

**INFORMATION FOR**  
**THE MATH 171 PROFICIENCY EXAM**

- Successful completion of this exam is **required** before registering for Math 171 Structure of Number Systems.
- **YOU MAY ONLY TAKE THIS EXAM ONCE.**
- The exam is a six part diagnostic exam testing your knowledge and skills in the following areas:
  - 1) Place Value
  - 2) Whole Numbers
  - 3) Integers and Exponents
  - 4) Fractions
  - 5) Decimals
  - 6) Percents

\*\*Visit [www.keene.edu/mathctr](http://www.keene.edu/mathctr) for additional information on these topics.\*\*

- Each part contains 10 multiple-choice questions, for a total of 60 questions.
- You will not be allowed to use a calculator while taking this exam.
- To pass the exam and be eligible to register for *Math 171 Structure of Number Systems*, you must answer **at least 8 out of 10** questions **correctly** (at least 80%) on **each of the six topics** listed above.
- If you **score less than 80% on 3 or less of the topics**, you will be need to **complete review work on these topics and then take a quiz on each topic**. Each quiz contains 10 questions and you must answer at least 8 questions correctly to pass. Once you pass all the quizzes you need to, you will be eligible to register for *Math 171 Structure of Number Systems*.
- If you **score less than 80% on 4 or more of the topics**, you will be **required to take and pass Math 071 Elementary Education Math Preparation, a non-credit course**, which covers the material on the exam. Once you pass the course, you will be eligible to register for *Math 171 Structure of Number Systems*.
- Although there is no time limit on the exam, the exam usually takes about one hour.
- You will be notified of your results within two weeks of taking the exam via your [ksc.mailcruiser.com](mailto:ksc.mailcruiser.com) email address.
- To schedule an appointment to take the exam, please contact Barbara Yardley at [byardley@keene.edu](mailto:byardley@keene.edu) or (603) 358 - 2023.
- If you have any questions, please contact Eileen Phillips, Director of the Math Center, at [ephillip@keene.edu](mailto:ephillip@keene.edu) or (603) 358 - 2387.

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***The following pages contain sample problems and answers. It is in your best interest to complete this sample before you take the exam.***





- 42) Perform the following operations:  $5.12 - 8.6 + 7.54$
- 43) Name the place value of the underlined digit:  $897.03\underline{2}41$
- 44) Round 54.908732 to the nearest ten-thousandth.
- 45) What must be added to 0.57 to get 15?
- 46) Write six hundred three and eighty-eight ten-thousandths as a decimal.
- 47) Write in order from smallest to largest: 5.0236, 5.02, 5.236, 5.063, 5.3
- 48) Write 0.783 as a percent.
- 49) Write  $\frac{3}{5}$  as a percent.
- 50) Change 7.5% to a decimal.
- 51) Change 24% to a fraction in lowest terms.
- 52) What is 110% of 400?
- 53) Shade 40% of the grid:
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- 54) 46.5 is 15% of what number?
- 55) 32 is what percent of 140? *(Round answer to the nearest tenth of a percent.)*
- 56) 0.4% of what number is 16?
- 57) A basketball player attempts 120 free throws. She makes 90% of them. How many free throws does she make?

## ANSWERS

- 1) a) tens    1) b) hundred-thousands                      2) 80,000                      3) 439,100
- 4) a) nineteen thousand, two hundred fifty-three
- 4) b) four million, one hundred three thousand, nine hundred eighteen
- 5)  $1 \cdot 10^5 + 5 \cdot 10^3 + 2 \cdot 10^1 + 7 \cdot 10^0$
- 6) 704,284                      7) a) 80,006                      7) b) 917,163
- 8) 10,008                      9) 5237                      10)  $5937+768 + 82 +17 = 6804$
- 11)  $83,012 - 763 = 82,249$     12)  $\frac{80+92+83+56+84}{5} = 79$     13)  $1000 - 896 = 104$
- 14) 23,688                      15)  $4007 \cdot 360 = 1,442,520$                       16)  $30823 \div 60 = 513 \text{ R } 43$
- 17) 
$$\begin{array}{r} 3 + 7 \cdot 5 - 9 \\ 3 + 35 - 9 \\ 38 - 9 \\ 29 \end{array}$$
- 18) Different signs, subtract and keep the sign of the larger absolute value: -16
- 19) Same signs, add and keep the common sign: -27
- 20)  $5 - (-34) = 5 + 34 = 39$                       21) Different signs, answer is negative: -12
- 22) Same signs, answer is positive: 96                      23) 0                      (any number times 0 = 0)
- 24) 
$$\begin{array}{r} 3^2 + 25 \div 5 \cdot 2 - 26 \\ 9 + 5 \cdot 2 - 26 \\ 9 + 10 - 26 \\ 19 - 26 \\ -7 \end{array}$$
- 25) 
$$\begin{array}{r} 7 - 4(3 - 8 \cdot 6) \\ 7 - 4(3 - 48) \\ 7 - 4(-45) \\ 7 + 180 \\ 187 \end{array}$$
- 26)  $5x^2 = 5(-4)^2 = 5(16) = 80$                       27) -15, -14, -2, 0, 7, 9
- 28)  $\frac{8 \text{ shaded}}{30 \text{ total}} = \frac{4}{15}$                       29)  $\frac{6}{8} = \frac{18}{x}$   
 $\frac{6x}{6} = \frac{144}{6}$ , so 24 dots should be circled  
 $x = 24$

$$30) \frac{3}{7}$$

$$31) \frac{56 \div 7}{84 \div 7} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

$$32) \frac{8 \bullet 5}{15 \bullet 5} = \frac{40}{75}$$

$$33) \begin{array}{r} \frac{3}{4} = \frac{15}{20} \\ + \frac{2}{5} = \frac{8}{20} \\ \hline \frac{23}{20} = 1\frac{3}{20} \end{array}$$

$$34) \begin{array}{r} 1\frac{3}{4} = 1\frac{15}{20} \\ - \frac{2}{5} = -\frac{8}{20} \\ \hline 1\frac{7}{20} \end{array}$$

$$35) \frac{3}{4} \bullet \frac{2}{5} = \frac{3 \bullet 2}{4 \bullet 5} = \frac{6}{20} = \frac{3}{10}$$

$$36) 1\frac{3}{4} \div 2\frac{1}{10} = \frac{7}{4} \div \frac{21}{10} = \frac{7}{4} \bullet \frac{10}{21} = \frac{7 \bullet 5 \bullet 2}{2 \bullet 2 \bullet 7 \bullet 3} = \frac{5}{2 \bullet 3} = \frac{5}{6}$$

37) Choose a fraction between  $\frac{15}{20}$  and  $\frac{8}{20}$ . Some possibilities:  $\frac{9}{20}, \frac{10}{20} = \frac{1}{2}, \frac{11}{20}, \frac{12}{20} = \frac{3}{5}, \frac{13}{20}, \frac{14}{20} = \frac{7}{10}$ .

$$38) \frac{8}{20} = 8 \div 20 = 0.4$$

39) Line up decimal points, add the numbers, and then bring down the decimal point in the answer: 15.75

40) Multiply as usual, count the number of decimal places in the factors, and then place that many decimal places in the answer: 2.9933

41) Move the decimal point in the divisor (6.03) to the right until you have a whole number (603). Move the decimal point in the dividend (2.7) the same number of places (270). Bring the decimal point up into the quotient (answer) and then divide.

$$\begin{array}{r} .447 \\ 603 \overline{)270.000} \end{array}$$

Since the directions said to round to the nearest hundredth, you need to carry the division out to the thousandths place and then round back to the hundredths place: 0.45.

$$42) \begin{array}{r} 5.12 - 8.6 + 7.54 \\ -3.48 + 7.54 \\ \hline 4.06 \end{array}$$

43) thousandths

44) Since 7 is in the ten-thousandths place, we look to the right. Since the 3 is less than five the 7 will remain a 7: 54.9087 (If the number to the right of 7 was 5 or greater, we would have changed the 7 to an 8.)

$$45) 15.00 - 0.57 = 14.43$$

46) The last digit of the number should appear in the decimal place given (ten-thousandths): 603.0088

47) Line up the decimal points, fill in with zeroes so that all numbers have the same number of decimal places and then compare their values: 5.02, 5.0236, 5.063, 5.236, 5.3

48) Move the decimal point 2 places to the right (multiply by 100): 78.3%

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

50) Move the decimal point 2 places to the left (divide by 100): 0.075

$$51) 24\% = \frac{24}{100} = \frac{6}{25}$$

For #52 – 57, the proportion method will be used,  $\frac{\%}{100} = \frac{is}{of} = \frac{part}{total}$ .

$$52) \begin{aligned} \frac{110}{100} &= \frac{x}{400} \\ \frac{100x}{100} &= \frac{44000}{100} \\ x &= 440 \end{aligned}$$

$$53) \begin{aligned} \frac{40}{100} &= \frac{x}{70} \\ \frac{100x}{100} &= \frac{2800}{100}, \text{ so 28 squares should be shaded} \\ x &= 28 \end{aligned}$$

$$54) \begin{aligned} \frac{15}{100} &= \frac{46.5}{x} \\ \frac{15x}{15} &= \frac{4650}{15} \\ x &= 310 \end{aligned}$$

$$55) \begin{aligned} \frac{x}{100} &= \frac{32}{140} \\ \frac{140x}{140} &= \frac{3200}{140} \\ x &= 22.9\% \end{aligned}$$

$$56) \begin{aligned} \frac{0.4}{100} &= \frac{16}{x} \\ \frac{0.4x}{0.4} &= \frac{1600}{0.4} \\ x &= 4000 \end{aligned}$$

$$57) \begin{aligned} \frac{90}{100} &= \frac{x}{120} \\ \frac{100x}{100} &= \frac{10800}{100}, \text{ so she makes 108 free throws} \\ x &= 108 \end{aligned}$$