LANE COMMUNITY COLLEGE
UPDATE: 3/02 LABEL

MATH REVIEW SHEETS
MATH 010, MATH 020 - BASIC MATHEMATICS

"These review sheets and the placement test are designed to place the student in the best possible class that fits their knowledge level. The placement test does not mean the student has all the prerequisite skills mastered. The placement test is just a sampling of previous knowledge and the concepts covered in the Math 020 class. Passing the placement test does not mean you have all the concepts mastered that are presented in the Math 020 class. If you bypass the class, you're doing so at your own risk of not being prepared for the next class."

A Summary of Concepts needed to be successful in Mathematics

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

WHY ARE THESE SHEETS USEFUL -

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

HOW TO USE THESE SHEETS-

- Study whole number concepts, fraction concepts, mixed number concepts, and decimal concepts to pass out of math 010. Study all concepts to pass out of Math 020.
- 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.
- These sheets are not intended to be a short course. You should use them to simply 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 review sheets.

* WHOLE NUMBER OPERATIONS CONTINUED

**DIVISION

1) $396 \div 23 \rightarrow$

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

2) $5422 \div 17 \rightarrow$

$$\begin{array}{r} 318 \text{ R } 16 \\ 17\overline{)5422} \\ \underline{-\ 51} \\ 32 \\ \underline{-\ 17} \\ 152 \\ \underline{-136} \\ 16 \end{array}$$

*ROUNDING

1) Round 4,868 to nearest hundred → 4,900
2) Round 92,449 to nearest thousand → 92,000
3) Round 799 to nearest ten → 800
4) Round 123 to nearest hundred → 100

* ESTIMATE SUMS, DIFFERENCES, PRODUCTS, QUOTIENTS

1) Estimate the sum of 38 + 99 + 21 + 14 by rounding to the nearest ten:
   40 + 100 + 20 + 10 → 170
2) Estimate the quotient by rounding to the nearest ten: 48 ÷ 8 → 50 ÷ 10 → 5
3) Estimate the difference by rounding to the nearest hundred: 621 - 267 → 600 - 300 → 300
4) Estimate the product by rounding to the nearest ten: 67 x 23 → 70 x 20 → 1400

*APPLICATIONS

1) Thirty identical chairs cost $1680. What is the cost of one chair? $1680 ÷ 30 = $56 each
2) Jose read 39 books in 1994, 27 books in 1995, and 35 book in 1996. How many books did he read over the 3 years? 39 + 27 + 35 → 101 books
3) Bart gives the cashier three $50 bills to pay for a purchase of $123, how much change should he get back?
   3 x $50 = $150 →$150 -$123 → $27 change
4) What is the number of square yards in a back yard that measures 30 yd by 41 yd?
   30 yd x 41 yd → 1230 sq yd

* ORDER OF OPERATIONS

- Parenthesis first { [( )] }
- Exponents, radicals second
- Multiplications and divisions as they occur left to right next
- Additions and subtractions as they occur left to right last

** PARENTHESIS

Work from inside to outside

**EXPONENTS (Repeated multiplication)

1) 3x3x3x3 → 3^4 The 3 is the base, the 4 is the exponent and tells how many factors of the base there were.
2) 9 x 9 = 9^2 = 81
3) 5 x 5 x 5 = 5^3 = 125
4) 4^5 = 4 x 4 x 4 x 4 x 4
5) 7^3 = 7 x 7 x 7

** RADICALS

1) $3^2 = 9$ $\sqrt{9} = 3$
2) $5^2 = 25$ $\sqrt{25} = 5$
3) $\sqrt{81} = 9$
4) $\sqrt{16} = 4$

** STRINGS (FOLLOW ORDER OF OPERATIONS)

1) 12 ÷ 4 x 3 → 3 x 3 → 9
2) 3 x 3 ÷ 3 → 9 ÷ 3 → 3
3) 9 + 3 ÷ 3 → 9 + 1 → 10
4) 9 - 6 ÷ 2 → 9 - 3 → 6
5) 14 + 7 x 2 → 14 + 14 → 28

** EXAMPLES (FOLLOW ORDER OF OPERATIONS)

1) 3 x (6 + 2) - 3 + 4 ÷ 2
   3 x 8 - 3 + 4 ÷ 2
   24 - 3 + 2
   21 + 2
   23

2) 2 x [9 + (3 ÷ 3)] - 5 x 2 + $\sqrt{36}$
   2 x [9 + 1] - 5 x 2 + $\sqrt{36}$
   2 x 10 - 5 x 2 + 6
   20 - 10 + 6
   10 + 6
   16

3) 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 x2
   5 x 12 + 20 ÷ 4 x 2
   60 + 5 x 2
   60 + 10
   70

* PRIME AND COMPOSITE NUMBERS

**Prime numbers have only themselves and 1 as factors→ 2, 3, 5, 7, 11, 13, 17, 19, 23

**Composite numbers have many factors→ 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 24, 25

* PRIME FACTORIZATION

1) 12 = 2 • 2 • 3 = 2^2 • 3
2) 8 = 2 • 2 • 2 = 2^3
3) 100 = 2 •2 • 5 • 5 = 2^2 • 5^2
4) 81 = 3 • 3 • 3 • 3 = 3^4
5) 105 = 3 • 5 • 7

* LOWEST COMMON MULTIPLE (LCM)
(of two or more numbers is the smallest number that they will divide into exactly)

1) LCM of 6 and 12 →12
2) LCM of 3 and 5 → 15
3) LCM of 6 and 7 → 42
4) LCM of 12 and 18 → 12, 24, 36, 48, 60, 72, 84, 96, → **36**
5) LCM of 15 and 30 → 30
6) LCM of 14 and 49 → 14, 28, 42, 56, 70, 84, → **98**

FRACTION CONCEPTS	SAMPLE PROBLEMS OF CONCEPTS
* SHADED PIECES / ASSORTED PIECES	1) □□□■■ → $\frac{2}{5}$ are shaded
	2) △ ◯ □ ? ! : → $\frac{3}{6}$ are geometric shapes
	3) 1, 2, ○, *, △, 4, 9, → $\frac{4}{7}$ are numbers
* EQUIVALENT FRACTIONS	1) $\frac{1}{3} \rightarrow \frac{1}{3} \cdot \frac{2}{2} = \frac{2}{6}$ equivalent to $\frac{1}{3}$
	2) $\frac{2}{7} \rightarrow \frac{2}{7} \cdot \frac{3}{3} = \frac{6}{21}$ equivalent to $\frac{2}{7}$
* SIMPLIFYING FRACTIONS (reducing fractions)	1) $\frac{6}{9} \rightarrow \frac{2 \cdot 3}{3 \cdot 3} = \frac{2}{3} \cdot \frac{3}{3} = \frac{2}{3} \cdot 1 = \frac{2}{3}$
	2) $\frac{12}{20} \rightarrow \frac{3 \cdot 4}{5 \cdot 4} = \frac{3}{5} \cdot \frac{4}{4} = \frac{3}{5} \cdot 1 = \frac{3}{5}$
	3) $\frac{3}{12} \rightarrow \frac{3 \cdot 1}{3 \cdot 4} = \frac{3}{3} \cdot \frac{1}{4} = 1 \cdot \frac{1}{4} = \frac{1}{4}$
* MULTIPLY AND SIMPLIFY	1) $\frac{6}{4} \cdot \frac{2}{3} = \frac{6 \cdot 2}{4 \cdot 3} = \frac{12}{12} = 1$
	2) $\frac{2}{3} \cdot \frac{1}{4} = \frac{2 \cdot 1}{3 \cdot 4} = \frac{2}{12} = \frac{2 \cdot 1}{2 \cdot 6} = \frac{1}{6}$
	3) $\frac{1}{9} \cdot \frac{2}{7} = \frac{1 \cdot 2}{9 \cdot 7} = \frac{2}{63}$
	4) $\frac{2}{7} \cdot \frac{14}{16} = \frac{2 \cdot 2 \cdot 7 \cdot 1}{7 \cdot 2 \cdot 2 \cdot 4} = \frac{1}{4}$
* RECIPROCALS	1) $\frac{2}{3} \cdot \frac{3}{2} = 1$ $\frac{2}{3}$ and $\frac{3}{2}$ are reciprocals
	2) Reciprocal of $\frac{8}{3} \rightarrow \frac{3}{8}$
	3) Reciprocal of $6 = \frac{6}{1} \rightarrow \frac{1}{6}$

* DIVIDE AND SIMPLIFY

1) $\frac{1}{3} \div \frac{2}{7} = \frac{1}{3} \cdot \frac{7}{2} = \frac{7}{6}$

2) $\frac{2}{5} \div \frac{5}{6} = \frac{2}{5} \cdot \frac{6}{5} = \frac{12}{25}$

4) $\frac{9}{8} \div \frac{3}{2} = \frac{9}{8} \cdot \frac{2}{3} = \frac{18}{24} = \frac{3 \cdot 6}{4 \cdot 6} = \frac{3}{4}$

* LOWEST COMMON DENOMINATOR - (LCD)
GET LCM OF DEMONINATOR AND THIS BECOMES THE LCD

1) LCD for $\frac{3}{4}$ and $\frac{1}{3}$ is 12

2) LCD for $\frac{1}{5}$ and $\frac{2}{15}$ is 15

3) LCD for $\frac{1}{2}$ and $\frac{1}{3}$ and $\frac{1}{4}$ is 12

4) LCD for $\frac{1}{5}$ and $\frac{1}{6}$ is 30

5) LCD for $\frac{7}{20}$ and $\frac{1}{25}$ is 100

6) LCD for $\frac{5}{12}$ and $\frac{7}{16}$ is 48

* ADD AND SIMPLIFY

1) $\frac{1}{4} + \frac{2}{5} = \frac{1}{4} \cdot \frac{5}{5} + \frac{2}{5} \cdot \frac{4}{4} = \frac{5}{20} + \frac{8}{20} = \frac{13}{20}$ LCD is 20

2) $\frac{1}{5} + \frac{7}{15} = \frac{1}{5} \cdot \frac{3}{3} + \frac{7}{15} = \frac{3}{15} + \frac{7}{15} = \frac{10}{15} = \frac{2}{3}$ LCD is 15

3) $\frac{5}{12} + \frac{7}{16} = \frac{5}{12} \cdot \frac{4}{4} + \frac{7}{16} \cdot \frac{3}{3} = \frac{20}{48} + \frac{21}{48} = \frac{41}{48}$ LCD is 48

*SUBTRACT AND SIMPLIFY

1) $\frac{9}{16} - \frac{1}{4} = \frac{9}{16} - \frac{1}{4} \cdot \frac{4}{4} = \frac{9}{16} - \frac{4}{16} = \frac{5}{16}$ LCD is 16

2) $\frac{1}{2} - \frac{3}{8} = \frac{1}{2} \cdot \frac{4}{4} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8} = \frac{1}{8}$ LCD is 8

3) $\frac{7}{9} - \frac{1}{12} = \frac{7}{9} \cdot \frac{4}{4} - \frac{1}{12} \cdot \frac{3}{3} = \frac{28}{36} - \frac{3}{36} = \frac{25}{36}$ LCD is 36

4) $\frac{7}{8} - \frac{1}{3} = \frac{7}{8} \cdot \frac{3}{3} - \frac{1}{3} \cdot \frac{8}{8} = \frac{21}{24} - \frac{8}{24} = \frac{13}{24}$ LCD is 24

MIXED NUMBER CONCEPTS

SAMPLE PROBLEMS OF CONCEPTS

*** MIXED NUMBER TO IMPROPER FRACTION**

1) $2\frac{1}{5} = \frac{5 \cdot 2 + 1}{5} = \frac{11}{5}$

2) $3\frac{3}{8} = \frac{8 \cdot 3 + 3}{8} = \frac{27}{8}$

3) $7\frac{1}{4} = \frac{4 \cdot 7 + 1}{4} = \frac{29}{4}$

*** IMPROPER FRACTION TO MIXED NUMBERS**

1) $\frac{25}{3} = 3\overline{)25}^{8} = 8\frac{1}{3}$

2) $\frac{12}{5} = 5\overline{)12}^{2} = 2\frac{2}{5}$

3) $\frac{37}{7} = 5\frac{2}{7}$

4) $\frac{49}{3} = 16\frac{1}{3}$

*** MULTIPLY AND SIMPLIFY**

1) $1\frac{1}{5} \cdot 2\frac{1}{3} = \frac{6}{5} \cdot \frac{7}{3} = \frac{42}{15} = \frac{14}{5} = 2\frac{4}{5}$

2) $2\frac{1}{5} \cdot 3\frac{1}{3} = \frac{11}{5} \cdot \frac{10}{3} = \frac{110}{15} = \frac{22}{3} = 7\frac{1}{3}$

3) $1\frac{1}{3} \cdot 1\frac{1}{2} = \frac{4}{3} \cdot \frac{3}{2} = \frac{12}{6} = 2$

*** DIVIDE AND SIMPLIFY**

1) $6\frac{3}{4} \div 1\frac{1}{2} = \frac{27}{4} \div \frac{3}{2} = \frac{27}{4} \cdot \frac{2}{3} = \frac{54}{12} = \frac{9}{2} = 4\frac{1}{2}$

2) $2\frac{5}{8} \div 1\frac{1}{6} = \frac{21}{8} \div \frac{7}{6} = \frac{21}{8} \cdot \frac{6}{7} = \frac{126}{56} = \frac{9}{4} = 2\frac{1}{4}$

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

* ADD AND SIMPLIFY

1) $3\frac{1}{4} = \frac{2}{8}$
$+\ 2\frac{3}{8} = \frac{3}{8}$
$= 5\frac{5}{8}$

2) $1\frac{1}{5} = \frac{7}{35}$
$+\ 2\frac{1}{7} = \frac{5}{35}$
$= 3\frac{12}{35}$

3) $3\frac{9}{16} = \frac{9}{16}$
$+\ 5\frac{3}{4} = \frac{12}{16}$
$= 8\frac{21}{16} = 9\frac{5}{16}$

* SUBTRACT AND SIMPLIFY

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

2) $5\frac{1}{16} = 4\frac{1}{16} + \frac{16}{16} = \frac{17}{16}$
$-\ 2\frac{3}{4} = 2\frac{12}{16} = \frac{12}{16}$
$= 2\frac{5}{16}$

3) $9\frac{1}{4} = 8\frac{2}{8} + \frac{8}{8} = \frac{10}{8}$
$-\ 3\frac{5}{8} = 3\frac{5}{8} = \frac{5}{8}$
$= 5\frac{5}{8}$

*APPLICATIONS OF FRACTIONS AND MIXED NUMBERS

1) 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?

$5\frac{1}{2} \div 2 = \frac{11}{2} \div \frac{2}{1} = \frac{11}{2} \cdot \frac{1}{2} = \frac{11}{4} = 2\frac{3}{4}$ cup

2) 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?

$\frac{1}{2} + \frac{2}{3} + \frac{3}{4} = \frac{6}{12} + \frac{8}{12} + \frac{9}{12} = \frac{23}{12} = 1\frac{11}{12}$ inches

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

$42\frac{3}{8} - 40\frac{7}{8} = 41\frac{11}{8} - 40\frac{7}{8} = 1\frac{4}{8} = \$1\frac{1}{2}$

4) 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 ?

$30\frac{1}{2} \cdot 1\frac{1}{4} \cdot \frac{1}{9} = \frac{61}{2} \cdot \frac{5}{4} \cdot \frac{1}{9} = \frac{305}{72} = 4\frac{17}{72}$ cu yds

DECIMAL CONCEPTS

SAMPLE PROBLEMS OF CONCEPTS

*** PLACE VALUE**

0.671235

6→ tenths; 7→hundredths; 1→thousandths; 2→ten-thousandths; 3→hundred-thousandths; 5→millionths

1) What place value does 3 have in 0.693→thousandths
2) What digit is in the ten-thousandths place in 0.28976 →7

*** WORD NAMES**

1) 10.123 → ten and one hundred twenty - three thousandths
2) 2.101 → two and one hundred one thousandths
3) 0.93 → ninety - three hundredths

*** DECIMAL NUMBERS FOR WORD NAMES**

1) four thousand and three hundredths → 4000.03
2) seventy - eight hundred-thousandths → 0.00078
3) one hundred two and two tenths → 102.2

*** ROUNDING**

1) 9.0673 to nearest hundredth → 9.07
2) 102.1029 to nearest tenth → 102.1
3) 39.9875 to nearest thousandth → 39.988
4) 10.1022 to nearest hundredth → 10.10

*** ADD AND/OR SUBTRACT**

1) 3.6 + 0.201 + 0.05 =

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  3.6
  0.201
+ 0.05
  3.851
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2) 39.78 - 23.99 =

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  39.78
- 23.99
  15.79
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*** MULTIPLY**

3) 23.05 x 11.62 =

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  23.05   2 places
x 11.62   2 places
   4610   4 places
  13830
   2305
  2305
 267841   → 267.8410
```

*** DIVIDE (3 decimal places)**

1) 6.350 ÷ 3

```
    2.116
3 ) 6.350
   -6
    03
   -3
    05
   - 3
     20
    -18
      2
```

2) 9.773 ÷ 0.12

```
     81.441
0.12 ) 9.77300
    -96
     17
    -12
      53
     -48
       50
      -48
        20
       -12
         8
```

(NO CALCULATORS)

* APPLICATIONS

1) If two dresses cost $93.98, How much does one dress cost?
   $93.98 ÷ 2 = $46.99
2) If 4 shirts cost $84.50, 3 coats cost $213.68 and 4 pair of slacks cost $98.99, how much is the total ?
   $84.50 + $213.68 + $98.99 = $397.17
3) 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?
   58.5 cm ÷ 6.5 cm = 9 pieces
4) If each cookie at a bake sale costs $.55, how much does a dozen cost? $.55 x 12 = $6.60 doz

RATIO AND RATE CONCEPTS

SAMPLE PROBLEMS OF CONCEPTS

* NOTATION:

(a,b; a to b; $\frac{a}{b}$)

* APPLICATION OF RATIO

If there are 2 doctors for every 125 people in a certain town, give the ratio of doctors to people and then people to doctors. $\frac{2}{125}$; $\frac{125}{2}$

* APPLICATIONS OF RATE

1) $\frac{120miles}{3gal} = \frac{40miles}{1gal} = 40mpg$
2) If 7 dozen eggs cost $4.41, what is the cost per dozen?
   $\frac{\$4.41}{7doz} = \frac{\$.63}{1doz} =$ $.63 per doz
3) If 6.34 cm of a steel beam weighs 31.7 kg, what is the weight per cm ?
   $\frac{31.7kg}{6.34cm} = \frac{5kg}{1cm}$ = 5kg per cm

PROPORTION CONCEPTS

SAMPLE PROBLEMS OF CONCEPTS

*DEFINITION:

Two equal ratios form a proportion. Pieces missing in a proportion are solved for by cross products.

* SOLVING FOR MISSING PIECES

1) $\frac{3}{6} = \frac{a}{8}$ $\quad 6 \cdot a = 3 \cdot 8 \quad 6 \cdot a = 24 \quad a = 24 \div 6 = 4$

2) $\frac{4}{6} = \frac{10}{a}$ $\quad 4 \cdot a = 10 \cdot 6 \quad 4 \cdot a = 60 \quad a = 60 \div 4 = 15$

3) $\frac{5}{a} = \frac{2}{3}$ $\quad 2 \cdot a = 5 \cdot 3 \quad 2 \cdot a = 15 \quad a = 15 \div 2 = 7.5$

4) $\frac{a}{4.2} = \frac{9.6}{5}$ $\quad 5 \cdot a = 4.2 \cdot 9.6 \rightarrow 5 \cdot a = 40.32 \rightarrow$

   $a = 40.32 \div 5 \rightarrow a = 8.064$

* APPLICATIONS

1) If 2 inches represents 270 miles on a map, how many inches represents 60 miles on a map? $\frac{2in}{270mi} = \frac{x}{60mi}$ $270 \cdot x = 2 \cdot 60$

$270 \cdot x = 120$

$x = 120 \div 270 \approx .44$ in

2) If a can of paint covers 320 sq ft, how many cans (whole cans) are needed to cover 1650 sq ft.

$\frac{1\,can}{320sq.ft.} = \frac{x\,cans}{1650sq.ft.}$ $320 \cdot x = 1650$

$x = 1650 \div 320 = 5.15625 \rightarrow 6$ cans

3) Two pounds (lbs) of butter will make 5 batches of cookies. How many pounds of butter will make 24 batches of cookies.

$\frac{2lbs}{5batches} = \frac{x\,lbs.}{24batches}$ $5 \cdot x = 2 \cdot 24$ $x = 48 \div 5$

$x = 9.6$ lbs

AVERAGE CONCEPT

* Definition

SAMPLE PROBLEMS OF CONCEPTS

An **average** is the sum of all the numbers divided by the number of original numbers.

1) Give the average of 92, 63, 77, 89.

$$\frac{92+63+77+89}{4} = \frac{321}{4} = 80.25$$

2) Find the average of 100, 72, 81, 93, 88.

$$\frac{100+72+81+93+88}{5} = \frac{434}{5} = 86.8$$

PERCENT CONCEPTS (PER 100)

* PERCENT TO DECIMAL

Move decimal two places **left**

1) 30% = .30 2) 3.92% = .0392 3) $12\frac{1}{2}\% = 12.5\% = .125$

* DECIMAL TO PERCENT

Move decimal two places **right**

1) 41.6 = 4160% 2) 0.016 = 1.6% 3) 0.42 = 42%

* PERCENT TO REDUCED FRACTION

1) $80\% = \frac{80}{100} = \frac{4}{5}$ 2) $25\frac{1}{2}\% = 25.5\% = 0.255 = \frac{255}{1000} = \frac{51}{200}$

3) $6\% = \frac{6}{100} = \frac{3}{50}$

* FRACTION TO PERCENT

1) $\frac{1}{4} \rightarrow 4\overline{)1.00} \rightarrow .25 = 25\%$ 2) $\frac{2}{3} \rightarrow 3\overline{)2.00} \rightarrow .666 \approx 66.7\%$

3) $\frac{5}{8} \rightarrow 8\overline{)5.00} \rightarrow .625 = 62.5\%$

* 3 TYPES OF PERCENT PROBLEMS

$M\% = \frac{M}{100}$; $\frac{M}{100} = \frac{PIECE}{WHOLE}$

(Solve for any missing piece by cross products.)

1) $\frac{30}{100} = \frac{x}{40}$ x = 12 2) $\frac{M}{100} = \frac{25}{20}$ M = 125 %

3) $\frac{20}{100} = \frac{33}{x}$ x = 165

* PERCENT APPLICATIONS

1) What % of 30 is 25? $\frac{M}{100} = \frac{25}{30}$ $M = 83.\overline{3}\%$

2) What is 12% of 52? $\frac{12}{100} = \frac{x}{52}$ x = 6.24

3) 42 is 43% of what? $\frac{43}{100} = \frac{42}{x}$ $x \approx 97.67$

4) 30% of 280 students can type. How many can type?

$\frac{30}{100} = \frac{x}{280}$ x = 84 students

5) 7 out of 54 items coming off an assembly line are defective. What percent is this? $\frac{M}{100} = \frac{7}{54}$ $M \approx 12.96\% \approx 13\%$

6) A 5.5% tax on a ring is $9.50, what is the original cost of the ring?

$\frac{5.5}{100} = \frac{\$9.50}{x}$ $x \approx \$172.73$

GEOMETRIC CONCEPTS

SAMPLE PROBLEMS OF CONCEPTS

* RECTANGLES

$A = \ell \cdot w$; $P = 2\ell + 2w$

$\ell \Rightarrow$ length w $\Rightarrow$ width A = area P = perimeter

1) What is the area of a square that is 2in on each side?

A = 2in. · 2in = 4 sq in.

2) What is the perimeter and area of a rectangle that is 13cm by 6cm?

P = 2 · 13cm + 2 · 6 cm = 26 + 12 = 38cm

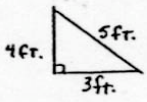
A = 13cm · 6 cm = 78 sq cm.

*** TRIANGLES**

$P = D + E + F$ $\qquad A = \frac{1}{2} \cdot b \cdot h$

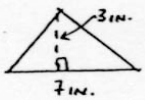
D, E, F sides of triangle

P = perimeter A = Area b = base h = height

1) 

$P = 4\text{ ft} + 3\text{ ft} + 5\text{ ft} = 12\text{ft}$

$A = \frac{1}{2} \cdot 3ft \cdot 4ft = 6\text{ sq ft}$

2) 

$A = \frac{1}{2} \cdot 7in \cdot 3in = 10\frac{1}{2}$ sq in <u>OR</u> = 10.5 sq in

*** CIRCLES**

$C = \pi \cdot D$ OR $C = 2 \cdot \pi \cdot R$ $\qquad A = \pi \cdot R^2$

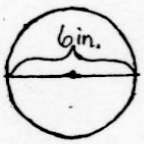
C ⇒ circumference $\pi \approx 3.14$ D ⇒ diameter R ⇒ radius

A ⇒ area

1) 

$C = 2 \cdot \pi \cdot R = 2 \cdot 3.14 \cdot 2.5 = 15.7\text{cm}$

$A = \pi \cdot R^2 = 3.14 \cdot (2.5\text{ cm})^2 = 19.625\text{ sq cm}$

2) 

$C = \pi \cdot D = 3.14 \cdot 6\text{ in} = 18.84\text{ in}$

$A = \pi \cdot R^2 = 3.14 \cdot (3\text{ in})^2 = 28.26\text{ sq in}$

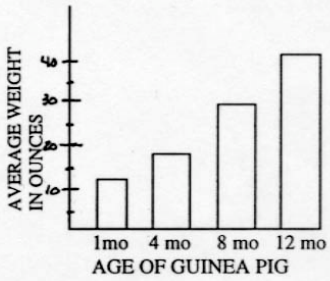
<u>RADICALS REVISITED</u>

1) $\sqrt{25} = 5$ $\qquad$ 2) $\sqrt{13} \approx 3.61$ $\qquad$ 3) $\sqrt{112} \approx 10.58$

GRAPH CONCEPTS

* CIRCLE GRAPHS

* BAR GRAPHS



* PICTOGRAPHS

Shampoo sales for a shampoo company

1996 ☺☺☺☺☺☺☺☺☺☺☺☺
1995 ☺☺☺☺☺☺
1994 ☺☺☺☺☺☺☺☺
1993 ☺☺☺☺☺☺☺☺
1992 ☺☺☺☺☺
1991 ☺☺☺

☺ = 1000 Bottles Sold

SAMPLE PROBLEMS OF CONCEPTS

1) A family makes $33,500 for the year. How much is spent for food?

$$\frac{18}{100} = \frac{X}{\$33{,}500} \quad X = \$6030$$

2) What percent of the salary for a family is spent on misc. and bills?

10% + 22% = 32%

1) When a guinea pig is 8 months old about how much should it weigh ?

30 ounces

2) When a guinea pig weighs about 38 ounces it is how old?

12 months

1) In what year did shampoo sales decline? 1995

2) In what year did shampoo sales grow the most? 1996

3) How many bottles of shampoo sold in year 1994?
8 · 1000 = 8000 bottles

NO CALCULATORS

WHOLE NUMBER CONCEPTS	SAMPLE PROBLEMS OF CONCEPTS
* PLACE VALUE	1) 2,345,167: 2 → 2 millions 3 → 3 hundred thousamds 4 → 4 ten thousands 5 → 5 thousands 1 → 1hundred 6 → 6 tens 7 → 7 ones
	2) The digit 3 in 4,235,100 names ten thousands. 3) The digit in the thousands place in 4,968,123 is 8.
* WORD NAMES	1) 305 → three hundred five 2) 10,660 → ten thousand, six hundred sixty
* STANDARD NOTATION	1) Thirty five thousand, six → 35,006 2) Ninety two thousand, twenty - one → 92,021 3) One thousand, five hundred ninety-one → 1,591
* EXPANDED NOTATION	1) 903,251 → 900,000 + 3000 + 200 + 50 + 1 2) 8,672 → 8000 + 600 + 70 + 2 3) 300 + 5 → 305 4) 40,000 + 200 + 70 + 2 → 40,272
* WHOLE NUMBER OPERATIONS ** ADDITION	1) 46 + 729 + 1025 + 47 → 46 729 1025 + 47 1,847
	2) 96 + 321 + 21 → 96 321 + 21 438
** SUBTRACTION	1) 423 - 69 Check: 69 + 354 = 423 354
	2) 982 -793 Check: 793 + 189 = 982 189
** MULTIPLICATION	1) 145 x 36 → 145 x 36 870 435 5,220 A dot can mean multiply also.
	2) 21 • 14 → 21 x 14 84 21 294