



# Math Study Strategies

## Math for Nursing Flow Rate Calculation



Many intravenous fluids are frequently ordered on the basis of **mL/hr**. The size of the drops is regulated by the size of the **IV** tubing. **IV** tubings are calibrated in gtt/ mL and this calibration is needed to calculate the flow rate.

The type of tubing is usually 10, 15, or 20 gtt to equal 1 mL in standard microdrip sets, and 60 gtt to equal 1 mL in mini or microdrip sets. The calibration, in gtt/ mL is clearly printed on each IV package.

To calculate the number of drops per minute the nurse needs to know the prescribed medication over the prescribed infusion time, and the drop factor of the device.

### Example:

One liter of Normal Saline is charted over 9 hours. The drop factor is 15. Calculate the number of drops per minute.

### What is given?

- The infusion amount **1 L of NS**
- Microdrip IV set calibration  $\frac{15 \text{ gtt}}{1 \text{ mL}}$
- Infusion time **9 hours**

### What is asked:

Number of drops to be infused per minute

Use conversion factors **1,000 mL = 1 L** **1 h = 60 minutes**

Start in the numerator with the units you are looking for and use dimensional analysis.

$$\frac{15 \text{ gtt}}{1 \text{ mL}} \times \frac{1 \cancel{\text{L}}}{9 \cancel{\text{hr}}} \times \frac{1 \cancel{\text{hr}}}{60 \cancel{\text{min}}} \times \frac{1,000 \cancel{\text{mL}}}{1 \cancel{\text{L}}}$$

Cross cancel same units and multiply the numerators and the denominators. The result will be:

$$\frac{15,000 \cancel{\text{mL}}}{540 \cancel{\text{min}}}$$

Cross cancel zeros and divide = 27.77

Because drops need to be a whole number the answer will be

$$\frac{28 \text{ drops}}{\text{min}}$$