Intravenous Injections and Infusion

- Injection of the medication in to a vein (IV)
- Another example of Parenteral administration
- Medication enter the circulation directly
- Its effect is immediate
Needleless Infusion Systems

- This system consists of administration of medication with tubing which is connected with some type of vascular access device, like Catheter.
- Reduces the risk of IV contamination via air, blood, or touch and also accidental needle-stick injuries.

Intravenous solution containers

- Made of Glass, Plastic with different sizes and shapes.
- Glass containers are vacuum sealed and has rubber stoppers for the tubing for venting and addition of medications.
- Size of opening into the drip chamber determines the size of drop delivered by infusion set.
  - Macro drop 10, 15 or 20 drops per ml
  - Micro drop (mini drip) sets, exact amounts of liquid
  - Drop size is called drop factor = number of drops needed to deliver 1 mL of liquid.
  - Drop rates – number of drop per minutes
- Plastic containers have special ports for insertion of tubing and medications.
- All containers are collaborated according to the amount of fluid contained are labeled to type of solution with instruction of use.
- See page 148 for an example
Common Intravenous Solutions and their abbreviations

- Water (W)
- Saltine (S)
- Normal saltine (NS)
- Dextrose (D)
- Ringer’s (R)
- Lactated Ringer’s (LR)

Reading label – Drop Factor (gtt per mL)

What is the calibration in drops per milliliter for the infusion set?

Primary I.V. Set
2 m (80 in.) long
10 drops/ml

Primary I.V. Set
2.5 m (100 in.) long
60 drops/ml
Reading IV Labels - An example of a portion of a label for an IV infusion fluid is shown.

- What is the total number of mL of solution in the container?

- What percent of the solution is sodium chloride?

Calculation of IV Flow rates - gtt per Minutes

- Flow rates (gtt/min) = Number of drop per 1 minutes.

- In most cases, we start with
  - Starting factor = Drop Factor = gtt/mL

- Rounding off to nearest whole number
A client is to receive 1000 mL of D5W IV that is to be infused in 8 hours. The available IV set has a drop factor of 10 gtt per mL. How many drops per minute would deliver the ordered flow rate?

Starting factor: 10 gtt/mL = drop factor
Answer unit: gtt/min
Equivalents: 1000mL = 8 hours, 60 min = 1 hour
Conversion Equations:

\[
\frac{10 \text{ gtt}}{1 \text{ mL}} \times \frac{1000 \text{ mL}}{8 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 21 \text{ gtt/min}
\]

Rounded to nearest whole number.

How many **drops per minute** would deliver the ordered flow rate?

Calculation of IV Flow rates (infusion rates) - Flow Rates mL per hour

Flow rates = gtt/min
Infusion rates = mL/hr
Drop factor = gtt/mL
Calculate the flow rate in mL per hr for the following medication order.

Order: 1000 mL Lactated Ringers IV to infuse in 10 hours

Flow rate (mL per hr)
ORDER:

\[
\frac{1000\text{mL}}{10\text{hr}} = 100\text{mL/hr}
\]

Calculate the flow rate in mL per hr

---

Calculate the flow rate in mL per hr for the following medication order.

Order: 500 mL 5% D/NS IV to infuse in 4 hours

\[
\frac{500\text{mL}}{4\text{hr}} = 125\text{mL/hr}
\]

Infusion rates = 125 mL/hr

Calculate the flow rate in mL per hr
Calculate Fusion time

Dimensional analysis can be used to calculate anticipated length of time required for an infusion to be completed.

Carry your answer nearest hundredths and then round to nearest tenths.

When calculating Infusion time,
starting factor: order
Equivalents: Drop factor, flow rate, …

Compute the infusion time for the following order.

Order: 900 mL of D5W IV
Drop Factor: 26 gtt per mL
Flow Rate: 30 gtt per min

How many hours will it take for the IV to infuse?

Starting factor: 900mL - ORDER
Answer unit: hour
Equivalents: 26gtt = 1 mL, 30gtt = 1 min, 1hr = 60min
Conversion Equations:

\[
900\text{mL} \times \frac{26\text{gtt}}{1\text{mL}} \times \frac{1\text{min}}{30\text{gtt}} \times \frac{1\text{hr}}{60\text{min}} = 13\text{hr}
\]

How many hours
Compute the infusion time for the following order.

Order: 1200 mL of D5W 1/4 NS
Drop Factor: 10 gtt per mL
Flow Rate: 20 gtt per min

How many hours will it take for the IV to infuse?

Starting factor: 1200mL
Answer unit: hour
Equivalents: 10gtt = 1 mL, 20gtt = 1 min, 1hr = 60min
Conversion Equations:

\[
1200\text{mL} \times \frac{10\text{gtt}}{1\text{mL}} \times \frac{1\text{min}}{20\text{gtt}} \times \frac{1\text{hr}}{60\text{min}} = 10\text{hr}
\]

Adding Medications to Intravenous Fluids

- IV flow rates is calculated the same whether or not medication has been added to the IV container.
- If medication to be added, inspect the information given and select the correct equivalents for the conversion equations.

- Flow rates = gtt/min
- Drop factor = gtt/mL
- Infusion rates = mL/hr
Calculate the flow rate in gtt per min for the following order. Refer to the label of the drug on hand.

**Order:** penicillin G potassium 5 million units in 100 mL of NS IV to be infused over 1 hour.

Starting factor: 15 gtt/mL
Answer unit: gtt/min
Equivalents: 100mL = 1 hr, 1hr = 60min
Conversion Equations:

\[
\frac{15 \text{ gtt}}{1 \text{ mL}} \times \frac{100 \text{ mL}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 25 \text{ gtt/hr}
\]

Calculate the flow rate in gtt per min

---

Calculate the flow rate in gtt per min for the following order. Refer to the label of the drug on hand.

**Order:** potassium chloride 40 mEq in 1000 mL of D5W IV to be infused over 10 hours.

Drop Factor: 20 gtt/mL
Starting factor: 20 gtt/mL
Answer unit: gtt/min
Equivalents: 1hr = 60 min, 1000mL=10hr
Conversion Equations:

\[
\frac{20 \text{ gtt}}{1 \text{ mL}} \times \frac{1000 \text{ mL}}{10 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 33 \text{ gtt/hr}
\]

Rounded to nearest whole number.

---

D5W = 5% DEXTROSE

Calculate the flow rate in gtt per min
Calculation of gtt/min When IV contains Medications

How many mL of the properly reconstituted supply of penicillin G potassium should be added to the 100 mL of NS for this order?

Order: penicillin G potassium 3 million units in 100 mL of NS IV to be infused over 1 hour.
Drop Factor: 15 gtt per mL

Refer to the label of the drug on hand.
Reconstitute with 8.2 mL of sterile water for injection to obtain a solution with a concentration of 500,000 units per mL.

Starting factor: 3 million units
Answer unit: mL
Equivalents: 1 mL = 500,000 units
Conversion Equations:

\[
3,000,000U \times \frac{1mL}{500,000U} = 6mL
\]

How many mL
Calculate the flow rate in gtt per min for the following order. Refer to the label of the drug on hand.

Order: penicillin G potassium 4 million units in 100 mL of NS IV to be infused over 1 hour.

Drop Factor: 10 gtt per mL

Starting factor: 10 gtt/mL
Answer unit: gtt/min
Equivalents: 100mL = 1 hr
Conversion Equations:

\[
\frac{10\text{ gtt}}{1\text{ mL}} \times \frac{100\text{ mL}}{1\text{ hr}} \times \frac{1\text{ hr}}{60\text{ min}} = 17\text{ gtt/min}
\]

Calculate the flow rate in gtt per min

Rounded to nearest whole number.

Compute the flow rate for the following order in gtt per min. The correct amount of the properly reconstituted supply was used to prepare the IV bag for administration.

Order: penicillin G potassium 3 million units in 100 mL of NS IV to be infused over 1 hour. Drop Factor: 15 gtt per mL

Refer to the label of the drug on hand.

Reconstitute with 8.2 mL of sterile water for injection to obtain a solution with a concentration of 500,000 units per mL.

Starting factor: 15 gtt/mL
Answer unit: gtt/min
Equivalents: 100mL = 1hr, 1hr = 60 min
Conversion Equations:

\[
\frac{15\text{ gtt}}{1\text{ mL}} \times \frac{100\text{ mL}}{1\text{ hr}} \times \frac{1\text{ hr}}{60\text{ min}} = 25\text{ gtt/min}
\]

Calculate the flow rate in gtt per min
How many mL of the properly reconstituted supply of cefotaxime sodium should be added to the 1000 mL of D5W for this order? Round answer to the nearest tenth of a mL.

**Drop Factor:** 15 gtt per mL

**Order:** cefotaxime sodium 1 g in 1000 mL of D5W IV to be infused over 8 hours.

Refer to the label of the drug on hand. Reconstitute the 2 g vial of cefotaxime sodium with 10 mL of D5W to obtain a solution with a concentration of 180 mg per mL.

**Starting Factor** | **Answer Unit**
--- | ---
1 g | mL

**Equivalents:** 1 g = 1000 mg, 180 mg = 1 mL

**Conversion Equation:**

\[
1 \text{ g} \times \frac{1000 \text{ mg}}{1 \text{ g}} \times \frac{1 \text{ mL}}{180 \text{ mg}} = 5.6 \text{ mL}
\]

**Volume:** 5.6 mL

How many mL

---

Compute the flow rate for the following order in gtt per min. The correct amount of the properly reconstituted supply was used to prepare the IV bag for administration.

**Order:** cefotaxime sodium 1 g in 1000 mL of D5W IV to be infused over 8 hours.

Reconstitute the 2 g vial of cefotaxime sodium with 10 mL of D5W to obtain a solution with a concentration of 180 mg per mL.

**Drop Factor:** 15 gtt per mL

Refer to the label of the drug on hand.

**Starting factor:** 15 gtt/mL

**Answer unit:** gtt/min

**Equivalents:** 1000 mL = 8 hr, 1 hr = 60 min

**Conversion Equations:**

\[
\frac{15 \text{ gtt}}{1 \text{ mL}} \times \frac{1000 \text{ mL}}{8 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 31 \text{ gtt/min}
\]

**Compute the flow rate for the following order in gtt per min**
Calculating IV dosage and Flow rate based on Body Weight

The client’s weight is 108 lb. How many milligrams of bretylium tosylate should be given to administer the following order? Round answer to the nearest whole milligram.

Order: bretylium tosylate 5 mg per kg IV bolus
Available Supply: 50 mg per mL
For direct administration give undiluted at a rate of 1 dose in 15 seconds.

Equivalents: 1 kg = 2.2 lb, 5 mg = 1 kg

Conversion Equation:

\[
108 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{5 \text{ mg}}{1 \text{ kg}} = 245 \text{ mg}
\]

How many milligrams
The client's weight is 108 lb. How many mL of the available supply of bretylium tosylate should be given to administer the following order? Round answer to the nearest tenth of an mL.

Order: bretylium tosylate 5 mg per kg IV bolus
Available Supply: 50 mg per mL
For direct administration give undiluted at a rate of 1 dose in 15 seconds.

Equivalents: 1 kg = 2.2 lb, 5 mg = 1 kg, 50 mg = 1 mL

Conversion Equation:

\[
108 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{5 \text{ mg}}{1 \text{ kg}} = 245 \text{ mg}
\]

\[
245 \text{ mg} \times \frac{1 \text{ mL}}{50 \text{ mg}} = 4.9 \text{ mL}
\]

or

\[
108 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{5 \text{ mg}}{1 \text{ kg}} \times \frac{1 \text{ mL}}{50 \text{ mg}} = 4.9 \text{ mL}
\]

How many mL

The client’s weight is 152 lb. How many mg of bretylium tosylate should be given to administer the following order? Round answer to the nearest whole mg.

Order: bretylium tosylate 5 mg per kg IV bolus
Available Supply: 50 mg per mL
For direct administration give undiluted at a rate of 1 dose in 15 seconds.

Equivalents: 1 kg = 2.2 lb, 5 mg = 1 kg

Conversion Equation:

\[
152 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{5 \text{ mg}}{1 \text{ kg}} = 345 \text{ mg}
\]

How many milligrams
The client’s weight is 152 lb. How many mL of the available supply of bretylium tosylate should be given to administer the following order? Round answer to the nearest tenth of a mL.

Order: bretylium tosylate 5 mg per kg IV bolus
Available Supply: 50 mg per mL
For direct administration give undiluted at a rate of 1 dose in 15 seconds.

Equivalent: 1 kg = 2.21 lb, 5 mg = 1 kg

Conversion Equation:

\[ \frac{152 \text{ lb}}{2.21 \text{ lb/kg}} \times \frac{5 \text{ mg}}{1 \text{ kg}} = 345 \text{ mg} \]

\[ \frac{345 \text{ mg}}{50 \text{ mg/mL}} = 6.9 \text{ mL} \]

or

\[ \frac{152 \text{ lb}}{2.21 \text{ lb/kg}} \times \frac{5 \text{ mg}}{1 \text{ kg}} \times \frac{1 \text{ mL}}{50 \text{ mg}} = 6.9 \text{ mL} \]

How many mL

How many mL of the available supply of naloxone should be administered for the following order?

Order: naloxone 0.4 mg IV bolus via primary infusion line
See label for the available supply.
Do not exceed a rate of 0.5 mg per min for IV bolus.

NDC 10019-059-68

**Naloxone HCI Injection, USP**

400 mcg/mL (0.4 mg/mL) \( R \) only

10 x 1 mL DOSETTE® Ampules

For Intramuscular, Subcutaneous or Intravenous Use

Each mL contains naloxone hydrochloride 400 mcg, sodium chloride 3.5 mg, metabisulfite 0.5 mg, and phenylethanol 0.2 mg in Water for Injection, pH 3.9 to 4.5, hydrochloric acid and sodium hydroxide used, if needed, for pH adjustment.

Usual Dosage: See package insert for complete prescribing information.

PROTECT FROM LIGHT: Keep covered in amber until time of use.

Store at controlled room temperature 15° to 30°C (59° to 86°F).

Avoid freezing.

To open ampule, ignore outer line, break at constriction.

**Baxter**

**Eisai Derleve**

Starting factor = order 0.4mg

Equivalent 0.4 mg = 1 mL

Conversion Equation:

\[ \frac{0.4 \text{ mg}}{0.4 \text{ mg/mL}} = 1 \text{ mL} \]
Compute the minimum number of seconds for administration of the following IV bolus.

Order: naloxone 0.4 mg IV bolus via primary infusion line
See label for the available supply.
Do not exceed a rate of 0.5 mg per min for IV bolus.

Starting factor = order 1mL from last problem.
Equivalents: 1min=0.5mg, 1min=60sec, 0.4mg/mL

\[
1mL \times \frac{0.4mg}{1mL} \times \frac{1min}{0.5mg} \times \frac{60sec}{1min} = 48sec
\]

How many mL of the available supply of naloxone should be administered for the following order?

Order: naloxone 0.6 mg IV bolus via primary infusion line
See label for the available supply.
Do not exceed a rate of 0.5 mg per min for IV bolus.

Starting factor = order 0.6mg
Equivalent: 0.4mg = 1mL
Conversion Equation:

\[
0.6mg \times \frac{1mL}{0.4mg} = 1.5mL
\]
Compute the minimum number of seconds for administration of the following IV bolus.

**Order:** naloxone 0.6 mg IV bolus via primary infusion line

See label for the available supply.

Do not exceed a rate of 0.5 mg per min for IV bolus.

Starting factor = order 1.5 mL from last problem.

Equivalents: 1 min = 0.5 mg,
1 min = 60 sec, 0.4 mg/mL

\[ 1.5 \text{mL} \times \frac{0.4 \text{mg}}{1 \text{mL}} \times \frac{1 \text{min}}{0.5 \text{mg}} \times \frac{60 \text{sec}}{1 \text{min}} = 72 \text{sec} \]

\[ 0.6 \text{mg} \times \frac{1 \text{min}}{0.5 \text{mg}} \times \frac{60 \text{sec}}{1 \text{min}} = 72 \text{sec} \]

---

After the following IV order has been infusing for 6 hours, 350 mL of NS remains to be infused. If the change is allowable, what should the rate be adjusted to in order for the infusion to be completed in the ordered time period?

**Order:** 1000 mL Lactated Ringer’s IV to infuse over a period of 10 hours.

Drop factor: 10 gtt per mL.

350 mL remain from the order and time remains 4 hours (10hr – 6hr)

Starting factor: 10 gtt/mL

Equivalents: 350 mL = 4 hr, 1 hr = 60 min

\[ \frac{10 \text{gtt}}{1 \text{mL}} \times \frac{350 \text{mL}}{4 \text{hr}} \times \frac{1 \text{hr}}{60 \text{min}} = 15 \text{gtt} / \text{min} \]

Rounded to nearest whole number.
After the following IV order has been infusing for 5 hours, 400 mL of D5W remains to be infused. If the change is allowable, what should the rate be adjusted to in order for the infusion to be completed in the ordered time period?
Order: 1000 mL D5W IV to infuse over a period of 8 hours.
Drop factor: 15 gtt per mL.

400 mL remain from the order and time remains 3 hours (8hr – 5hr)

Starting factor = 15gtt/mL drop factor
Equivalents: 400mL=3hr, 1hr = 60min
Conversion equations:

\[
\frac{15 \text{ gtt}}{1 \text{ mL}} \times \frac{400 \text{ mL}}{3 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 33 \text{ gtt/min}
\]

Rounded to nearest whole number.

---

**Critical Care IV Calculation**

- The provider may order the IV medication to be infused at the rate of a specific concentration (amount) of drug per unit of time.
- Drug fusion rate can be calculated in terms of:
  - Volume of solution per unit of time (mL/hr or mL/min)
  - Or
  - Concentration of drug per unit of time (mg, mcg, units per hour or min)
The client’s weight is 135 lb. How many mcg per min must be administered for the lower range of titration (3 mcg per kg per min) for the following order? Round answer to the nearest whole mcg.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrate at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg

lower limit = 3 mcg per kg per min

Equivalents: 1 kg = 2.2 lbs, 1 kg = 3 mcg per min

\[
135 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{3 \text{ mcg per min}}{1 \text{ kg}} = 184 \text{ mcg / min}
\]

How many mcg per min

The client’s weight is 135 lb. How many mL per hr must be administered for the lower range of titration (3 mcg per kg per min) for the following order? Round answer to the nearest tenth of a mL.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrate at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg

Using lower range (3 mcg per kg per min)

We calculate flow rates by

\[
135 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{3 \text{ mcg per min}}{1 \text{ kg}} = 184 \text{ mcg / min}
\]

Equivalents: 1 hr = 60 min, 1 min = 184 mcg, 50 mg = 250 mL, 1 mg = 1000 mcg

\[
\frac{184 \text{ mcg}}{1 \text{ min}} \times \frac{1 \text{ mg}}{1000 \text{ mcg}} \times \frac{250 \text{ mL}}{50 \text{ mg}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 55.2 \text{ mL / hr}
\]

How many mL per hr
The client’s weight is 135 lb. How many mcg per min must be administered for the upper range of titration (6 mcg per kg per min) for the following order? Round answer to the nearest whole mcg.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrated at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg

Upper limit = 6 mcg per kg per min

Equivalents: 1 kg = 2.2 lbs, 1 kg = 6 mcg per min

\[
135 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{6 \text{ mcg per min}}{1 \text{ kg}} = 368 \text{ mcg / min}
\]

How many mcg per min

The client’s weight is 135 lb. How many mL per hr must be administered for the upper range of titration (6 mcg per kg per min) for the following order? Round answer to the nearest tenth of a mL.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrated at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg

Using upper range (6 mcg per kg per min)

We calculate flow rates by

\[
135 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}} \times \frac{6 \text{ mcg per min}}{1 \text{ kg}} = 368 \text{ mcg / min}
\]

Equivalents: 1 hr = 60 min, 1 min = 368 mcg, 50 mg = 250 mL, 1 mg = 1000 mcg

\[
\frac{368 \text{ mcg}}{1 \text{ min}} \times \frac{1 \text{ mg}}{1000 \text{ mcg}} \times \frac{250 \text{ mL}}{50 \text{ mg}} \times \frac{60 \text{ min}}{1 \text{ hr}} = 110.4 \text{ mL / hr}
\]

How many mL per hr
The client’s weight is 135 lb. The client has been receiving the lower limit amount of medication for the following order, which has been administered at a rate of 55.2 mL per hour. The client’s blood pressure reading after an hour was 170 mm Hg, indicating that the dosage needed to be increased. Increase the rate by 5 mL per hour. Once the rate is increased, how many mcg per min will the client be receiving? Confirm that the amount is within the lower and upper range of mcg per min for the client.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrate at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg.

Equivalents: 1 hr = 60 min, 1 hr = 60.2 mL (55.2 mL + 5 mL), 50 mg = 250 mL, 1 mg = 1000 mcg

\[
\frac{60.2 \text{ mL}}{1 \text{ hr}} \times \frac{50 \text{ mg}}{250 \text{ mL}} \times \frac{1000 \text{ mcg}}{1 \text{ mg}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 201 \text{ mcg / min}
\]

Notice that a flow rate of 201 mcg per min is within the lower and upper bounds of 184 to 368 mcg per min for this patient.

The client’s weight is 162 lb. How many mcg per min must be administered for the lower range of titration (3 mcg per kg per min) for the following order? Round answer to the nearest whole mcg.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrate at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg.

lower limit = 3 mcg per kg per min

Equivalents: 1 kg = 2.2 lbs, 1 kg = 3 mcg per min

\[
162 \text{ lbs} \times \frac{1 \text{ kg}}{2.2 \text{ lbs}} \times \frac{3 \text{ mcg per min}}{1 \text{ kg}} = 221 \text{ mcg / min}
\]
The client’s weight is 162 lb. How many mcg per min must be administered for the upper range of titration (6 mcg per kg per min) for the following order? Round answer to the nearest whole mcg.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrte at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg.

Upper limit = 6mcg per kg per min

Equivalents: 1kg = 2.2 lbs, 1kg = 6mcg per min

\[
\frac{162 \text{ lbs}}{2.2 \text{ lbs}} \times \frac{1 \text{ kg}}{1 \text{ kg}} \times \frac{6 \text{ mcg per min}}{1 \text{ kg}} = 442 \text{ mcg / min}
\]

how many mcg per min

The client’s weight is 162 lb. The client has been receiving the lower limit amount of medication for the following order, which has been administered at a rate of 66.3 mL per hour. The client’s blood pressure reading after an hour was 170 mm Hg, indicating that the dosage needed to be increased. Increase the rate by 5 mL per hour. Once the rate is increased, how many mcg per min will the client be receiving? Confirm that the amount is within the lower and upper range of mcg per min for the client.

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrte at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg.

Equivalents: 1hr=60min, 1hr=71.3mL(66.3mL+5mL), 50mg=250mL, 1mg=1000mcg

\[
\frac{71.3 \text{ mL}}{1 \text{ hr}} \times \frac{50 \text{ mg}}{250 \text{ mL}} \times \frac{1000 \text{ mcg}}{1 \text{ mg}} \times \frac{1 \text{ hr}}{60 \text{ min}} = 238 \text{ mcg / min}
\]

Notice that a flow rate of 238mcg per min is within the lower and upper bounds of 221 to 442 mcg per min for this patient.

how many mcg per min
The client's weight is 162 lb. One hour after increasing the amount of medication for the following drug order by 5 mL per hour, the client's systolic blood pressure has decreased from 170 mm Hg to 150 mm Hg. Should the administration rate be increased, decreased, or remain the same at this time?

Order: Infuse nitroprusside sodium 50 mg in 250 mL of D5W IV. Titrate at a rate of 3 – 6 mcg per kg per min to maintain the systolic blood pressure at 150 mm Hg.

Answer using the correct response from the following selections: increase, decrease, remain the same

Remain the same

Calculation of IV Flow rates - gtt per Minutes

- Flow rates (gtt/min) = Number of drop per 1 minutes.

- In most cases, we start with
  - Starting factor = Drop Factor = gtt/mL

- Rounding off to nearest whole number
Calculate Fusion time

Dimensional analysis can be used to calculate anticipated length of time required for an infusion to be completed. Carry your answer nearest hundredths and then round to nearest tenths.

When calculating Infusion time,
starting factor: order
Equivalents: Drop factor, flow rate, …

Notes
- Read the questions carefully
- You may be given more information that you may need to solve the question.
- Pay attention what question is being asked
- Note if they are asking for medication to be added (mL, mg) OR process to administer the medication (flow rates, drop factor, infusion time,…)
- Make sure to answer unit and your final answer matches.