



2025-2026/ First Stage Pharmaceutical Calculations

Chapter 4: Interpretation of Prescriptions and Medication Orders

(1) John M. Brown, M.D.
100 Main Street
Libertyville, Maryland
Phone 123-4567

(2) Name Mary Smith Date Jan 9, 20yy (3)
Address 123 Broad Street

(4) R
(5) Lipitor 10 mg
(6) Tabs No. 30
(7) Sig: tab i every day

(8) Refill 6 times
Label: Yes ☒ No ☐
Generic if available: Yes ☐ No ☒

(1) JM Brown, M.D.
DEA No. 1234563
State License No. 65432

Chapter 4: Interpretation of Prescriptions and Medication Orders

Objectives

- ✓ Demonstrate an understanding of the format and components of a typical prescription.
- ✓ Demonstrate an understanding of the format and components of a typical institutional medication order.
- ✓ Interpret correctly standard abbreviations and symbols used on prescriptions and medication orders.
- ✓ Differentiate between *patient compliance* and *noncompliance* and apply calculations to determine compliancy.

Prescription: an order for medication issued by a physician, dentist, or other properly licensed medical practitioner. A prescription designates a specific medication and dosage to be prepared by a pharmacist and administered to a particular patient

- 1) Prescriber information and signature
- 2) Patient information
- 3) Date prescription was written
- 4) R symbol (the Superscription), meaning “take thou,” “you take,” or “recipe”
- 5) Medication prescribed (the Inscription)
- 6) Dispensing instructions to the pharmacist (the Subscription)
- 7) Directions to the patient (the Signa)
- 8) Special instructions

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(8)	Refill <u>0</u> times Label: Yes ☒ No ☐ Generic if available: Yes ☐ No ☒		
	JM Brown, M.D. DEA No. 1234563 State License No. 65432		(1)

Prescriptions can be for

for a prefabricated product: *not requiring compounding* or admixture by the pharmacist

requiring compounding. The extemporaneous compounding of prescriptions is an activity for which pharmacists are uniquely qualified by virtue of their education

Prescriptions for compounding medications may include compounding a liquid medication, capsule, powder, creams, and other dosage forms eligible for extemporaneous compounding

A prescription may be written using:

Brand or trademark: Lipitor

Generic: chemical or nonproprietary, Atorvastatin

A prescription may be typed or hand-written

Medication order: used for hospital settings

Some medications have special forms

Some specialized healthcare institutions have different forms depending on their requirements

E-prescribing/E-prescriptions

Advantages traditional paper prescriptions are

- ✓ Reduced errors due to prescription legibility
- ✓ Concurrent software screens for drug interactions
- ✓ Reduced incidence of altered or forged prescriptions
- ✓ Efficiency for both prescriber and pharmacist
- ✓ Convenience to the patient, whose prescription would likely be ready for pick-up upon arrival at the pharmacy

TABLE 4.1 COMPARATIVE EXPRESSIONS OF REGULAR AND MILITARY TIME

REGULAR TIME	MILITARY TIME	REGULAR TIME	MILITARY TIME
Midnight	0000	Noon	1200
1:00 A.M.	0100	1:00 P.M.	1300
2:00 A.M.	0200	2:00 P.M.	1400
3:00 A.M.	0300	3:00 P.M.	1500
4:00 A.M.	0400	4:00 P.M.	1600
5:00 A.M.	0500	5:00 P.M.	1700
6:00 A.M.	0600	6:00 P.M.	1800
7:00 A.M.	0700	7:00 P.M.	1900
8:00 A.M.	0800	8:00 P.M.	2000
9:00 A.M.	0900	9:00 P.M.	2100
10:00 A.M.	1000	10:00 P.M.	2200
11:00 A.M.	1100	11:00 P.M.	2300

Military time

Its use provides an unambiguous expression of time.

In health care institutions, military time may be used to record the time of a patient's admission, when a medication was administered, the time of surgery, and so forth

SI (International System) metric units of weight and measurement vs the apothecaries' system may be use

you don't need to memorize the conversations but you should able to use the tables when needed

TABLE A.1 PRACTICAL AND PRECISE CONVERSION EQUIVALENTS

UNIT	PRACTICAL PHARMACY EQUIVALENT	PRECISE EQUIVALENT ^a	
Conversion Equivalents of Length			
1 m	39.37 in	39.37008	in
1 in	2.54 cm (exact)		
Conversion Equivalents of Volume			
1 mL	16.23 ℥	16.23073	℥
1 ℥	0.06 mL	0.06161152	mL
1 f℥	3.69 mL	3.696691	mL
1 f℥	29.57 mL	29.57353	mL
1 pt.	473 mL	473.1765	mL
1 gal. (U.S.) ^b	3785 mL	3785.412	mL
Conversion Equivalents of Weight			
1 g	15.432 gr	15.43236	gr
1 kg	2.20 lb (avoir.)	2.204623	lb (avoir.)
1 gr	0.065 g (65 mg)	0.06479891	g
1 oz. (avoir.)	28.35 g	28.349523125	g
1 ℥	31.1 g	31.1034768	g
1 lb (avoir.)	454 g	453.59237	g
1 lb (apoth.)	373 g	373.2417216	g
Other Useful Equivalents			
1 oz. (avoir.)	437.5 gr (exact)		
1 ℥	480 gr (exact)		
1 gal. (U.S.)	128 f℥ (exact)		

TABLE 2.3 SOME USEFUL EQUIVALENTS

Equivalents of Length			
1 inch	=	2.54	cm
1 meter (m)	=	39.37	in
Equivalents of Volume			
1 fluidounce (fl. oz.)	=	29.57	mL
1 pint (16 fl. oz.)	=	473	mL
1 quart (32 fl. oz.)	=	946	mL
1 gallon, US (128 fl. oz.)	=	3785	mL
1 gallon, UK	=	4545	mL
Equivalents of Weight			
1 pound (lb, Avoirdupois)	=	454	g
1 kilogram (kg)	=	2.2	lb

The roman numbers

ss	=	$\frac{1}{2}$	L or l	=	50
I, i, or j	=	1	C or c	=	100
V or v	=	5	D or d	=	500
X or x	=	10	M or m	=	1000

The student also may recall that the following rules apply in the use of Roman numerals:

1. A letter repeated once or more, repeats its value (e.g., xx = 20; xxx = 30).
2. One or more letters placed *after* a letter of greater value *increases* the value of the greater letter (e.g., vi = 6; xij = 12; lx = 60).
3. A letter placed *before* a letter of greater value *decreases* the value of the greater letter (e.g., iv = 4; xl = 40).

Use of abbreviations in prescriptions and medication orders

- Standard abbreviations set to help reduce medication errors
- Used to write dispensing or compounding instructions for the pharmacist (subscription) or instructions for the patient (Signa)
- It is highly recommended to avoid using any abbreviations

For the purposes of this course, you need to know

- ✓ Prescription filling directions
- ✓ Quantity and measurements
- ✓ Signa/patient instructions
- ✓ Routs of administration
- ✓ Dosage forms/vehicles

TABLE 4.2 SELECTED ABBREVIATIONS, ACRONYMS, AND SYMBOLS USED IN PRESCRIPTIONS AND MEDICATION ORDERS^{a,b}

ABBREVIATION (LATIN ORIGIN ^c)	MEANING	ABBREVIATION (LATIN ORIGIN ^c)	MEANING
Prescription Filling Directions		pt.	pint
aa. or (<i>ana</i>)	of each	qt.	quart
ad (<i>ad</i>)	up to; to make	ss or $\overline{ss}$ (<i>semissem</i>)	one half
disp. (<i>dispensatur</i>)	dispense	tbsp.	tablespoonful
div. (<i>dividatur</i>)	divide	tsp.	teaspoonful
d.t.d. (<i>dentur tales doses</i>)	give of such doses	Signa/Patient Instructions	
ft (<i>fiat</i>)	make	a.c. (<i>ante cibos</i>)	before meals
M. (<i>mice</i>)	mix	ad lib. (<i>ad libitum</i>)	at pleasure, freely
No. (<i>numero</i>)	number	admin	administer
non rep. or NR (<i>non repatur</i>)	do not repeat	A.M. (<i>ante meridiem</i>)	morning
q.s. (<i>quantum sufficit</i>)	a sufficient quantity	aq. (<i>aqua</i>)	water
q.s. ad (<i>quantum sufficiat ad</i>)	a sufficient quantity to make	ATC	around the clock
Sig. (<i>Signa</i>)	write (directions on label)	b.i.d. (<i>bis in die</i>)	twice a day
Quantities and Measurement		c or $\overline{c}$ (<i>cum</i>)	with
BSA	body surface area	d (<i>die</i>)	day
cm ³	cubic centimeter or milliliter (mL)	dil. (<i>dilutus</i>)	dilute
f or fl (<i>fluidus</i>)	fluid	et	and
fl $\overline{3}$ or f $\overline{3}$	fluid dram ($\equiv$ teaspoonful, 5 mL)	h. or hr. (<i>hora</i>)	hour
fl $\overline{3}$ ss or f $\overline{3}$ ss	half-fluidounce ($\equiv$ tablespoonful, 15mL)	h.s. (<i>hora somni</i>)	at bedtime
g	gram	i.c. (<i>inter cibos</i>)	between meals
gal	gallon	min. (<i>minutum</i>)	minute
gtt (<i>gutta</i>)	drop	m&n	morning and night
lb (<i>libra</i>)	pound	N&V	nausea and vomiting
kg	kilogram	noct. (<i>nocte</i>)	night
L	liter	NPO (<i>non per os</i>)	nothing by mouth
m ² or M ²	square meter	p.c. (<i>post cibos</i>)	after meals
mcg	microgram	P.M. (<i>post meridiem</i>)	afternoon; evening
mEq	milliequivalent	p.o. (<i>per os</i>)	by mouth (orally)
mg	milligram	p.r.n. (<i>pro re nata</i>)	as needed
mg/kg	milligrams (of drug) per kilogram (of body weight)	q (<i>quaque</i>)	every
mg/m ²	milligrams (of drug) per square meter (of body surface area)	qAM	every morning
mL	milliliter	q4h, q8h, etc.	every — hours
mL/h	milliliters (of drug administered) per hour (as through intravenous administration)	q.i.d. (<i>quarter in die</i>)	four times a day
mOsm or mOsmol	milliosmoles	rep. (<i>repetatur</i>)	repeat
oz.	ounce	s (<i>sine</i>)	without
		s.i.d. (<i>semel in die</i>)	once a day
		s.o.s. (<i>si opus sit</i>)	if there is need; as needed
		stat. (<i>statim</i>)	immediately
		t.i.d. (<i>ter in die</i>)	three times a day
		ut dict. (<i>ut dictum</i>)	as directed
		wk.	week
		Medications	
		APAP	acetaminophen
		ASA	aspirin
		AZT	zidovudine

(continued)

TABLE 4.2 Continued

ABBREVIATION (LATIN ORIGIN ^c)	MEANING	ABBREVIATION (LATIN ORIGIN ^c)	MEANING
EES	erythromycin ethylsuccinate	D5NS	dextrose 5% in normal saline (0.9% sodium chloride)
HC	hydrocortisone	D5W	dextrose 5% in water
HCTZ	hydrochlorothiazide	D10W	dextrose 10% in water
MTX	methotrexate	elix.	elixir
NTG	nitroglycerin	inj.	injection
Clinical		NS	normal saline
BM	bowel movement	½NS	half-strength normal saline
BP	blood pressure	oint or ungt.	ointment
BS	blood sugar	(unguentum)	
CHD	coronary heart disease	pulv. (<i>pulvis</i>)	powder
CHF	congestive heart failure	RL, R/L or LR	Ringer's Lactate or Lactated Ringer's
GERD	gastrointestinal reflux disease	sol. (solutio)	solution
GI	gastrointestinal	supp.	suppository
GFR	glomerular filtration rate	(suppositorium)	
GU	genitourinary	susp.	suspension
HA	headache	syr. (syrupus)	syrup
HBP	high blood pressure	tab. (tableta)	tablet
HRT	hormone replacement therapy	Routes of Administration	
HT or HTN	hypertension	CIVI	continuous (24 hour) intravenous infusion
IOP	intraocular pressure	ID	intradermal
MI	myocardial ischemia/ infarction	IM	intramuscular
OA	osteoarthritis	IT	intrathecal
Pt	patient	IV	intravenous
SOB	shortness of breath	IVB	intravenous bolus
TPN	total parenteral nutrition	IV Drip	intravenous infusion
URI	upper respiratory infection	IVP	intravenous push
UTI	urinary tract infection	IVPB	intravenous piggy back
Dosage Forms/Vehicles		NGT	nasogastric tube
amp.	ampul	p.o. or PO (<i>per os</i>)	by mouth
cap.	capsule	rect.	rectal or rectum
D5LR	dextrose 5% in lactated Ringer's	SL	sublingual
		SubQ	subcutaneously
		Top.	topically
		V or PV	vaginally

^a The abbreviations set in **boldface type** are considered most likely to appear on prescriptions. It is suggested that these be learned first.

^b In practice, periods and/or capital letters may or may not be used with the abbreviations. Some abbreviations, acronyms, and symbols have medication-error risks associated with their use. Therefore, the Institute for Safe Medication Practices (ISMP) and the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) have issued a list of items prohibited from use and others considered for prohibition (see text).⁹ These designated items are not included in Table 4.2, with the exception of *hs*, *subQ*, *AZT*, and *HCTZ*, which are included for instructional purpose due to their remaining use in practice.

^c Muldoon HC. *Pharmaceutical Latin*. 4th Ed. New York: John Wiley & Sons, 1952.

Use of abbreviations in prescriptions and medication orders

In the prescription

Meaning

M. ft. ung.

Ft. sup. no xii

M. ft. cap. d.t.d. no. xxiv

Caps. i. q.i.d. p.c. et h.s.

gtt. ii rt. eye every a.m

tab. ii stat tab. 1 q. 6 h. 7 d

Recommendations to minimize medication errors

✓	✗
4 mg	4.0 mg
0.2 mg	.2 mg
10 mg	10mg (leave space between number and unit)
100 mg	0.1 g
Phenobarbital	PB (use full name of the drug)
G	Gm or gm (use USP designation for units)
100 unit	100 u (might be read as 1000)
International Unit	IU might be read as IV (intravenous)

Right eye	o.d (can be read as a.d which means right ear
Every day, four times a day, every other day	q.d , q.i.d, q.o.d (these three abbreviations can be misinterpreted
mg/kg/day	mg/kg/d (d can be misinterpreted as dose)
Swallow 1 capsule with water in the morning	Take 1 cap am
Use capital letters for drugs with similar spellings: DIGoxin and DESoxyn	

CASE IN POINT 4.1: A pharmacist received the following prescription, which requires the correct interpretation of abbreviations prior to engaging in calculations, compounding, labeling, and dispensing.

Rx

Lisinopril
 Hydrochlorothiazide aa. 10 mg
 Calcium Phosphate 40 mg
 Lactose q.s. ad 300 mg
 M.ft. cap. i D.T.D. # 30
 Sig: cap. i AM a.c.

- How many milligrams each of lisinopril and hydrochlorothiazide are required to fill the prescription?
- What is the weight of lactose required?
- Translate the label directions to the patient.

Medication scheduling and patient compliance

Medication scheduling may be defined as the frequency (i.e., times per day) and duration (i.e., length of treatment) of a drug's prescribed or recommended use.

Patient compliance: patient understanding and adherence to the directions for use.

Compliance includes

taking medication at the desired strength

in the proper dosage form

at the appropriate time of day and night

at the proper interval for the duration of the treatment

with proper regard to food and drink and consideration of other

concomitant medications

Patient noncompliance: failure to comply with a practitioner's or labeled direction in the self-administration of any medication.

Noncompliance may involve underdosage or overdosage

inconsistent or sporadic dosing

incorrect duration of treatment

drug abuse or misadventuring with medications

Examples:

R Hydrochlorothiazide 50 mg
No. XC
Sig. i q AM for HBP

If the prescription was filled initially on April 15, on about what date should the patient return to have the prescription refilled?

- Prescription is for 90 tablets (XC means: 100 (C) – 10 (X) = 90)
- Patient should come back for refill in about 90 days or 3 months which is around July 15

$$\% \text{ Compliance rate} = \frac{\text{Number of days supply of medication}}{\text{Number of days since last Rx refill}} \times 100$$

- If in the previous example, the patient came back for refill on August 1st, calculate % compliance rate
- Keep in mind that true compliance might be slightly different in the patient has remaining medication from previous refills or other sources

Problem 4: (a) if a 10-ml vial of insulin contains 100 units of insulin per milliliter, and a patient is to be administered 20 units daily, how many days will the product last the patient?

Total amount of insulin = 10 ml X 100 unit/ml = 1000 unit

20 units 1 day

1000 unit ? Day

? = (1000 unit X 1 day / 20 unit) = 50 day

(b) If the patient returned to the pharmacy in exactly 7 weeks for another vial of insulin, was the patient compliant as indicated by the percent compliance rate?

7 weeks = 49 days < # of days supply

Patient is compliant

Problem 5: a prescription to be taken as follows: 1 tab qid, the first day, 1 tab tid, the second day, 1 tab bid X 5d; and 1 tab q.d thereafter. How many tablets should be dispensed to equal a 30-day supply?

1. Interpret each of the following *Subscriptions* (directions to the pharmacist) taken from prescriptions:
 - (a) Disp. supp. rect. no. xii
 - (b) M. ft. iso. sol. Disp. 120 mL.
 - (c) M. et div. in pulv. no. xl
 - (d) DTD vi. Non rep.
 - (e) M. et ft. ung. Disp. 10 g
 - (f) M. et ft. caps. DTD xlvi
 - (g) M. et ft. susp. 1 g/tbsp. Disp. 60 mL.
 - (h) Ft. cap. #1. DTD no.xxxvi N.R.
 - (i) M. et ft. pulv. DTD #C
 - (j) M. et ft. I.V. inj.
 - (k) Label: hydrocortisone, 20 mg tabs.
2. Interpret each of the following *Signas* (directions to the patient) taken from prescriptions:
 - (a) Gtt. ii each eye q. 4 h. p.r.n. pain.
 - (b) Tbsp. i in $\frac{1}{3}$ gl. aq. q. 6 h.
 - (c) Appl. a.m. & p.m. for pain prn.
 - (d) Gtt. iv right ear m. & n.
 - (e) Tsp. i ex aq. q. 4 or 5 h. p.r.n. pain.
 - (f) Appl. ung. left eye ad lib.
 - (g) Caps i c aq. h.s. N.R.
 - (h) Gtt. v each ear 3 $\times$ d. s.o.s.
 - (i) Tab. i sublingually, rep. p.r.n.
 - (j) Instill gtt. ii each eye of neonate.
 - (k) Dil. c = vol. aq. and use as gargle q. 5 h.
 - (l) Cap. ii 1 h. prior to departure, then cap. i after 12 h.
 - (m) Tab i p.r.n. SOB
 - (n) Tab i qAM HBP
 - (o) Tab ii q 6h ATC UTI
 - (p) $\overline{3}$ ii 4 $\times$ d p.c. & h.s.
 - (q) $\overline{3}$ ss a.c. t.i.d.
 - (r) Add crushed tablet to pet's food s.i.d.
3. Interpret each of the following taken from medication orders:
 - (a) AMBIEN 10 mg p.o. qhs $\times$ 5 d
 - (b) 1000 mL D5W q. 8 h. IV c 20 mEq KCl to every third bottle.
 - (c) Admin. Prochlorperazine 10 mg IM q. 3h. prn N&V
 - (d) Minocycline HCl susp. 1 tsp p.o. q.i.d. DC after 5 d.
 - (e) Propranolol HCl 10 mg p.o. t.i.d. a.c. & h.s.
 - (f) NPH U-100 insulin 40 Units subc every day A.M.
 - (g) Cefamandole nafate 250 mg IM q. 12 h.
 - (h) Potassium chloride 15 mEq p.o. b.i.d. p.c.
 - (i) Vincristine sulfate 1 mg/m² pt. BSA.
 - (j) Flurazepam 30 mg at HS prn sleep.
 - (k) D5W + 20 mEq KCl/L at 84 mL/hour.
 - (l) 2.5 g/kg/day amino acids TPN.
 - (m) PROCRIT (epoetin alpha) stat. 150 units/kg subQ. 3 $\times$ wk. $\times$ 3–4 wks.
6. In preparing the prescription in Figure 4.3, the pharmacist calculated and labeled the dose as "1 teaspoonful every 12 hours." Is this correct or in error?

Case in Point 4.1

- (a) Since aa. means "of each," 10 mg lisinopril and 10 mg hydrochlorothiazide are needed for each capsule. And since D.T.D. means "give of such doses," 30 capsules are to be prepared. Thus,

$$10 \text{ mg lisinopril} \times 30 \text{ (capsules)} = 300 \text{ mg lisinopril}$$

$$10 \text{ mg hydrochlorothiazide} \times 30 \text{ (capsules)} = 300 \text{ mg hydrochlorothiazide}$$
 are needed to fill the prescription.
- (b) Since q.s. ad means "a sufficient quantity to make," the total in each capsule is 300 mg. The amount of lactose per capsule would equal 300 mg less the quantity of the other ingredients (10 mg + 10 mg + 40 mg), or 240 mg. Thus,

$$240 \text{ mg lactose/capsule} \times 30 \text{ (capsules)} = 7200 \text{ mg} = 7.2 \text{ g lactose}.$$
- (c) Take one (1) capsule in the morning before breakfast.

Practice Problems

1.
 - (a) Dispense 12 rectal suppositories.
 - (b) Mix and make an isotonic solution. Dispense 120 mL.
 - (c) Mix and divide into 40 powders.
 - (d) Dispense six such doses. Do not repeat.
 - (e) Mix and make ointment. Dispense 10 grams.
 - (f) Mix and make capsules. Dispense 48 such doses.
 - (g) Mix and make a suspension containing 1 gram per tablespoon. Dispense 60 milliliters.
 - (h) Make one capsule. Dispense 36 such doses. Do not repeat.
 - (i) Mix and make powder. Divide into 100 such doses.
 - (j) Mix and make an intravenous injection.
 - (k) Label: hydrocortisone, 20 mg tabs.
2.
 - (a) Instill 2 drops in each eye every four (4) hours as needed for pain.
 - (b) Take 1 tablespoonful in one-third glass of water every 6 hours.
 - (c) Apply morning and night as needed for pain.
 - (d) Instill 4 drops into the right ear morning and night.
 - (e) Take 1 teaspoonful in water every 4 or 5 hours as needed for pain.
 - (f) Apply ointment to the left eye as needed.
 - (g) Take 1 capsule with water at bedtime. Do not repeat.
 - (h) Instill 5 drops into each ear 3 times a day as needed.
 - (i) Place 1 tablet under the tongue, repeat if needed.
 - (j) Instill 2 drops into each eye of the newborn.
 - (k) Dilute with an equal volume of water and use as gargle every 5 hours.
 - (l) Take 2 capsules 1 hour prior to departure, then 1 capsule after 12 hours.
 - (m) Take 1 tablet as needed for shortness of breath.
 - (n) Take 1 tablet every morning for high blood pressure.
 - (o) Take 2 tablets every 6 hours around the clock for urinary tract infection.
 - (p) Take 2 teaspoonfuls 4 times a day after meals and at bedtime.
 - (q) Take 1 tablespoonful before meals 3 times a day.
 - (r) Add crushed tablet to pet's food once a day.
3.
 - (a) AMBIEN 10 milligrams by mouth at every bedtime for 5 days.
 - (b) 1000 milliliters of 5% dextrose in water every 8 hours intravenously with 20 milliequivalents of potassium chloride added to every third bottle.
 - (c) Administer 10 milligrams of prochlorperazine intramuscularly every 3 hours, if there is need, for nausea and vomiting.

- (d) One teaspoonful of minocycline hydrochloride suspension by mouth four times a day. Discontinue after 5 days.
 - (e) 10 milligrams of propranolol hydrochloride by mouth three times a day before meals and at bedtime.
 - (f) 40 units of NPH 100-Unit insulin subcutaneously every day in the morning.
 - (g) 250 milligrams of cefamandole nafate intramuscularly every 12 hours.
 - (h) 15 milliequivalents of potassium chloride by mouth twice a day after meals.
 - (i) 1 milligram of vincristine sulfate per square meter of patient's body surface area.
 - (j) Administer 30 mg of flurazepam at bedtime as needed for sleep.
 - (k) Administer 20 milliequivalents of potassium chloride per liter in D5W (5% dextrose in water) at the rate of 84 milliliters per hour.
 - (l) Administer 2.5 grams per kilogram of body weight per day of amino acids in total parenteral nutrition.
 - (m) Start epoetin alpha (PROCRIT) immediately at 150 units per kilogram of body weight subcutaneously and then 3 times a week for 3 to 4 weeks.
- 4. (a) 50 days
(b) yes
 - 5. (a) 40 tablets
 - 6. (a) correct

Thank You