

Information for the
Nursing Major

Mathematics Assessment Exam

- ☐ 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.
- ☐ You will be notified of the dates, times, and locations of when the exam will be offered.
- ☐ 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:
 - Basic operations with fractions and decimals
 - Rounding decimal numbers
 - Ratios, proportions, and percentages
 - Unit conversions (conversion chart will be provided)
 - 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.
- ☐ 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 : $\frac{2}{14} = \frac{x}{217}$
- 7) Write $\frac{3}{5}$ 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?

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

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 = $\frac{2}{5} \cdot \frac{2200}{1} = \frac{4400}{5} = 880$ 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:
 $15 \text{ mL} \times \frac{1 \text{ tsp}}{5 \text{ mL}} = \frac{15 \times 1}{5} \text{ tsp} = 3 \text{ tsp}$
- 12) Since 1 kilogram (kg) = 2.2 pounds (lbs), then we can set up the following conversion:
 $75 \text{ kg} \times \frac{2.2 \text{ lbs}}{1 \text{ kg}} = \frac{75 \times 2.2}{1} = 165 \text{ lb}$
- 13) Since 1 inch (in) = 2.54 centimeters (cm), then we can set up the following conversion:
 $35 \text{ in} \times \frac{2.54 \text{ cm}}{1 \text{ in}} = \frac{35 \cdot 2.54}{1} \text{ cm} = 88.9 \text{ cm}$
- 14) Since 1 milligram (mg) = 1000 micrograms (mcg), then we can set up the following conversion:
 $43 \text{ mcg} \times \frac{1 \text{ mg}}{1000 \text{ mcg}} = \frac{43 \times 1}{1000} \text{ mg} = 0.043 \text{ mg}$

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. $\frac{750 \text{ mL}}{3 \text{ hr}} = 250 \text{ mL in 1 hour}$

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. $52 \text{ kg} \times \frac{5 \text{ mg}}{1 \text{ kg}} = 260 \text{ mg}$

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

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

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

$$\frac{50 \text{ mg}}{2 \text{ mL}} = \frac{2000 \text{ mg}}{x \text{ mL}}$$

$$50x = 4000$$

$$x = 80 \text{ mL}$$

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

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

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

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

$$125x = 500$$

$$x = 4 \text{ capsules}$$

20) Set up a series of unit fractions to determine the number of drops per minute.

$$\frac{500 \text{ mL}}{5 \text{ hrs}} \times \frac{30 \text{ drops}}{1 \text{ mL}} \times \frac{1 \text{ hr}}{60 \text{ min}} = \frac{500 \times 30 \times 1}{5 \times 1 \times 60} = \frac{15000}{300} = 50 \text{ drops per minute}$$

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.

Handwritten long division showing 40.00 divided by 250, resulting in 0.16, and a box containing 16%.