 \text{ ml/min} \left| \frac{60 \text{ min}}{1 \text{ hr}} = 16.7 \text{ ml/hr}$$

$$\text{① conc} = \frac{450 \text{ mg}}{250 \text{ ml}} = 1.8 \text{ mg/ml}$$

8. Propofol (Diprivan) is infusing at 7 ml/hr. The drug is supplied as 1GM/100ml. The

patient weighs 160 lbs. How many mcg/kg/min is the patient receiving?

16

$$72.72$$

$$d = \frac{RC}{m}$$

$$43.63.6$$

$$43.63.6$$

$$= (7 \text{ ml/hr}) \left(\frac{1000 \text{ mcg}}{100 \text{ ml}} \right) \left(\frac{1}{60 \text{ min/hr}} \right) = 11.67 \text{ mcg/kg/min}$$

9. Nitroprusside (Nipride) is ordered to maintain a systolic blood pressure less than 180.

4362

The starting dose is 0.4mcg/kg/min. The drug is supplied as 50mg/250ml and the

patient weighs 94kg. What rate should be set on the pump?

516

$$(0.4 \text{ mcg}) (94) = 37.6 \text{ mcg/kg/min}$$

$$\frac{\text{dose}}{\text{conc}} = \frac{2.256}{0.2} = 11.28$$

$$\frac{37.6 \text{ mcg}}{1000 \text{ mcg}} \left| \frac{1 \text{ mg}}{1000 \text{ mcg}} = 0.0376 \text{ mg} \left| \frac{60 \text{ min}}{1 \text{ hr}} = 2.256 \text{ mg/hr} = \text{dose}$$

10. The order is for metoprolol (Lopressor) 2.5mg IV push for acute chest pain. The drug

is supplied as 10mg/2ml. How many mL's should you deliver?

$$\frac{d}{A} \times V = \frac{2.5}{10} \times 2 = 0.5$$

11. The patient is receiving diltiazem (Cardizem) 10ml/hr. The drug is supplied as 250mg/

500ml. How many mg/hr are infusing?

$$\frac{d}{H} \times V = \frac{10 \text{ ml/hr}}{500 \text{ ml}} \times 250 \text{ mg} = 5 \text{ mg/hr}$$

med Conc X Rate

$$\text{mg/hr} = \frac{30 \text{ mg}}{500 \text{ ml}} \times 30 \text{ ml/hr} = 1.8 \text{ mg/hr}$$

$$\frac{20 \text{ mg}}{500 \text{ ml}} \times 30 \text{ ml/hr} = 1.2 \text{ mg/hr}$$

$$\frac{\text{mg/ml}}{\text{mg/ml}} = \text{Rate}$$

$$\text{SXL} = \frac{0.002}{0.002} = 1$$

$$\frac{0.12 \text{ grams}}{1} \times 1000 = 120 \text{ mg}$$

$$\frac{30 \text{ ml/hr}}{500 \text{ ml}} \times 0.002 = 0.00012 \text{ mg/hr}$$

$$0.00012 \text{ mg/hr} \times 1000 = 0.12 \text{ mg/hr}$$

12. Xylocaine (Lidocaine) is infusing at 30ml/hr for ventricular tachycardia. The drug is supplied as 2GM/500ml. How many mg/min are infusing?

4/5

$$\frac{20 \text{ mg}}{100 \text{ ml}} \times 30 \text{ ml/hr} = 6 \text{ mg/hr}$$

$$\frac{30 \text{ ml/hr}}{60 \text{ min/hr}} = 0.5 \text{ ml/min}$$

13. The patient is to receive Cipro ^{order} 400 mg IV over 1 hour. You receive a bag from the pharmacy labeled Cipro 400 mg in 100 ml D5W. The IV tubing delivers 12 gtt/ml.

How many drops per minute (gtt/min) will you deliver?

$$\text{gtt/min} = \frac{\text{Vol} \times \text{drop factor}}{\text{Time}}$$

$$= \frac{100 \times 12 \text{ gtt/ml}}{60 \text{ min}} = 20 \text{ gtt/min}$$

14. The patient is on a Dopamine drip infusing at 35 ml/hr. The label reads 400 mg Dopamine in 500 ml D5W. The patient weighs 62 kg. How many mcg/kg/min is the patient receiving?

Infusion Rate = $\frac{35 \text{ ml}}{\text{hour}}$

Concentration = $\frac{400 \text{ mg}}{500 \text{ ml}} = 800 \text{ mcg/ml}$

Mass = 62 kg

Formula = $\frac{(R)(C)}{m(60 \text{ min/hr})} = \frac{(35)(800)}{62(60)} = \frac{28000}{3720} = 7.5 \text{ mcg/kg/hr}$

15. The order is to begin a Nitroglycerin infusion at 5 mcg/min. The bottle is labeled 25 mg/250 ml D5W. At what rate will you set the pump?

$$\text{Conc} = \frac{25 \text{ mg}}{250 \text{ ml}} = 0.1 \text{ mg/ml}$$

$$\frac{5 \text{ mcg}}{1000 \text{ mcg}} = 0.005 \text{ mg}$$

$$\frac{0.005 \text{ mg}}{60 \text{ min/hr}} = 0.000083 \text{ mg/min}$$

$$\frac{\text{dose}}{\text{conc}} = \frac{0.3 \text{ mg/hr}}{0.1 \text{ mg/ml}} = 0.3 \text{ ml/hr}$$