

IV FLOW RATE CALCULATION

I. Calculating Large volume gtt/min rates from ml/hr ordered.

Example 1 : An IV is ordered to infuse at a rate of 125 ml/hr using a set calibrated at 10 gtt/ml. Calculate the gtt/min flow rate.

STEP 1 : change the ml/hr ordered to ml/min

- $125 \text{ ml} \div 60 \text{ min} = 2 \text{ ml/min}$

STEP 2 : Convert ml/min to ml/hr

SOLUTION	
• Using RATIO & PROPORTION	• Using FRACTIONS
$10 \text{ gtt} : 1 \text{ ml} = X \text{ gtt} : 2 \text{ ml}$ $X = 20 \text{ gtt}$	$\frac{10 \text{ gtt}}{1 \text{ ml}} = \frac{X \text{ gtt}}{2 \text{ ml}} = 20 \text{ gtt}$

II. Calculating small volume gtt/min rates from ml/hr ordered.

Example 1 : An IV medication of 100 ml is to be infused in 40n min using a set calibrated at 15 gtt/ml. Calculate the gtt/min flow rate..

Ref: Curren M (2005). Math for Meds: Dosage and Solutions. 9th ed. Delmar Learning. Canada

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STEP 1 : Calculate the ml/min to be administered.

SOLUTION	
• Using RATIO & PROPORTION	• Using FRACTIONS
$100 \text{ ml} : 40 \text{ min} = X \text{ ml} : 1 \text{ min}$ $X = 2.5 \text{ ml/min}$	$\frac{100 \text{ ml}}{40 \text{ min}} = \frac{X \text{ ml}}{1 \text{ min}} = 2.5 \text{ ml/min}$

STEP 2 : calculate the gtt/min rate.

SOLUTION	
• Using RATIO & PROPORTION	• Using FRACTIONS
$15 \text{ gtt} : 1 \text{ ml} = X \text{ gtt} : 2.5 \text{ ml}$ $X = 37.5 = 38 \text{ gtt}$	$\frac{15 \text{ gtt}}{1 \text{ ml}} = \frac{X \text{ gtt}}{2.5 \text{ ml}} = 37.5 = 38 \text{ gtt}$

III. Formula Method of Flow Rate Calculation

$$\text{FLOW RATE} = \frac{\text{Volume X Set Calibration}}{\text{Time (in min)}}$$

Example 1 : An IV ordered to infuse at 125 ml/hr. Calculate the gtt/min rate for a set calibrated at 10 gtt/ml

STEP 1 : Convert the hr to min

- $\frac{125 \text{ ml} \times 10 \text{ gtt/ml}}{60 \text{ min}}$

STEP 2 : calculate the gtt/min rate.

- $\frac{125 \times 10}{60} = 20.8 = 21 \text{ gtt/min}$

IV. Division Factor Method of Calculation

R NOTE : This Method can only be used if the rate is expressed in ml/hr (ml/60min).

Example 1 : Administer IV at 125 ml/hr. The set calibration is 10 gtt/ml. Calculate the gtt/min rate. Express the hr rate as 60 min.

- $\frac{125 \text{ ml} \times \frac{10}{60} \text{ gtt/min}}{6} = 20.8 = 21 \text{ gtt/min.}$

R NOTE : The gtt/min flow rate can be calculated for ml/hr IV orders in one step by dividing the ml/hr to be infused by the division factor of the administration set.

Example 1 : Infuse an IV at 100 ml/hr using a set calibrated at 10 gtt/ml

- Determine the division factor:
 $60 \div 10 = 6$
- Calculate the flow rate
 $100 \text{ ml} \div 6 = 16.6 = 17 \text{ gtt/min}$

Example 2 : Infuse an IV at 125 ml/hr using a set calibrated at 15 gtt/ml

- Determine the division factor:
 $60 \div 15 = 4$
- Calculate the flow rate
 $125 \text{ ml} \div 4 = 31.2 = 31 \text{ gtt/min}$

R NOTE : For microdrip sets (60 gtt/ml) the gtt/min flow rate will be identical to the ml/hr

Example : Infuse at 50 ml/hr using a micro drip set.

- $60 \div 60 = 1$
- $50 \text{ ml} \div 1 = 50 \text{ gtt/min}$

V. Regulating Flow Rate

Example 1 : An IV is to run at a rate of 60 gtt/min. What will the 15 sec count be?

- $60 \text{ gtt/min} \div 4 = 15 \text{ gtt}$

V. Correcting off-schedule rates

Example 1 : An IV of 1000 ml was ordered to infuse over 10 hr at a rate of 25 gtt/min. The set calibration is 15 gtt/ml. After 5 hr a total of 650 ml have infused instead of the 500 ml ordered. Recalculate the new gtt/min flow rate to complete the infusion on schedule.

- Time remaining $10 \text{ hr} - 5 \text{ hr} = 5 \text{ hr}$
- Volume remaining: $1000 \text{ ml} - 650 \text{ ml} = 350 \text{ ml}$
 - $350 \text{ ml} \div 5 \text{ hr} = 70 \text{ ml/hr}$
- Set calibration is 15 gtt/ml
 - $70 \div 4 \text{ (division factor)} = 17.5 = 18 \text{ gtt/min}$

***Slow the rate from 25 gtt/min to 18 gtt/min**

Example 2 : An IV of 500 ml was ordered to infusing at 28 gtt/min. It was to complete in 3 hr, but after 1 ½ hr only 175 ml have infused. Recalculate the new gtt/min flow rate to complete the infusion on schedule. Set calibration is 10 gtt/ml

- Time remaining $3 \text{ hr} - 1.5 \text{ hr} = 1.5 \text{ hr}$
- Volume remaining: $500 \text{ ml} - 175 \text{ ml} = 325 \text{ ml}$
 - $325 \text{ ml} + 1.5 \text{ hr} = 216.6 = 217 \text{ ml/hr}$
- Set calibration is 10 gtt/ml
 - $217 \div 6 \text{ (division factor)} = 36.1 = 36 \text{ gtt/min}$

***Increase the rate to 36 gtt/min.**