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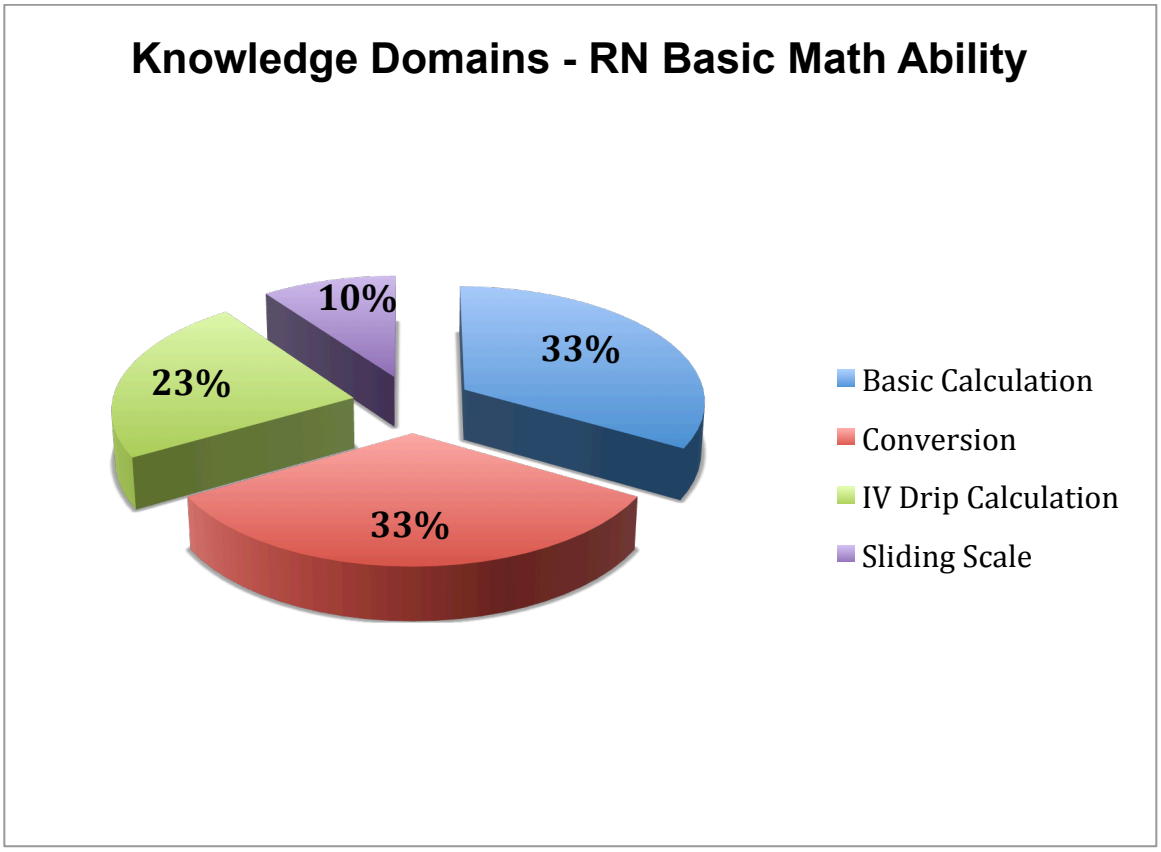
RN Basic Math Ability Exam Content Outline

Exam Objective: To measure clinical competency of basic math skills needed to accurately and safely perform math calculations in the healthcare setting.

*** NOTE - The weights and doses contained in this exam may not be practical to an actual healthcare scenario.*



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I. Basic Calculations

A. Knowledge of how to perform basic math calculations such as addition, subtraction, multiplication, and division related to medication dosages.

B. Knowledge of formulas used to calculate medication dosages for oral, IM, IV, and SQ routes.

II. Conversion

A. Knowledge of how to perform metric conversions, including but not limited to converting grams to kilograms and kilograms to pounds.

B. Knowledge of how to perform weight-based calculations and formulas to determine medication dosages.

C. Knowledge of recognition of decimal places – tenths, hundredths, etc.

III. IV Drip Calculations

A. Knowledge of how to perform basic math such as addition, subtraction, multiplication, and division in order to calculate bolus, continuous infusion, and IV drip rates.

B. Knowledge of formulas used to calculate medication dosages for bolus, continuous infusion, and IV drip rates.

C. Knowledge of how to perform weight-based calculations for IV dosages.

IV. Sliding Scale

A. Knowledge of how to calculate sliding scale insulin dosages based upon specific sliding scale insulin orders.

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Calculation Formulas

***NOTE – The following formulas are some methods used to accurately and safely perform math calculations in the healthcare setting. There are other formulas and methods available and acceptable for accurately calculating dosages.*

Drug Dosage Calculations for Oral & Parenteral Doses

Formula Method

$$\frac{D}{H} \times Q = A$$

D = Desired *Dose* (or dose ordered)
H = Have *Available* (dosage of the available medication on hand)
Q = *Quantity* (unit of measure of the available medication on hand)
Such as one tablet, 2 capsules or volume (mL)
A = *Amount* of Medication to Administer

Dosage Calculations by Body Weight

Body Weight Conversion

$$\frac{\text{\# of lbs}}{2.2} = \text{weight in kilograms}$$

Desired Dose:

Dosage Ordered per kg x Weight (kg) = Desired Dose

(*May be ordered as mg/kg, mcg/kg, mEq/kg, mg/kg/day, etc.*)

Dose to be given by Weight:

$$\frac{D}{H} \times Q = A \qquad \frac{\text{Desired Dose (mg)}}{\text{Have Available (mg)}} \times Q\,(mL) = \text{Dose (mL)}$$

OR Simplified:

$$\frac{\text{Dosage Ordered (mg/kg) x Weight (kg)}}{\text{Have (mg)}} \times Q\,(mL) = \text{Dose (mL)}$$

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Calculating IV Flow Rates

Calculating Flow Rate mL/hr

$$\frac{\text{Total volume ordered (mL)}}{\text{Total hours ordered (hr)}} = \text{Flow Rate (mL/hr)}$$

Calculating Flow Rate in Drop Factor gtt/min

$$\frac{\text{Volume (mL)} \times \text{Drop factor (gtt/mL)}}{\text{Time (hr)} \times \text{60 minutes}} = \text{Drip Rate (gtt/min)}$$

Calculating Infusion Rate mL/hr

$$\frac{\text{D (Unit/hr ordered)}}{\text{H (Units on hand)}} \times \text{V (mL on hand)} = \text{Infusion Rate (mL/hr)}$$

Drug Concentration

$$\frac{\text{Amount of drug in solution (g, mg, mcg, etc.)}}{\text{Amount of solution (mL)}} = \text{Drug Concentration}$$

Amount pt is receiving per hour

Drug Concentration X Infusion Rate = mg/hr