Name _____
Date _____

MTH 135 – Introduction to Technical Mathematics
Class #1 - B

Chapter 2.1 – Conversion Analysis

Consider Table 2.1 on Page 47

1. Write a unit rate for the "Given" values and then convert to the "asked for" units.

a. The Grand Canyon is 1.300 miles deep. Suppose you want to know the depth of the Grand Canyon in inches:

b. A security guard at MCC must "walk his beat" 2 times every hour. If the perimeter of MCC is 4,000 feet, how many miles will the security guard walk on each 8 hour shift?

c. The cost of a gallon of gas is $3.25. if you travel 40 miles (back and forth) to work each day, and your car gets 25 miles per gallon, determine how much you will spend on gas each week. (5-day work week).

Section 2.2 Conversions – Continued

1. Metric – Metric Conversions: The metric system has units of differing magnitude varying by powers of 10. The arithmetic needed to do conversions simply requires a "shift" left and right of the decimal point by the various "prefixes" of the basic units of the metric system.

2. Some basic Metric Conversions:

(L)

K. H. Da. M. d. c. m.

(G)

Prefixes:	Meaning
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

* More Prefixes can be referenced on the tables on page 51 of our text.

3. Metric to Metric Conversions – Practice

a.	0.005 cm	_____ m	f.	1.25 HL	_____ DaL
b.	14.5 m	_____ cm	g.	0.0056 Kg	_____ g
c.	12.5L	_____ daL	h.	45.9 cL	_____ L
d.	0.0045 Km	_____ m	i.	1200 mm	_____ m
e.	45 mg	_____ g	j.	14.5 dL	_____ L

Units of Distance (Length), Weight (Mass), and Capacity (Volume)

1. The perimeter of a square is measured in _____ units. If the side of a square is measured in inches, then the perimeter would be measured in _____.

2. The area of a square is measured in _____ units. If the side of a square is measured in inches, then the area would be measured in _____.

3. The volume of a cube (squared prism) is measured in _____ units. If the side of a square is measured in inches, then the volume would be measured in _____.

Chapter 2.2 Reductions and Conversions

1. Define Reduction: _____

_____

Reduction Values are _____ values.

2. Define Conversion: _____

_____

Conversion Values of _____ values.

3. Table 2.4 from our textbook.

Table 2.4 Reduction and Conversion Factors

Reduction factors		
$144\ \text{in.}^2 = 1\ \text{ft}^2$	(all are exact)	$100\ \text{mm}^2 = 1\ \text{cm}^2$
$9\ \text{ft}^2 = 1\ \text{yd}^2$		$10{,}000\ \text{cm}^2 = 1\ \text{m}^2$
$1728\ \text{in.}^3 = 1\ \text{ft}^3$		$1000\ \text{mm}^3 = 1\ \text{cm}^3$
$27\ \text{ft}^3 = 1\ \text{yd}^3$		$1000\ \text{cm}^3 = 1\ \text{L}$
Conversion factors		
1 in. = 2.54 cm (exactly)		$1\ \text{ft}^3 = 28.32\ \text{L}$
1 m = 39.37 in.	(all others are approx.)	$1\ \text{pt} = 473.2\ \text{cm}^3$
1 mi = 1.609 km		1 L = 1.057 qt
1 lb = 453.6 g		
1 kg = 2.205 lb		

Practice Section:

Problem 1.

Convert a distance of 2.800 mi to kilometers.
Since 1 mi = 1.609 km, the fraction

Problem 2.

Reduce 30 mi/h to feet per second.

Problem 3.

Reduce 575 g/cm^3 to kilograms per cubic meter.

Problem 4.

Convert 62.80 lb/in.^{2} to kilograms per square meter.

Problem 5.

A certain laptop weighs 8.00 pounds. What is its weight in kilograms?

Problem 6.

Solid copper wire is specified by its gauge. For example, 22-gauge wire is common to electronic equipment and has a diameter of 0.0253 inches. Convert the diameter to millimeters (mm).

Chapter 2.3 Approximate Numbers and Significant Digits.

In technical mathematics, some numbers are exact while other numbers are approximate. When we perform calculations we need to consider the accuracy of the numbers are are performing the calculations on because they would affect the accuracy of our answers.

Exact Numbers:_____

Approximate Numbers:_____

Examples – Check whether the number given is approximate or exact.

1. A surveyor determines the distance between two benchmarks to be 176.5 feet

   Approx: _____ Exact: _____

2. A computer counts the number of students majoring in scores or technology to be 768.

   Approx: _____ Exact: _____

3. 60 seconds = 1 minute

   Approx: _____ Exact: _____

Section – Significant Digits

When we write approximate numbers we often times have to use zeros so that the placement of the decimal point is correct. The "Rules" for significant digits are outlined in our text, and on the following table:

DETERMINING THE NUMBER OF SIGNIFICANT DIGITS

- All non-zero digits are significant.
- Zeros placed between two significant digits are significant.
- Zeros placed to the right of both the decimal point and another significant digit are significant.
- Zeros placed at the beginning of a decimal problem or before other digits are not significant.
- Zeros used as placeholders are not significant.

Considering the Accuracy and Precision of a Number:

Accuracy: _____

Precision: _____

Final Skills Set – Working with Approximate Numbers

1. Rounding:

Procedure for Rounding Off

- Determine the number of significant digits.
- Consider the digit in the next place to the right.
- If this digit is less than 5, we accept the digit in the last place.
- If this digit is greater than or equal to 5, we increase the digit in the last place by 1 and this result digit becomes the final significant digit in our approximation.

2. The Operations of Arithmetic and Approximate Numbers.

Expressing Results From Arithmetic Operations on Approximate Numbers

1. *When approximate numbers are **added** or **subtracted, the result is expressed with the precision of the least precise number.***
2. *When approximate numbers are **multiplied** or **divided, the result is expressed with the accuracy of the least accurate number.** That is, use the smallest number of significant digits.*
3. *When the root of an approximate number is found, the **accuracy of the result is the same as the accuracy of the original number.** That is, use the same number of significant digits.*

Practice: Significant Digits

1. How many sig digs does 48.6 have _____

2. How many sig digs does 4800 have? _____

3. How many sig digs does $40,\overline{500}$ have? _____

4. Which of the two numbers, 70,370 and 50,400 is more accurate: _____ and more precise _____.

5. Round 70, 360 to 3 significant digits _____

6. 39.72 rounded to two significant digits _____

7. Add the approximiate numbers 73.2 + 8.0627 + 66.296 _____

8. Divide 292.6 by 3.4 _____

HW Section

Page(s)	Section(s)	Problems(s)
49	Chapter 2.1	All Odd
54	Chapter 2.2	1 → 39 Odd
59 → 60	Chapter 2.3	1 → 15 Odd, 17, 25
66 → 67	Chapter 2.4	All Odd

Next Class – Squares Quiz to 15