<u>Information for the</u>
<u>Nursing Major</u>

<u>Mathematics Assessment Exam</u>

☐ As a Nursing major, you will be required to complete a mathematics assessment exam. The exam is given to determine if you have the knowledge of the mathematical concepts necessary to complete the quantitative components of this major.

☐ If you have taken *MATH 120 Applied Algebra and Trigonometry* or *MATH 111 Applied College Algebra* and received a C or better, you do not need to take this exam.

☐ The exam will contain questions based on the following topics:

- o Basic operations with fractions and decimals

- o Rounding decimal numbers

- o Ratios, proportions, and percentages

- o Unit conversions (conversion chart will be provided)

- o Problem solving

☐ There are 20 short answer questions on the exam worth 1, 2, or 3 points, for a total of 30 points.

☐ You will be allowed to use a calculator while completing the quiz, but you must show all your work.

☐ If you receive a **score of 80% or better (24 points or higher)**, then you will have **passed the math assessment exam**.

☐ If you receive a **score of less than 80% (less than 24 points)**, you will need to complete a review packet, covering the concepts on the exam, have a tutor at the Math Center (www.keene.edu/mathctr) check the packet, and then re-take the exam.

☐ If you receive a **score of less than 80% (less than 24 points)** on the second attempt, you will need to take and pass *MATH 111 Applied College Algebra*.

☐ Your results will be emailed to you within one week of completing the exam.

☐ To schedule an appointment to take the exam or if you have any questions, please contact Eileen Phillips, Director of the Math Center at ephillip@keene.edu.

The following pages include **sample questions and solutions** to problems like those you will find on the assessment exam. If you need more review, you can meet with a Math Center tutor during the semester (www.keene.edu/mathctr) or search Khan Academy for online tutorials (https://www.khanacademy.org)
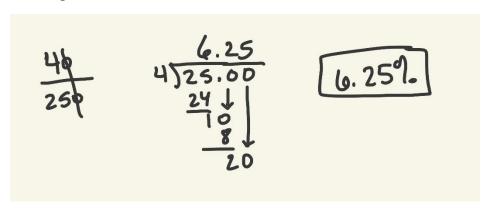
Sample Questions

See the next page for a conversion table.

1) What fraction of a day is 9 hours?

2) A nursing student has an income of $2200 a month. She spends $\frac{2}{5}$ of her income for rent on her apartment. How much does she spend on rent each month?

3) Round 54.90873 to the nearest hundredth.

4) If a patient drinks 5.2 ounces of liquid and needs to drink 12 ounces, how many more ounces does the patient need to drink?

5) Of the 32 cars in the hospital parking lot, 18 are small cars and 14 are large cars. What is the ratio of large cars to small cars?

6) Solve for x : $\quad \dfrac{2}{14} = \dfrac{x}{217}$

7) Write $\dfrac{3}{5}$ as a percent.

8) Write 24% as a fraction in lowest terms.

9) What is 0.4% of 4000?

10) In a survey of 1400 patients, 602 prefer ibuprofen to acetaminophen for pain relief. What percentage of patients preferred ibuprofen?

11) How many teaspoons are in 15 milliliters of liquid?

12) If a person weighs 75 kilograms, how many pounds do they weigh?

13) A child is 35 inches tall. How tall is that child in centimeters?

14) How many milligrams are in 43 micrograms?

15) If there are 5,000 units per 1 mL of a drug that is injected, how many units are there in 3 mL?

16) If 750 mL of medicine are to be given via an infusion pump over 3 hours, how many milliliters will the patient receive in 1 hour?

17) If a patient who weighs 52 kg needs to take a medicine that is prescribed as 5 mg per 1 kg of weight, how many milligrams of this medicine does the patient need to take?

18) How many mL of a liquid drug should a nurse give if the patient needs 2 g and the drug is available in 50 mg per 2 mL?

19) A certain drug is available in 125 mg per 1 capsule. If a patient needs to receive 0.5 g of this drug, how many capsules should they receive?

20) A patient is to receive 500 mL of a medication over 5 hours. If the patient receives 30 drops of the medication per 1 mL, how many drops do they receive per minute?

21) Below is a word problem and the work of a student follows. Explain what the student did incorrectly and then find the correct answer.

There are 40 mL of cough medicine left in a container that holds 250 mL. What percentage of the cough medicine is left in the container?

CONVERSIONS			
METRIC		**HOUSEHOLD & APOTHECARY** **EXACT VOLUME EQUIVALENTS**	
Volume	**Weight**	**Volume (Liquid)**	**Weight (Dry)**
Liter (L) 1 L = 1000 ml **Milliliter (ml)** 1 ml = 0.001 L 1 ml = 1000 mcl 30 ml = 1 oz 5 ml = 1 tsp 15 ml = 1 Tbs **Microliter (mcl)** 1 mcl = 0.001 ml 1000 mcl = 1 ml **Length** **Centimeter (cm)** 2.54 cm = 1 inch	**Kilogram (kg)** 1 kg = 2.2 lbs 1 kg = 1000 g **Milligrams (mg)** 1 mg = 0.001 g 1 mg = 1000 mcg **Microgram (mcg)** 1 mcg = 0.001 mg **Gram (g)** 1 g = 1000 mg 1 g = 1 ml 1 g = 0.001 kg 453.6 g = 1 lb	**Measuring cup** 1 cup = 8 oz 1 cup = 240 ml 2 cups = 1 pint **Ounces (oz)** 1 oz = 30 ml 1 oz = 2 Tbs 8 oz = 1 cup 16 oz = 1 pint **Tablespoons (Tbs)** 1 Tbs = 3 tsp 1 Tbs = 15 ml 2 Tbs = 1 oz **Teaspoon (tsp)** 1 tsp = 5 ml 3 tsp = 1 Tbs	**Pounds (lb)** 1 lb = 0.45 kg 1 lb = 453.6 g 1 lb = 16 oz

Solutions

1) Since there are 24 hours in one day, we write $\frac{9}{24}$, then simplify to $\frac{3}{8}$. So, 9 hours is $\frac{3}{8}$ of a day.

2) $\frac{2}{5}$ of $2200 = \frac{2}{5} \bullet \frac{2200}{1} = \frac{4400}{5} = 880$ So, she spends $880 on rent each month.

3) 54.91 Since 0 is in the hundredth place, we look to the right. Since the 8 is greater than five the 0 will be changed to a 1. *(If the number to the right of 0 was less than 5, we would have left 0 as a 0.)*

4) 12.0 – 5.2 = 6.8 ounces

5) large cars : small cars = 14:18 = 7:9

6) $\frac{2}{14} = \frac{x}{217}$
   $14x = 434$
   $x = \frac{434}{14} = 31$

7) Divide 5 into 3, which equals 0.6, then move the decimal point 2 places to the right: 60%

8) $24\% = \frac{24}{100} = \frac{6}{25}$

9) 0.004(4000) = 16

10) $1400n = 602$ 43% of the patients preferred ibuprofen.
    $n = \frac{602}{1400}$
    $n = 0.43$

11) Since 1 teaspoon (tsp) = 15 milliliters (mL), then we can set up the following conversion:
    $$15 \, mL \, \times \frac{1 \, tsp}{5 \, mL} = \frac{15 \times 1}{5} tsp = \, 3 \, tsp$$

12) Since 1 kilogram (kg) = 2.2 pounds (lbs), then we can set up the following conversion:
    $$75 \, kg \, \times \frac{2.2 \, lbs}{1 \, kg} = \frac{75 \, \times 2.2}{1} = 165 \, lb$$

13) Since 1 inch (in) = 2.54 centimeters (cm), then we can set up the following conversion:
    $$35 \, in \times \frac{2.54 \, cm}{1 \, in} = \frac{35 \bullet 2.54}{1} cm = 88.9 \, cm$$

14) Since 1 milligram (mg) = 1000 micrograms (mcg), then we can set up the following conversion:
    $$43 \, mcg \, \times \frac{1 \, mg}{1000 \, mcg} = \frac{43 \times 1}{1000} mg = \, 0.043 \, mg$$

15) Since there are 5000 units per 1 mL, then there would be 3 times as many units in 3 mL, so 5000(3) = 15,000 units.

16) Since there would be 750 mL of medicine given over 3 hours, we need to divide to determine how many mL of medicine would be given in 1 hour. $\frac{750 \; mL}{3 \; hr} = 250 \; mL \; in \; 1 \; hour$

17) Since the medicine is given in 5 mg per 1 kg of weight, and the patient's weight is 52 kg, we need to multiply to determine how many mg the person need to take. $52 \; kg \; \times \frac{5 \; mg}{1 \; kg} = 260 \; mg$

18) Since the drug is available in 50 mg per 2 mL, we first need to convert the 2 grams needed into milligrams.

$2g \times \frac{1000 \; mg}{1 \; g} = 2000 \; mg$

Then we set up a proportion to determine the number of mL needed for 2000 mg.

$\frac{50 \; mg}{2 \; mL} = \frac{2000 \; mg}{x \; mL}$
$50x = 4000$
$x = 80 \; mL$

19) Since the drug is available in 125 mg per 1 capsule, we first need to convert the 0.5 grams needed to milligrams.

$0.5 \; g \; \times \frac{1000 \; mg}{1 \; g} = 500 \; mg$

Then set up a proportion to determine the number of capsules needed for 500 mg.

$\frac{500 \; mg}{x \; capsules} = \frac{125 \; mg}{1 \; capsule}$
$125x = 500$
$x = 4 \; capsules$

20) Set up a series of unit fractions to determine the number of drops per minute.
$\frac{500 \; mL}{5 \; hrs} \times \frac{30 \; drops}{1 \; mL} \times \frac{1 \; hr}{60 \; min} = \frac{500 \times 30 \times 1}{5 \times 1 \times 60} = \frac{15000}{300} = 50 \; drops \; per \; minute$

21) The student set up the problem correctly, but they divided it incorrectly. They had $\frac{40}{250}$, which means 40 divided by 250, so the 250 should have been the number out front.