Pharmaceutics I

Lecture 1
Pharmaceutical calculations

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Course Instructors:
Prof. Dalia Samuel
Dr. Heidi A. Mageed

<table>
<thead>
<tr>
<th>Weighting of Assessments</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30</td>
</tr>
<tr>
<td>Oral Exam</td>
<td>10</td>
</tr>
<tr>
<td>Practical Exam</td>
<td>30</td>
</tr>
<tr>
<td>Semester Work</td>
<td>10</td>
</tr>
<tr>
<td>Fifth week of Assessment</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Credit Hours: 4  Lecture: 3 hrs/week  Practical: 2 hrs/ week

Office Hours:
Wednesday: 1-2pm
Thursday: 3-4 pm

Dr. Heidi abdel Mageed
Course Goals & Objectives

- Understand and practice pharmaceutical calculations for 2nd year pharmacy students

- To learn about pharmaceutical liquid preparations
  - Understand the development of liquid dosage forms
  - Define Physico-chemical properties of pharmaceutical dosage forms and products and related concepts.

- Understand disperse systems in pharmaceutical preparations including suspensions, colloids and aerosols.
Metrology and Calculations:
- Roman numbers
- Measuring systems
- Dose conversions
- Calculation of doses
- Calculations of child dose
- Alligation

Objectives
- Learn the commonly used subscription and signatura abbreviations.
- Correctly interpret a prescription for compounding.
- Learn how to translate the signature

Learn how to label your prescription

Practice examples for pharmaceutical calculations will be available at the copy center
Rx

Ammonium Chloride  IV g
Liq. Extract of Liquorice  3 ml
Syrup  50 ml
Water q.s  a.d  C ml

Fiat: Cough syrup

Sig.: 5 ml t.i.d.
We can divide content of a prescription into:

**Drug + excipient = medicine**
- **Active ingredient** = Drug
- **Inactive ingredient** = excipients/additives
  E.g. sweetening agent, coloring agent…etc.
- **vehicle**

---

**Rx**

- *Ammonium Chloride* 4 g
- *Liq. Extract of Liquorice* 3 ml
- *Syrup* 50 ml
- *Water q.s a.d* C ml

**Fiat:** Cough syrup

**Sig.:** 5 ml t.i.d.

---

**Numericals**
- **Solid, liquids and Vehicle**
- **Measuring systems**
Roman numerals use a basic set of **Seven** symbols:

The Romans can express large numbers by the use of few letters in a simple notation indicating addition or subtraction.

- \( ss = \frac{1}{2} \)
- \( l \) or \( L = 50 \)
- \( i \) or \( I = 1 \)
- \( c \) or \( C = 100 \)
- \( v \) or \( V = 5 \)
- \( d \) or \( D = 500 \)
- \( x \) or \( X = 10 \)
- \( m \) or \( M = 1000 \)
1-When the second letter has a value **smaller** than the first or **equal** the values are **added**.

- \( ii = 2 \)
- \( Li = 50 + 1 = 51 \)
- \( LXiv = 50 + 10 + 1 - 5 = 64 \)
- \( lxxxviii = 88 \)

2-When the second letter has a value **greater** than the first, the **smaller** is to be subtracted.

- \( Iv = 5 - 1 = 4 \)
- \( Xxiv = 24 \)
- \( xliv = 44 \)
3-I/X/C are used as subtractors 
Each is used to be subtracted from the next 2 higher characters .

\[ \text{I V X L C D M} \]

e.g  I is subtracted from v and x. 
   x is subtracted from l and C .
   C is subtracted from D and M.

99=xcix

4-Any character cannot be repeated more than three times.

III does not exist
5- A subtractor is placed so as to proceed only one character higher than itself.

e.g 19 is written xix not ixx.

6- Roman number is expressed as a method of addition (only subtraction is done if there is no other way).

   e.g (8) is expressed as viii and not iix
An accurate way to write large numbers in Roman numerals is to handle first
the thousands, then hundreds, then tens, then units.

Example: the number 1988.

One thousand is M
nine hundred is CM
eighty is LXXX
eight is VIII.

Put it together: (M C M L X X X V I I I I )
The following mnemonics recall the order of Roman numeral values above ten, with **L** being 50,

- **C** being 100,
- **D** being 500,
- and **M** being 1000.

**Lucky Cows Drink Milk**

**Lucy Can't Drink Milk**
Main difference between Arabic and Roman numbers are that roman numerals lack zero and the numerical placement within a number can sometimes indicate subtraction rather than addition.

Roman numerals remained in common use until about the 14th century, when they were replaced by Arabic numerals (thought to have been introduced to Europe from al-Andalus, by way of Arab traders and arithmetic treatises, around the 11th century).
At least four different systems are currently used in drug preparation and delivery:

- the metric system
- the apothecary system
- the avoirdupois system
- the household system
• The basic unit of **weight** in the metric system is the gram abbreviated "g"
• The basic unit of **volume** in the metric system the **liter**, abbreviated “l”
• The basic **linear unit** of the metric system is the **meter**, abbreviated “m”

**The most commonly used units are:**

**Length:** meter, centimeter, and millimeter.

**Volume:** liter, milliliter

**Weight:** gram, kilogram, milligram, and microgram.
# Measuring system

## Metric System

<table>
<thead>
<tr>
<th>Measure of length: “Meters”</th>
<th>Measure of Volume: “Liters”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kilometer (km) = 1000 m</td>
<td>1 kiloliter (kl) = 1000 l</td>
</tr>
<tr>
<td>1 hectometer (Hm) = 100 m</td>
<td>1 hectoliter (hl) = 100 l</td>
</tr>
<tr>
<td>1 decameter (Dm) = 10 m</td>
<td>1 dekaliter (dl) = 10 l</td>
</tr>
<tr>
<td>1 decimeter (dm) = 0.100 m</td>
<td>1 deciliter (dl) = 0.1 l</td>
</tr>
<tr>
<td>1 centimeter (cm) = 0.01 m</td>
<td>1 centiliter (cl) = 0.01 l</td>
</tr>
<tr>
<td>1 millimeter (mm) = 0.001 m</td>
<td>1 milliliter (ml) = 0.001 l</td>
</tr>
<tr>
<td>1 micrometer (µm) = 0.000,001 m</td>
<td>1 microliter (µl) = 0.000,001 l</td>
</tr>
<tr>
<td>1 nanometer (nm) = 0.000,000,001 m</td>
<td></td>
</tr>
</tbody>
</table>

## English/Common System

## Household measurements

## Measure of Weight: “Grams”

<table>
<thead>
<tr>
<th>Measure of Weight: “Grams”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 kilogram (kg) = 1000 g</td>
</tr>
<tr>
<td>1 hectogram (Hg) = 100 g</td>
</tr>
<tr>
<td>1 dekagram (Dg) = 10 g</td>
</tr>
<tr>
<td>1 decigram (dg) = 0.1 g</td>
</tr>
<tr>
<td>1 centigram (cg) = 0.01 g</td>
</tr>
<tr>
<td>1 milligram (mg) = 0.001 g</td>
</tr>
<tr>
<td>1 microgram (µg) = 0.000,001 g</td>
</tr>
<tr>
<td>1 nanogram (ng) = 0.000,000,001 g</td>
</tr>
</tbody>
</table>
PRACTICE PROBLEMS

• Add 7.25 L and 875 ml.
  7.25 L = 7250 ml
  Total = 7250 + 875 = 8125 ml

• A vitamin capsule contains 6.25 mcg of vitamin B12. How many capsules can be prepared from 1 g of vitamin B12?
  1 g = 10^6 mcg
  1 capsule → 6.25 mcg
  X capsule → 10^6 mcg
  X = 10^6 / 6.25 = 160,000 capsule
• Aspirin tablets contain 325 mg of aspirin. How many tablets can be prepared from 5 kg of aspirin?

\[5 \text{ kg} = 5 \times 10^6 \text{ mg}\]
\[1 \text{ tablet} \rightarrow 325 \text{ mg}\]
\[X \text{ tablet} \rightarrow 5 \times 10^6 \text{ mg}\]
\[X = \frac{5 \times 10^6}{325} = 15384 \text{ tablet}\]

• If an injectable solution contains 25 mcg of a drug in each 0.5 ml. how many milliliter will be required to provide a patient with 0.25 mg of the drug?

\[25 \text{ mcg} = 0.025 \text{ mg}\]
\[0.5 \text{ ml} \rightarrow 0.025 \text{ mg}\]
\[X \text{ ml} \rightarrow 0.25 \text{ mg}\]
\[X = \frac{0.25 \times 0.5}{0.025} = 5 \text{ ml}\]
Measuring system

Metric System

English/Common System

Household measurements

Apothecaries':
- Weight
  - 1-pound (lb)
  - 2-ounce (ʒ)
  - 3- drachms (ʒ)
  - 4-scruple (/calendar)
  - 5-grain (gr)

Volume
- 1-gallon (gal)
- 2-quart (qt)
- 3-pint (pt)
- 4-fluid ounce (fʒ)
- 5-fluid drachms (fʒ)
- 6-minim (m)

Avoir du poitou:
- Weight
  - 1-pound (lb)
  - 2-ounce (oz)
  - 3-grain (gr)
Remember:

- **Avoirdupois** – used in *measuring bulk medications* (pounds, ounces, grains)
- **Apothecary** – developed after the Avoirdupois system to enable fine *weighing of medications* (pounds, ounces, drams, scruples, grains, gallons, pints, fluid ounces, fluid drams, minims)
- **Household** – commonly used to *measure liquids with home utensils* (teaspoons, tablespoons, cups)
Apothecaries’ system

- It has two divisions of measurement: **weight** and **volume**
- The basic unit of **weight** is the **grain**, abbreviated **gr**, and never capitalized; the basic unit of **volume** is the **minim**

An interesting feature of this system is that it uses Roman numerals placed after the unit of measure to denote amount.

For example, 15 grains would be written “gr xv.”

The Avoir-dupoius system

This system is the one used in the United States for **weight only** and is used in commercial **buying and selling**.

The basic unit of the avoirdupois system is also the **grain**.

The name derives from a misspelling of the Old French term **aveir de peis** meaning literally "goods of weight", referring to goods sold by weight.

In the avoirdupois system, all units are multiples or fractions of the pound.
### Apothecaries Fluid measures

<table>
<thead>
<tr>
<th>gal.</th>
<th>qt.</th>
<th>pt.</th>
<th>ft³</th>
<th>ft³</th>
<th>m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>8</td>
<td>128</td>
<td>1024</td>
<td>61440</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>32</td>
<td>256</td>
<td>15360</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>16</td>
<td>128</td>
<td>7680</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>480</td>
<td></td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

### Apothecaries Weight measures

<table>
<thead>
<tr>
<th>lb.</th>
<th>3</th>
<th>3</th>
<th>3</th>
<th>gr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>96</td>
<td>288</td>
<td>5760</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>24</td>
<td>480</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>60</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

### Avoirdupois Weight measures

<table>
<thead>
<tr>
<th>lb.</th>
<th>oz</th>
<th>gr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>7000</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>437.5</td>
</tr>
</tbody>
</table>
## For Mass Measurement

<table>
<thead>
<tr>
<th>Unit</th>
<th>Symbol</th>
<th>Division</th>
<th>Grains</th>
<th>SI units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pound</td>
<td>℔</td>
<td>12 ounces</td>
<td>5760</td>
<td>373.242 g</td>
</tr>
<tr>
<td>Ounce</td>
<td>℥</td>
<td>8 drams</td>
<td>480</td>
<td>31.103 g</td>
</tr>
<tr>
<td>Drachm</td>
<td>℥</td>
<td>3 scruples</td>
<td>60</td>
<td>3.888 g</td>
</tr>
<tr>
<td>Scruple</td>
<td>℧</td>
<td>20 grains</td>
<td>20</td>
<td>1.296 g</td>
</tr>
<tr>
<td>Grain</td>
<td>G</td>
<td></td>
<td>1</td>
<td>64.8 mg</td>
</tr>
</tbody>
</table>

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# For Volume Measurements

<table>
<thead>
<tr>
<th>Unit</th>
<th>Symbol</th>
<th>Division</th>
<th>Minims</th>
<th>SI units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallon Quarts</td>
<td>gal.</td>
<td>4 quarts 2 pints</td>
<td>61440</td>
<td>4.54609 L</td>
</tr>
<tr>
<td></td>
<td>qt.</td>
<td></td>
<td>15360</td>
<td></td>
</tr>
<tr>
<td>Pint</td>
<td>pt.</td>
<td>16 ounces</td>
<td>7680</td>
<td>568.26 mL</td>
</tr>
<tr>
<td>Ounce</td>
<td>oz.</td>
<td>8 drachms</td>
<td>480</td>
<td>28.413 mL</td>
</tr>
<tr>
<td>Drachm</td>
<td>dr.</td>
<td>60 minims</td>
<td>60</td>
<td>3.5516 mL</td>
</tr>
<tr>
<td>Minim</td>
<td>min.</td>
<td>Dr. Heidi abdel Mageed</td>
<td>1</td>
<td>0.0592 mL</td>
</tr>
</tbody>
</table>
Ex: Reduce sum of ss oz/ʒii/Ξi to grain (Apothecaries measure of weight)

\[
\begin{align*}
\text{ss} &= \frac{1}{2} \times 480 \text{ gr.} = 240 \text{ gr.} \\
\text{ʒii} &= 2 \times 60 \text{ gr.} = 120 \text{ gr.} \\
\Xi &= 1 \times 20 \text{ gr.} = 20 \text{ gr.} \\
\text{Total} &= 380 \text{ gr.}
\end{align*}
\]

convert ʒv and ʒiiss to drachms. (Apothecaries measure of volume)

\[
\begin{align*}
\text{ʒv} &= 5 \times 8 = 32 \text{ f ʒ} \\
\text{ʒiiss} &= 2 \frac{1}{2} \text{ f ʒ} = 34\frac{1}{2} \text{ f ʒ}
\end{align*}
\]
The grain is the same in both the avoirdupois and apothecaries, systems of weight but other denominations with the same names are not equal. To convert from either system to the other, first reduce the given quantity to grains in the one system, and then reduce the result to any desired denomination in the other system.
EX: Convert $\frac{2}{3}$ ii and $\frac{3}{2}$ ii to OZ in avoirdupois weight. (Apothecaries measure of weight)

\[
\begin{align*}
\frac{2}{3} \text{ ii} & = 2 \times 480 \text{ gr.} = 960 \text{ gr.} \\
\frac{3}{2} \text{ ii} & = 2 \times 60 \text{ gr.} = 120 \text{ gr.} \\
\text{Total} & \quad 1080 \text{ gr.} \\
\frac{3}{5} \text{ oz.} & = 437.5 \text{ gr.} \\
1080 \div 437.5 & = 2 \text{ oz. 205 gr.} \quad \text{(Avoirdupois measure of weight)}
\end{align*}
\]

EX: How many grains of a drug are left in a 1 ounce (avoirdupois) bottle after enough amount of it has been used to make 2000 tablets each containing 0.1 gr of the drug?

1 ounce = 437.5 gr.

The used amount = 2000 \times 0.1 = 200 gr.

The remaining amount = 437.5 - 200 = 237.5 gr.

Ex: If a drug costs $1.75 per oz. what is the cost of $2 \frac{3}{4}$?

1 oz. = 437.5 gr., and $2 \frac{3}{4} \times 60 = 120$ gr.

437.5 gr. \times 1.75 $ = 120$ gr. \times ?

= $0.48

\[\text{Apothecaries Weight measures} \quad 1 \frac{1}{20} \quad \text{Avoirdupois Weight measures} \quad 1 \frac{16}{7000} \]

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<table>
<thead>
<tr>
<th>gal.</th>
<th>qt.</th>
<th>pt.</th>
<th>(\text{f}^3)</th>
<th>(\text{f}^3)</th>
<th>m.</th>
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**Apothecaries Fluid measures**

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<th>gr.</th>
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<td>7000</td>
</tr>
<tr>
<td>1</td>
<td>437.5</td>
<td></td>
</tr>
</tbody>
</table>
Conversion equivalents of length

1 M = 39.37 inch.
1 inch = 2.54 cm.

Conversion equivalents of volume

1 ml = 16.23 m.
1 m. = 0.06 ml.
1 f 3 = 3.69 ml.
1 f 3 = 29.57 ml.
1 pt. = 473 ml.
1 gal.(U.S.) = 3785 ml.

Conversion equivalents of weight

1 g = 15.432 gr.
1 kg. = 2.02 lb. (avoir)
1 gr. = 0.065 g.
Conversions between metric and common systems

Some Practical Equivalents

Conversion of Liquid Quantities

a- to convert metric volumes to apothecaries fluid equivalents:
For small volumes, X No. of ml by 16.23 to get minims and reduce the result to measurable units if necessary.
For larger volumes, reduce to ml and ÷ by 29.57 to get f  or by 473 to get (pt.)

Ex: Convert 0.4 ml to minims.
0.4 ml × 16.23 m = 6.492 or ~ 6.5 m

EX: Convert 2.5 L to fluidounces
2.5 L × 1000 = 2500 ml
1 f X 29.57 ml
? 2500 mlv
= 84.5 f

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Conversion

b- to convert apothecaries fluid volumes to metric equivalents:
For small volumes, reduce to minims and ÷ by 16.23 to get ml.
For large volumes, reduce to f and X by 29.57 to get ml.

Ex: Convert f ʒ iiss to milliliters
F ʒ iiss = 2 ½ × 60 m = 150 m
1 ml X 16.23 m
? ml 150 m

= 9.24 ml
Conversion of Weights

a- To convert metric weight to common weights: (apothecaries & avoirdupois systems)

For small quantities reduce to gm and \( \times \) by 15.432 or \( \div \) by 0.065 to get grains, and reduce the quantity to any desired denomination.

For larger quantities reduce to gm and \( \div \) by 31.1 to get apothecaries ounces, or \( \div \) by 28.35 to get avoirdupois ounces or \( \div \) by 454 to get pounds avoirdupois.

**EX:** Convert 12.5 gm to grains.

\[
12.5 \times 15.432 \text{ gr.} = 192 \text{ gr.} \\
12.5 \div 0.065 \text{ gr.} = 192 \text{ gr.}
\]

**EX:** Convert 5 gm to grains

\[
1 \text{ g.} \times 15.43 \text{ gr} \\
5 \text{ g.} \quad \text{--gr} = 77 \text{ gr.}
\]

**EX:** Convert 15 kg. to pounds avoirdupois

\[
1 \text{ kg} \times 2.2 \text{ lb} \\
15 \text{ kg} \quad \text{? lb} = 33.0 \text{ lb}
\]
# Measuring system

## Metric System

<table>
<thead>
<tr>
<th>In the Sig.</th>
<th>On The Label</th>
<th>To calculate The Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3i or 5 mL</td>
<td>One teaspoonful</td>
<td>1 teaspoonful = 5 ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 teaspoonfuls = 1 fluid ounce or 30 ml</td>
</tr>
<tr>
<td>3ii or 10 mL</td>
<td>Two teaspoonfuls or one dessert spoonful</td>
<td>1 dessert spoonful = 10 ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 dessert spoonful = 30 mL</td>
</tr>
<tr>
<td>3ss or 15 mL</td>
<td>One tablespoonful</td>
<td>1 tablespoonful = 15 mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 tablespoonfuls = 1 fluid ounce or 30 mL</td>
</tr>
<tr>
<td>3i or 30 mL</td>
<td>One coffecupful</td>
<td>1 coffecupful = 30 mL</td>
</tr>
</tbody>
</table>

## English/Common System

## Household measurements
These combine bits of both the apothecary and avoirdupois systems and also throws in a couple of measures found in neither system.

This system uses the **teaspoon** as the basic unit of **fluid measure** and the **pound** as the basic unit of **solid measure**.
**CAUTION:** For the conversion of specific quantities in a prescription or in converting a pharmaceutical formula from one system to another, exact equivalents must be used.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Apothecary</th>
<th>Household</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ml</td>
<td>1 fl dr</td>
<td>1 teaspoonful*</td>
</tr>
<tr>
<td>10 ml</td>
<td>2 fl dr</td>
<td>1 dessertspoonful</td>
</tr>
<tr>
<td>15 ml</td>
<td>4 fl dr</td>
<td>1 tablespoonful (1/2 fl oz)</td>
</tr>
<tr>
<td>30 ml</td>
<td>8 fl dr</td>
<td>2 tablespoonfuls (1 fl oz)</td>
</tr>
<tr>
<td>60 ml</td>
<td>2 fl oz</td>
<td>1 wineglassful</td>
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<tr>
<td>120 ml</td>
<td>4 fl oz</td>
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<td>240 ml</td>
<td>8 fl oz</td>
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<tr>
<td>480 ml</td>
<td>16 fl oz</td>
<td>1 pint</td>
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<tr>
<td>960 ml</td>
<td>32 fl oz</td>
<td>1 quart</td>
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*Official U.S.P. teaspoonful is 5 ml.*
Examples:

How many teaspoonfuls would be prescribed in each dose of an elixir if 30 vi contained 18 doses?

\[ 30 \text{ vi} = 6 \times 30 = 180 \text{ ml} = 36 \text{ teaspoonfuls} \]

Size of dose = 36 tsp / 18 doses = 2 teaspoonfuls/dose

How many drops would be prescribed in each dose of a liquid medicine if 15 ml contained 60 doses? The dispensing dropper calibrates 32 drops per ml.

15 ml. = 15 x 32 drops = 480 drops

Size of dose = 480 drops / 60 doses = 8 drops/dose
Rx

Ammonium Chloride  IV g
Liq. Extract of Liquorice  f3 ml
Syrup  50 ml
Water q.s  a.d  C ml

Fiat: Cough syrup

Sig.: 5 ml t.i.d.
A label of a suitable size should be placed on the container, this label should be placed for two reasons:

1) To **identify the contents** of the container.

2) To ensure that the patient have concise **information** which will enable him to use his medication in the most effective and appropriate way.
The **name** of the preparation on the label comes from **Fiat** in the prescription.

The name should be **centered**.

The **instruction** to the patient on the label comes from **Sig**. in the prescription.

Leave an indent before writing the instruction.
Read this prescription

Rx

*Ammonium Chloride*  IV g
*Liq. Extract of Liquorice*  3 ml
*Syrup*  50 ml
*Water q.s a.d 100 ml*

**Fiat: Cough syrup**

**Sig.: 5 ml t.i.d.**
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<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<td>Sig.</td>
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<td>Aq.</td>
<td>Water</td>
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<tr>
<td>b.i.d</td>
<td>Twice a day</td>
</tr>
<tr>
<td>t.i.d</td>
<td>Three times daily</td>
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<tr>
<td>m.d.u</td>
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<td>t.d.u</td>
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<tr>
<td>n.m</td>
<td>Night and morning</td>
</tr>
<tr>
<td>o.n</td>
<td>Every night</td>
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<td>o.m</td>
<td>Every morning</td>
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<td>p.c</td>
<td>After meals</td>
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<tr>
<td>h.s</td>
<td>At bedtime</td>
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Dr. Heidi abdel Mageed
The Cough Syrup

One teaspoonful to be taken three times daily.
• If no instructions are written and the medication is for **internal use**, then
  Write → **To be taken as directed.**

• If the medication is for **external use**, then write → **To be used as directed.**
  – **White label** is used for **internal preparation**.
  – **Red label** is used for **external preparation**.
Units of Measure cont. (Equivalencies)

- Equivalencies among systems
  - 1 inch = 2.54 cm
  - 1 kg = 2.2 pounds (lb)
  - 1 fluid ounce (fl oz) = 29.57(30) milliliters (ml)
  - 1 pint (pt) = 473.167 (480) milliliters (ml)
  - 1 teaspoonful (tsp) = 5 milliliters (ml)
  - 1 tablespoonful (TBS) = 15 milliliters (ml)
  - 1 ounce (oz) = 28.35 grams (g)
  - 1 pound (lb) = 453.59 (454) grams (g)
• Fill in the blanks:
  a. 1 liter (L) = ___________ml
  b. 1000 g = _______________kg
  c. 1 g = _________________mg
  d. 1000 mcg = _____________mg
  e. 1 tbsp = _______________tsp
  f. 1 tsp = ________________ml
  g. 2 fl oz = _________________ml
  h. 70 kg = _________________pounds (lb)
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</tbody>
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Don’t memorize this table!
Office hours:
Wednesday 10-11 am
Thursday 1-2 pm