THE MATH 171 PROFICIENCY EXAM

Successful completion of this exam is required for Early Childhood Education, Elementary Education, and Mathematics Education for Elementary Teachers before registering for *Math 171 Structure of Number Systems*.

Information about the exam:

- The exam is a six-part diagnostic exam, containing 10 multiple-choice questions per section for a total of 60 questions, testing your knowledge and skills in the following areas:

  - Place Value
  - Integers
  - Fractions
  - Decimals
  - Percents
  - Algebra

  For additional information topics, visit *www.keene.edu/mathctr*

- You will **not** be allowed to use a calculator while taking this exam.

- Although there is no time limit on the exam, the exam usually takes about one hour.

- You will be allowed to take the exam only ONCE.

  If you…

  1) …pass all 6 sections of the exam on the first try, you are eligible to enroll in ***MATH 171 Structure of Number Systems****.*

  2) …receive less than 80% on one, two, or three sections of the exam, you will need to **complete review packets, see a tutor, and take paper quizzes (not multiple choice) on those sections**. Once all of the quizzes have been passed with a score of 80% or higher, you will be eligible to register for *MATH 171 Structure of Number Systems.*

  3) …receive less than 80% on four, five, or six sections of the exam, you will need to enroll in and pass ***MATH 102 Math for the Professions***, a one-credit course. Once you pass this course, you will be eligible to enroll in MATH 171 *Structure of Number Systems*.

- To schedule an appointment to take the exam or if you have any questions, please contact Lisha Hunter, Math Center Testing Coordinator, at Allysha.Hunter@keene.edu.

The following pages contain sample problems and answers. It is in your best interest to complete this sample before you take the exam. If you have questions, please visit a peer tutor at the Math Center before you take the exam. **For specific tutoring and testing times, please visit www.keene.edu/mathctr.**

Updated 6/5/18

Sample Questions for the Math 171 Proficiency Exam

1) What is the place value of the digit 6 in the following numbers?

   a) 872,061 b) 90,627,045

2) Round 79,236 to the nearest ten-thousand.

3) Round 439,071to the nearest hundred.

4) Write each of the following in words.

   a) 19,253 b) 4,103,918

5) Write the number 105,027 in expanded form, using exponents.

6) Write $7 \bullet 10^5 + 4 \bullet 10^3 + 2 \bullet 10^2 + 8 \bullet 10 + 4$ in standard form.

7) Write each number using numerals.

   a) eighty thousand, six

   b) nine hundred seventeen thousand, one hundred sixty-three

8) Find the quotient and the remainder when 30823 is divided by 60.

9) $-8 + (-19) = ?$ 10) $5 - (-34) = ?$

11) $(-8)(-12) = ?$ 12) $-72 \div 6 = ?$

13) $-23 - 10 + 7 = ?$ 14) $3 + 7 \bullet 5 - 9 = ?$

15) $3^2 + 25 \div 5 \bullet 2 - 26 = ?$ 16) $7 - 4(3 - 8 \bullet 6) = ?$

17) $\dfrac{37-(3-7)^2}{3^2-8\div 4} = ?$

18) Write the following integers in order from smallest to largest: 7, -15, 0, -14, 9, -2

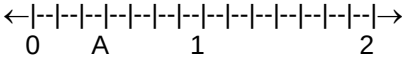
19) Name the fraction represented by this set model:

• • • • o o
• • • • o o
o o o o o o
o o o o o o
o o o o o o

20) The shaded dots have a value of $\frac{6}{8}$. Draw a circle around "1".

• • • • • • o
• • • • • • o
• • • o o o o
• • • o o o o
o o o o o o o

21) Name the fraction represented by the point labeled “A” on the number line.



22) Write in lowest terms: $\frac{56}{84}$

23) Write $\frac{8}{15}$ with a denominator of 75.

24) Add: $\frac{3}{4}+\frac{2}{5}$

25) Subtract: $1\frac{3}{4}-\frac{2}{5}$

26) Multiply: $\frac{3}{4}\bullet\frac{2}{5}$

27) Divide: $1\frac{3}{4}\div 2\frac{1}{10}$

28) Name a fraction between $\frac{3}{4} and \frac{2}{5}$.

29) Write $\frac{8}{20}$ as a decimal.

30) Add: 7.45 + 8.3

31) Multiply: 8.09 • 0.37

32) Divide: 2.7 ÷ 6.03 (Round quotient to the nearest hundredth.)

33) Perform the following operations: 5.12 - 8.6 + 7.54

34) Name the place value of the underlined digit: 897.03<u>2</u>41

35) Round 54.908732 to the nearest ten-thousandth.

36) Three items are purchased that cost $0.85, $4.07, and $2.99. If the person gives the clerk a ten dollar bill, how much change should be given?

37) Write six hundred three and eighty-eight ten-thousandths as a decimal.

38) Write in order from smallest to largest: 5.0236, 5.02, 5.236, 5.063, 5.3

39) Write 0.783 as a percent.

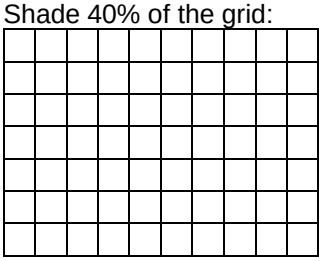
40) Write $\frac{3}{5}$ as a percent.

41) Change 7.5% to a decimal.

42) Change 24% to a fraction in lowest terms.

43) What is 110% of 400?

44) Shade 40% of the grid:



45) 46.5 is 15% of what number?

46) 32 is what percent of 140? *(Round answer to the nearest tenth of a percent.)*

47) 0.4% of what number is 16?

48) A basketball player attempts 120 free throws. She makes 90% of them. How many free throws does she make?

49) Evaluate the expression $5x^2$ when x = -4.

50) Translate this verbal phrase into a mathematical expression: eight times the sum of six and four

51) Is the point (2, 7) on the line $y = 3x + 2$?

52) Evaluate $x^2 + 6x - 7$ when $x = -4$.

53) Simplify: $9 - 4(n + 2)$

54) Solve for x: $7 + 3(4x - 6) = 25$

55) Simplify: $5x^3 \bullet 3x^4$

56) Given $F = \frac{9}{5}C + 32$, find F when $C = 25°$.

57) Simplify: $3(n + 1) + n$

58) Solve for L : $P = 2W + 2L$

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) $1 \bullet 10^5 + 5 \bullet 10^3 + 2 \bullet 10^1 + 7 \bullet 10^0$

6) 704,284 7) a) 80,006 7) b) 917,163

8) 30823 ÷ 60 = 513 R 43 9) Same signs, add and keep the common sign: -27

10) 5 – (-34) = 5 + 34 = 39 11) Same signs, answer is positive: 96

12) Different signs, answer is negative: -12 13) -23 – 10 + 7 = -33 + 7 = -26

14)
$$\begin{aligned} &3+7\bullet 5-9\\ &3+35-9\\ &38-9\\ &29 \end{aligned}$$

15)
$$\begin{aligned} &3^2+25\div 5\bullet 2-26\\ &9+5\bullet 2-26\\ &9+10-26\\ &19-26\\ &-7 \end{aligned}$$

16)
$$\begin{aligned} &7-4(3-8\bullet 6)\\ &7-4(3-48)\\ &7-4(-45)\\ &7+180\\ &187 \end{aligned}$$

17) $\dfrac{37-(3-7)^2}{3^2-8\div 4}=\dfrac{37-(-4)^2}{9-8\div 4}=\dfrac{37-16}{9-2}=\dfrac{21}{7}=3$

18) -15, -14, -2, 0, 7, 9

19) $\dfrac{8\ shaded}{30\ total}=\dfrac{4}{15}$

20) $\dfrac{6}{8}=\dfrac{18}{x}$

$\dfrac{6x}{6}=\dfrac{144}{6}$, so 24 dots should be circled

$x=24$

21) $\dfrac{3}{7}$

22) $\dfrac{56\div 7}{84\div 7}=\dfrac{8\div 4}{12\div 4}=\dfrac{2}{3}$

23) $\dfrac{8\bullet 5}{15\bullet 5}=\dfrac{40}{75}$

24)
$$\begin{aligned} &\frac{3}{4}=\frac{15}{20}\\ &+\frac{2}{5}=\frac{8}{20}\\ &\hline &\frac{23}{20}=1\frac{3}{20} \end{aligned}$$

25)
$$\begin{aligned} &1\frac{3}{4}=1\frac{15}{20}\\ &-\frac{2}{5}=-\frac{8}{20}\\ &\hline &1\frac{7}{20} \end{aligned}$$

26) $\dfrac{3}{4}\bullet\dfrac{2}{5}=\dfrac{3\bullet 2}{4\bullet 5}=\dfrac{6}{20}=\dfrac{3}{10}$

27) $1\frac{3}{4} \div 2\frac{1}{10} = \frac{7}{4} \div \frac{21}{10} = \frac{7}{4} \bullet \frac{10}{21} = \frac{7 \bullet 5 \bullet 2}{2 \bullet 2 \bullet 7 \bullet 3} = \frac{5}{2 \bullet 3} = \frac{5}{6}$

28) Since $\frac{3}{4} = \frac{15}{20}$ and $\frac{2}{5} = \frac{8}{20}$, then some possibilities are: $\frac{9}{20}, \frac{10}{20} = \frac{1}{2}, \frac{11}{20}, \frac{12}{20} = \frac{3}{5}, \frac{13}{20}, \frac{14}{20} = \frac{7}{10}$.

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

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

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

32) 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.

$$603\overline{)270.000}\quad .447$$

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.

33)
$$\begin{array}{r} 5.12 - 8.6 + 7.54 \\ -3.48 + 7.54 \\ \hline 4.06 \end{array}$$

34) thousandths

35) 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.)*

36) 10 – (0.85 + 4.07 + 2.99) = 10 – 7.91 = 2.09 The person should get $2.09 in change.

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

38) 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

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

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

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

42) $24\% = \frac{24}{100} = \frac{6}{25}$

For #43 – 48, the proportion method will be used, $\frac{\%}{100} = \frac{is}{of} = \frac{part}{total}$.

43) $\frac{110}{100} = \frac{x}{400}$

$\frac{100x}{100} = \frac{44000}{100}$

$x = 440$

44) $\frac{40}{100} = \frac{x}{70}$

$\frac{100x}{100} = \frac{2800}{100}$, so 28 squares should be shaded

$x = 28$

45) $\frac{15}{100} = \frac{46.5}{x}$

$\frac{15x}{15} = \frac{4650}{15}$

$x = 310$

46) $\frac{x}{100} = \frac{32}{140}$

$\frac{140x}{140} = \frac{3200}{140}$

$x = 22.9\%$

47) $\frac{0.4}{100} = \frac{16}{x}$

$\frac{0.4x}{0.4} = \frac{1600}{0.4}$

$x = 4000$

48) $\frac{90}{100} = \frac{x}{120}$

$\frac{100x}{100} = \frac{10800}{100}$, so she makes 108 free throws

$x = 108$

49) $5x^2 = 5(-4)^2 = 5(16) = 80$

50) $8(6+4)$ "the sum" indicates use of ( )

51) No, (2, 7) is not on the line $y = 3x + 2$. When (2, 7) is substituted for (x, y), the statement is false.

$7 = 3(2) + 2$

$7 = 6 + 2$

$7 \neq 8$

52) $x^2 + 6x - 7$

$(-4)^2 + 6(-4) - 7$

$16 - 24 - 7$

$-8 - 7$

-15

53) $9 - 4(n+2)$

$9 - 4n - 8$

$-4n + 1$

54) $7 + 3(4x - 6) = 25$

$7 + 12x - 18 = 25$

$12x - 11 = 25$

$12x = 36$

$x = 3$

55) $5x^3 \bullet 3x^4$

$5 \bullet 3 \bullet x^3 \bullet x^4$

$15x^{3+4}$

$15x^7$

56) $F = \frac{9}{5}C + 32$

$F = \frac{9}{5}(25) + 32$

$F = 45 + 32$

$F = 77°$

57) $3(n+1) + n$

$3n + 3 + n$

$4n + 3$

58) $P = 2W + 2L$

$P - 2W = 2L$

$L = \frac{P - 2W}{2}$