REVIEW SHEETS
BASIC MATHEMATICS
MATH 010

A Summary of Concepts Needed to be Successful in Mathematics

The following sheets list the key concepts that are taught in the specified math course. The sheets present concepts in the order they are taught and give examples of their use.

WHY THESE SHEETS ARE USEFUL –

- To help refresh your memory on old math skills you may have forgotten.
- To prepare for math placement test.
- To help you decide which math course is best for you.

HOW TO USE THESE SHEETS –

- Students who successfully review spend from four to five hours on this material. We recommend that you cover up the solutions to the examples and try working the problems one by one. Then check your work by looking at the solution steps and the answer. **Note: no calculators can be used on this test, so you should practice without using one.**

KEEP IN MIND –

- These sheets are not intended to be a short course. You should use them simply to help you determine at what skill level in math you should begin study. For many people, the key to success and enjoyment of learning math is in getting started at the right place. You will most likely be more satisfied and comfortable if you start onto the path of math and science by selecting the appropriate beginning stepping stone.

I. Whole number concepts – You should have the following skills with whole numbers:

- **Recognize place value for each place.**
- **Name numbers correctly with words.**
- **Write numbers correctly given the word names.**
- **Add, subtract, multiply and divide.**
- **Round numbers to any given place.**
- **Estimate sums, differences, products and quotients.**

- **Solve application problems using whole numbers.**
- **Correctly apply the order of operations.**
- **Express numbers using exponents.**
- **Distinguish between prime and composite numbers.**
- **Give the prime factorization of numbers.**
- **Find the Lowest Common Multiple of two numbers.**

1. What place value does 3 have in 4,235,100?

2. Which digit is in the thousands place in 4,968,123?

3. Write correctly in words:

   a. 305

   b. 10,660

4. 46 + 729 + 1025 + 47 =

5. 96 + 321 + 21 =

6. 423 – 69 =

7. 982 – 793 =

8. 145 x 36 =

9. 21 · 14 =

10. 396 ÷ 23 =

11. 5422 ÷ 17 =

12. Round 799 to the nearest ten

13. Round 92,449 to the nearest thousand

14. Round 4,868 to the nearest hundred

15. Round 123 to the nearest hundred

16. Estimate the sum of 38 + 99 + 21 + 14 by rounding to the nearest ten.

17. Estimate the difference of 621 - 267 by rounding to the nearest hundred.

18. Estimate the quotient of 48 ÷ 8 by rounding to the nearest ten.

19. Estimate the product of 67 x 23 by rounding to the nearest ten.

20. Thirty identical chairs cost $1680. What is the cost of one chair?

21. Jose read 39 books in 1994, 27 books in 1995, and 35 books in 1996. How many books did he read over the 3 years?

22. Bart gives the cashier three $50 bills to pay for a purchase of $123. How much change should he get back?

23. What is the number of square yards in a field that measures 30 yds. by 41 yds. ?

24. Rewrite using exponents

a. 9 x 9

b. 5 x 5 x 5

25. Rewrite without exponents

a. 4^5

b. 7^3

26. 12 ÷ 4 x 3 =

27. 3 x 3 ÷ 3 =

28. 9 – 6 ÷ 2 =

29. 14 + 7 x 2 =

30. 3 x (6 + 2) – 3 + 4 ÷ 2 =

31. 5 x {3 x [9 – (4 + 1)]} + 20 ÷ 4 x 2 =

32. Find the prime factorization of each number:

a. 12

b. 100

b. 81

d. 105

33. Find the Least Common Multiple of each pair of numbers:

a. 6 and 12

b. 6 and 7

c. 12 and 18

d. 15 and 30

e. 14 and 49

II. Fractions – You should have the following skills with fractions:

- **Calculate what fraction of a set of assorted objects are shaded.**
- **Convert fractions to equivalent fractions.**
- **Reduce fractions.**
- **Multiply fractions and simplify.**
- **Find reciprocals.**
- **Divide fractions and simplify.**
- **Find the lowest common denominator (LCD) of two fractions.**
- **Add fractions and simplify.**
- **Subtract fractions and simplify.**

34. What fraction of the rectangles are shaded? 

35. What fraction of the objects are geometric shapes? ! ? ; 

36. What fraction of the objects are numbers? 1, 2, * , Δ, 4, 9, §

37. Which fraction is equivalent to $\frac{1}{3}$? $\frac{2}{4}$ $\frac{2}{6}$ $\frac{3}{1}$ $\frac{3}{6}$

38. Which fraction is equivalent to $\frac{2}{7}$? $\frac{7}{2}$ $\frac{1}{6}$ $\frac{3}{8}$ $\frac{6}{21}$

39. Reduce each fraction to lowest terms:

a. $\frac{6}{9}$ b. $\frac{12}{20}$

c. $\frac{3}{12}$

40. Multiply each pair of fractions and simplify (reduce) the result:

a. $\frac{6}{4} \cdot \frac{2}{3}$ b. $\frac{2}{3} \cdot \frac{1}{4}$

c. $\frac{1}{9} \cdot \frac{2}{7}$ d. $\frac{2}{7} \cdot \frac{14}{16}$

41. Find the reciprocal of each number:

a. $\frac{2}{3}$ b. $\frac{8}{3}$

c. 6

42. Divide and simplify the results:

a. $\frac{1}{3} \div \frac{2}{7}$ b. $\frac{2}{5} \div \frac{5}{6}$

c. $\frac{9}{8} \div \frac{3}{2}$

43. Find the lowest common denominator (LCD) of each set of fractions:

a. $\frac{3}{4}$, $\frac{1}{3}$ b. $\frac{1}{5}$, $\frac{2}{15}$

c. $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ d. $\frac{1}{5}$, $\frac{1}{6}$

e. $\frac{7}{20}$, $\frac{1}{25}$ f. $\frac{5}{12}$, $\frac{7}{16}$

44. Add and simplify:

a. $\frac{1}{4} + \frac{2}{5}$ b. $\frac{1}{5} + \frac{7}{15}$

c. $\frac{5}{12} + \frac{7}{16}$

45. Subtract and simplify:

a. $\frac{9}{16} - \frac{1}{4}$ b. $\frac{1}{2} - \frac{3}{8}$

c. $\frac{7}{9} - \frac{1}{12}$ d. $\frac{7}{8} - \frac{1}{3}$

III. Mixed numbers – You should have the following skills with mixed numbers:

- **Change a mixed number to an improper fraction.**
- **Change an improper fraction to a mixed number.**
- **Multiply and simplify.**
- **Divide and simplify.**
- **Add and simplify.**
- **Subtract and simplify.**
- **Solve application problems involving fractions and mixed numbers.**

46. Change to improper fractions:

a. $2\frac{1}{5}$ b. $3\frac{3}{8}$

c. $7\frac{1}{4}$

47. Change to mixed numbers:

a. $\frac{25}{3}$ b. $\frac{12}{5}$

c. $\frac{37}{7}$ d. $\frac{49}{3}$

48. Multiply and simplify:

a. $1\frac{1}{5} \cdot 2\frac{1}{3}$ b. $2\frac{1}{5} \cdot 3\frac{1}{3}$

c. $1\frac{1}{3} \cdot 1\frac{1}{2}$

49. Divide and simplify:

a. $6\frac{3}{4} \div 1\frac{1}{2}$

b. $2\frac{5}{8} \div 1\frac{1}{6}$

c. $4 \div 1\frac{1}{2}$

50. Add and simplify:

a. $3\frac{1}{4} + 2\frac{3}{8}$

b. $1\frac{1}{5} + 2\frac{1}{7}$

c. $3\frac{9}{16} + 5\frac{3}{4}$

51. Subtract and simplify:

a. $3\frac{1}{2} - 1\frac{1}{3}$

b. $5\frac{1}{16} - 2\frac{3}{4}$

c. $9\frac{1}{4} - 3\frac{5}{8}$

52. Solve each application problem:

a. A recipe calls for $5\frac{1}{2}$ cups of flour. How many cups of flour are needed for $\frac{1}{2}$ of the recipe?

b. A bamboo plant grew $\frac{1}{2}$ inch Monday, $\frac{2}{3}$ inch Tuesday, and $\frac{3}{4}$ inch Wednesday. How many inches did the bamboo grow in the 3 days?

c. A share of stock XYZ went from \$40 $\frac{7}{8}$ to \$42 $\frac{3}{8}$. What was the dollar gain for the stock XYZ?

d. How many cubic yards of cement must be ordered to pour a sidewalk $30\frac{1}{2}$ yd by $1\frac{1}{4}$ yd by $\frac{1}{9}$ yd?

IV. Decimals – You should have the following skills with decimals:

- **Recognize the value of each place in the number.**
- **Be able to name decimal numbers accurately.**
- **Round decimals accurately.**
- **Add, subtract, multiply and divide (to 3 decimal places).**
- **Solve application problems involving decimals.**

53. What place value does 3 have in 0.693?

54. What digit is in the ten-thousandths place in 0.28976?

55. Write the word name for each decimal number:

    a. 10.123 b. 2.101

    c. 0.93

56. Write the decimal number for each word name:

    a. four thousand and three hundredths b. seventy-eight hundred-thousandths

    c. one hundred two and two tenths

57. Round each number to the indicated place:

    a. 9.0673 to nearest hundredth b. 102.1029 to nearest tenth

    c. 39.9875 to nearest thousandth d. 10.1022 to nearest hundredth

58. 3.6 + 0.201 + 0.05 = 59. 39.78 – 23.99 =

60. 23.05 x 11.62 = 61. 6.350 ÷ 3 =

62. 9.773 ÷ 0.12 =

63. If two dresses that are the same price cost $93.98 total, how much does one dress cost?

64. If 4 shirts cost $84.50, 3 coats costs $213.68, and 4 pairs of slacks cost $98.99, what is the total for all the clothing?

65. If a steel beam 58.5 cm long is to be cut into pieces that are 6.5 cm in length, how many pieces will there be?

66. If each cookie at a bake sale costs $0.55, how much does a dozen cost?

Math 010 Review Answers

1. ten thousands 4,235,100

4 = millions
2 = hundred thousands
3 = ten thousands
5 = thousands
1 = hundreds
0 = tens
0 = ones

2. 8

3a. three hundred five

3b. ten thousand, six hundred sixty

4. 1,847

$$\begin{array}{r} 46 \\ 729 \\ 1025 \\ +\ 47 \\ \hline 1{,}847 \end{array}$$

5. 438

6. 354

$$\begin{array}{r} 423 \\ -\ 69 \\ \hline 354 \end{array}$$

7. 189

8. 5,220

$$\begin{array}{r} 145 \\ \times\ 36 \\ \hline 870 \\ 435 \\ \hline 5{,}220 \end{array}$$

9. 294 (A dot also means multiply)

10. 396 ÷ 23 =

$$\begin{array}{r} 17\ \text{R}\ 5 \\ 23\overline{)\,396} \\ -\ 23 \\ \hline 166 \\ -\ 161 \\ \hline 5 \end{array}$$

11. 318 r 16

12. 800

13. 92,000

14. 4,900

15. 100

16. 40 + 100 + 20 + 10 = 170

17. 600 - 300= 300

18. 50 ÷ 10 = 5

19. 70 x 20 = 1400

20. $1680 ÷ 30 = $56

21. 101 books

22. 3 x $50 = $150; $150 – $123 = $27 change

23. 30 yd x 41 yd= 1230 sq yd

Exponents: They represent repeated multiplication. $3 \times 3 \times 3 \times 3 = 3^4$
The 3 is the base, the 4 is the exponent and tells how many factors of the base there are.

24a. 9^2

24b. 5^3

25a. 4 x 4 x 4 x 4 x 4

25b. 7 x 7 x 7

Order of operations: Parentheses { [( )] } Work from the inside to outside.
Exponents and radicals
Multiplications and division as they occur left to right
Additions and subtractions as they occur left to right

26. 12 ÷ 4 x 3 =
3 x 3 =
9

27. 3 x 3 ÷ 3 =
9 ÷ 3 =
3

28. 9 – 6 ÷ 2 =
9 - 3 =
6

29. 14 + 7 x 2 =
14 + 14 =
28

30. 3 x (6 + 2) – 3 + 4 ÷ 2 =
3 x 8 - 3 + 4 ÷ 2 =
24 - 3 + 4 ÷ 2 =
24 - 3 + 2 =
21 + 2 =
23

31. 5 x { 3 x [9 – (4 + 1)]} + 20 ÷ 4 x 2 =
5 x {3 x [9 - 5]} + 20 ÷ 4 x 2 =
5 x {3 x 4} + 20 ÷ 4 x 2 =
5 x 12 + 20 ÷ 4 x 2 =
60 + 5 x 2 =
60 + 10 =
70

Prime and composite numbers: Prime numbers (such as 2, 3, 5, and 7) have only themselves and 1 as factors. Composite numbers (such as 4, 6, 8, 10, and 12) are divisible by at least one other factor. The prime factorization of a number is showing it as a product of primes. The prime factorization of 12 is $2^2 \cdot 3$.

Lowest Common Multiple (LCM): The LCM of two or more numbers is the smallest number divisible by those numbers. 15 is the LCM of 3 and 5 because 15 is the smallest number divisible by both 3 and 5.

32a. $12 = 2 \cdot 2 \cdot 3 = 2^2 \cdot 3$

32b. $100 = 2 \cdot 2 \cdot 5 \cdot 5 = 2^2 \cdot 5^2$

32c. $81 = 3 \cdot 3 \cdot 3 \cdot 3 = 3^4$

32d. $105 = 3 \cdot 5 \cdot 7$

33a. 12

33b. 42

33c. 36

33d. 30

33e. 98

34. $\frac{2}{5}$

35. $\frac{3}{6}$

36. $\frac{4}{7}$

37. $\frac{1}{3} \cdot \frac{2}{2} = \frac{2}{6}$

38. $\frac{2}{7} \cdot \frac{3}{3} = \frac{6}{21}$

39a. $\frac{6}{9} = \frac{2 \cdot 3}{3 \cdot 3} = \frac{2}{3} \cdot \frac{3}{3} = \frac{2}{3} \cdot 1 = \frac{2}{3}$

39b. $\frac{12}{20} = \frac{3 \cdot 4}{5 \cdot 4} = \frac{3}{5}$

39c. $\frac{3}{12} = \frac{1 \cdot 3}{4 \cdot 3} = \frac{1}{4}$

40a. $\frac{6}{4} \cdot \frac{2}{3} = \frac{12}{12} = 1$

40b. $\frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12} = \frac{1 \cdot 2}{6 \cdot 2} = \frac{1}{6}$

40c. $\frac{1}{9} \cdot \frac{2}{7} = \frac{2}{63}$

40d. $\frac{2}{7} \cdot \frac{14}{16} = \frac{28}{112} = \frac{1 \cdot 28}{4 \cdot 28} = \frac{1}{4}$

41a. $\frac{3}{2}$

41b. $\frac{3}{8}$

41c. $\frac{1}{6}$

42a. $\frac{1}{3} \div \frac{2}{7} = \frac{1}{3} \cdot \frac{7}{2} = \frac{7}{6}$

42b. $\frac{2}{5} \div \frac{5}{6} = \frac{2}{5} \cdot \frac{6}{5} = \frac{12}{25}$

42c. $\frac{9}{8} \div \frac{3}{2} = \frac{9}{8} \cdot \frac{2}{3} = \frac{18}{24}$

$\frac{18}{24} = \frac{3 \cdot 6}{4 \cdot 6} = \frac{3}{4}$

43a. 12

43b. 15

43c. 12

43d. 30

43e. 100

43f. 48

44a. $\frac{1}{4}+\frac{2}{5}$ LCD is 20

$\frac{5}{20}+\frac{8}{20}=\frac{13}{20}$

44b. $\frac{1}{5}+\frac{7}{15}$ LCD is 15

$\frac{3}{15}+\frac{7}{15}=\frac{10}{15}=\frac{2}{3}$

44c. $\frac{5}{12}+\frac{7}{16}$ LCD is 48

$\frac{20}{48}+\frac{21}{48}=\frac{41}{48}$

45a. $\frac{9}{16}-\frac{1}{4}$ LCD is 16

$\frac{9}{16}-\frac{4}{16}=\frac{5}{16}$

45b. $\frac{1}{2}-\frac{3}{8}$ LCD is 8

$\frac{4}{8}-\frac{3}{8}=\frac{1}{8}$

45c. $\frac{7}{9}-\frac{1}{12}$ LCD is 36

$\frac{28}{36}-\frac{3}{36}=\frac{25}{36}$

45d. $\frac{7}{8}-\frac{1}{3}$ LCD is 24

$\frac{21}{24}-\frac{8}{24}=\frac{13}{24}$

46a. $2\frac{1}{5}=\frac{5\cdot2+1}{5}=\frac{11}{5}$

46b. $3\frac{3}{8}=\frac{8\cdot3+3}{8}=\frac{27}{8}$

46c. $7\frac{1}{4}=\frac{4\cdot7+1}{4}=\frac{29}{4}$

47a. $\frac{25}{3}=$ $3\overline{)25}$ $=8\frac{1}{3}$

47b. $2\frac{2}{5}$

47c. $5\frac{2}{7}$

47d. $16\frac{1}{3}$

48a. $1\frac{1}{5}\cdot 2\frac{1}{3}=$

$\frac{6}{5}\cdot\frac{7}{3}=\frac{42}{15}=2\frac{4}{5}$

48b. $2\frac{1}{5}\cdot 3\frac{1}{3}=$

$\frac{11}{5}\cdot\frac{10}{3}=\frac{110}{15}=7\frac{1}{3}$

48c. $1\frac{1}{3}\cdot 1\frac{1}{2}=$

$\frac{4}{3}\cdot\frac{3}{2}=\frac{12}{6}=2$

49a. $6\frac{3}{4}\div 1\frac{1}{2}=\frac{27}{4}\div\frac{3}{2}=$

$\frac{27}{4}\cdot\frac{2}{3}=\frac{54}{12}=4\frac{1}{2}$

49b. $2\frac{5}{8}\div 1\frac{1}{6}=\frac{21}{8}\div\frac{7}{6}=$

$\frac{21}{8}\cdot\frac{6}{7}=\frac{126}{56}=2\frac{1}{4}$

49c. $4 \div 1\frac{1}{2} = \frac{4}{1} \div \frac{3}{2} =$

$\frac{4}{1} \cdot \frac{2}{3} = \frac{8}{3} = 2\frac{2}{3}$

50a. $3\frac{1}{4} = \frac{2}{8}$

$+\ 2\frac{3}{8} = \frac{3}{8}$

$= 5\frac{5}{8}$

50b. $1\frac{1}{5} = \frac{7}{35}$

$+ 2\frac{1}{7} = \frac{5}{35}$

$= 3\frac{12}{35}$

50c. $3\frac{9}{16} = \frac{9}{16}$

$+\ 5\frac{3}{4} = \frac{12}{16}$

$= 8\frac{21}{16} = 9\frac{5}{16}$

51a. $3\frac{1}{2} = \frac{3}{6}$

$-\ 1\frac{1}{3} = \frac{2}{6}$

$= 2\frac{1}{6}$

51b. $5\frac{1}{16} = 4\frac{1}{16} + \frac{16}{16} = \frac{17}{16}$

$-\ 2\frac{3}{4} = 2\frac{12}{16} = \frac{12}{16}$

$= 2\frac{5}{16}$

51c. $9\frac{1}{4} = 8\frac{2}{8} + \frac{8}{8} = \frac{10}{8}$

$-\ 3\frac{5}{8} = 3\frac{5}{8} = \frac{5}{8}$

$= 5\frac{5}{8}$

52a. $5\frac{1}{2} cups \div 2 = \frac{11}{2} cups \cdot \frac{1}{2} = \frac{11}{4} cups$

$= 2\frac{3}{4} cups$

52b. $\frac{1}{2}\ in + \frac{2}{3} in + \frac{3}{4}\ in = \frac{23}{12}\ in = 1\frac{11}{12}\ in$

52c. $\$42\frac{3}{8} - \$40\frac{7}{8} = \$1\frac{4}{8} = \$1\frac{1}{2}$

52d. $30\frac{1}{2}\ yd \cdot 1\frac{1}{4}\ yd \cdot \frac{1}{9} yd = 4\frac{17}{72} cu\ yd$

53. thousandths 6 = tenths
9 = hundredths
3 = thousandths

54. 7

55a. ten and one hundred twenty-three thousandths

55b. two and one hundred one thousandths

55c. ninety-three hundredths

56a. 4000.03

56b. 0.00078

56c. 102.2

57a. 9.07

57b. 102.1

57c. 39.988

57d. 10.10

58. 3.6
0.201
+ 0.05
3.851

59. 39.78
- 23.99
15.79

60. 23.05 2 places
x 11.62 2 places
4610 4 places
13830
2305
2305
2678410 = 267.8410

61. 2.11$\overline{6}$
3) 6.350
-6
03
-3
05
- 3
20
- 18
2

62. 81.441$\overline{6}$
0.12)9.77300
- 96
17
- 12
53
- 48
50
- 48
20
- 12
8

63. $93.98 ÷ 2 = $46.99

64. $84.50 + $213.68 + $98.99 = $397.17

65. 58.5 cm ÷ 6.5 cm = 9; 9 pieces

66. $0.55 x 12 = $6.60