Indiana State University
Department of Baccalaureate Nursing
Mathematics Competency and Remediation Policy

Indiana State University Baccalaureate Nursing Program recognizes its responsibility to provide students with adequate mathematical skills to develop confidence and competence in approaching nursing problems which have solutions that require mathematical concepts. The following policy has been developed to provide basic expectations for the faculty and students.

In each nursing course that involves medication administration or instruction in medication administration, students will be expected to pass a mathematics competency examination at the 95% proficiency level. Each mathematics competency examination will be specific for each nursing course that involves medication administration, and will test students for the appropriate mathematics skills needed to safely administer medications in that particular nursing course. Each course will determine a time limit for the math tests to be completed. In most courses, the expectation is that each student is expected to pass the mathematics test before the first clinical experience.

Each test will share the following characteristics:
1. The test will consist of 15-20 questions
2. The mathematical method used will be dimensional analysis (required for students in campus-based program track).
3. Each test may contain questions requiring the following calculations:
   - Tablets/capsules
   - mL need to prepare a dose
   - drops per minute (IV infusions)
   - mL/hr (IV infusions)
   - Weight-based dosages (kg and BSA)
   - Dosages requiring conversions
   - Additional questions related to specific course content

4. The following abbreviations may be used in test questions:

Abbreviation	Meaning	Abbreviation	Meaning
ac	before meals	b.i.d	twice a day
pc	after meals	t.i.d.	three times daily
IM	intramuscular	q2h	every 2 hours
IV	intravenous	q4h	every 4 hours
subcut	subcutaneous	gtt	drop
ID	intradermal	tab	tablet
SL	sublingual	g	gram
PO ; orally	by mouth	mg	milligram
IVP	Intravenous push	kg	kilogram
IVPB	Intravenous piggyback	mcg	microgram
PO	By mouth	tsp	teaspoon
gr	grain	tbsp	tablespoon
oz	ounce	BSA	Body surface area
min	minute	hr	hour

5. The following guidelines for grading the mathematics test will be followed. One-half point from each answer will be subtracted from the final score if the student fails to appropriately apply the rules listed below:

    - Incorrect rounding. See rounding rules below.
    - Fractional parts of a unit are always expressed as decimal fractions.
        - Example: 1.5 mL not 1 ½ mL

    - A zero is always placed in front of the decimal point when it is not preceded by a whole number.
        - Example: Write 0.8 mL, not .8 mL

    - Excess zeros following a decimal fraction are eliminated.
        - Example: Write 0.5, not 0.500

    - All answers must be labeled appropriately.
        - Example: tab or gtt/min

    - Time: All questions and answers concerning time will be expressed using the 24-hour clock (military time).

6. Each test will be a timed test. The specific time limit will be determined by the instructor. Speed is considered to be an important component of dosage calculation. A simple calculator is required.   No cell phones or graphing calculators will be allowed.
7. Each student will be allowed a maximum of two attempts per clinical nursing course to pass the mathematics test at the 95% level.
8. There will be no course points awarded for the test but passing the test is required to demonstrate competency.
9. The test on the second attempt will be a different version containing similar problems.
10. If the student is unable to achieve 95% on the first attempt, the student:
    - Will not be allowed to pass medications in the clinical setting.
    - Is expected to participate in remediation.
    - Will take the 2nd and final test following a minimum of 48hrs and a maximum of two weeks after the first attempt.
11. Remediation. A student failing math on the first try is expected to contact the instructor of the course to diagnose problems and talk about anxiety control, critical and logical thinking, and self-confidence. The student may also complete sample problems assigned by the instructor.
12. Should the student fail to achieve a 95% on the second attempt, the student must withdraw from the clinical nursing course involved.

Rounding Rules for Dosage Calculation

The overall rule is: 0.4 or below do not round

0.5 or greater round up

Tablets and capsules: to the whole tablet or capsule or half tablet (you cannot give ½ of a capsule).

Oral liquids: round to the whole mL for adult dosages and to the 10th place (one decimal point)

for pediatric dosages.

Injections (IV, ID, Subcut, or IM): Round to the 10th place (one decimal point) using the rule above.

Weight-based dosages: kilograms are always rounded to the 10th place (one decimal point). When you divide the weight in pounds by 2.2 you immediately round that number to the 10th place (one decimal point) using the rule above. Clear your calculator and put the weight in kg (rounded to the 10th place-one decimal point) back in the calculator to do the calculations).

Example: Administer rifampin 5 mg/kg, IV, every 12 hours for 4 days. The patient weighs 186 lbs.

determine mg/dose.   Answer: 211.3 mg/dose

Body Surface Area (BSA): put the weight and height into the correct formula and do all of the calculations at once. Multiply the height by the weight, divide by the correct factor, and then hit the square root button. Round this number to the hundredth place (two decimal points) using the rule above. The BSA is reported as m^2. Use the BSA value and continue to calculate the dose.

Example: Administer fluorouracil (Adrucil) 370 mg/m^2 one dose only today. The patient weighs 85 lb

and is 66 inches tall. Determine mg/dose.   Answer: 495.8 mg/dose

IV Rates (mL/hr): Round to the nearest whole number.

Drop rates (gtt/min): always round to the nearest whole drop using the rule above.

Infusion times: Round hours to the 10th place (one decimal point) before continuing with the problem.

Example: The order reads: Infuse 500 mL or NS at 42 mL/hr. What is the infusion time?

Hr = <u>1 Hr</u>   x   <u>500 mL</u>   =   <u>500</u>   = 11.904761 Hrs = 0.9 x 60 = 54 minutes

    42 mL   42

Answer: 11 Hrs 54 minutes