ELECTROCARDIOGRAPHY II

- *Bipolar Leads (Leads I, II, III,) Einthoven's Law, and*
- *Mean Electrical Axis on the Frontal Plane*

DATA REPORT

Student's Name: _____

Lab Section: _____

Date: _____

Subject Profile

Name:_____ Height:_____

Age:_____ Gender: Male / Female Weight:_____

I. Data and Plots

A. **Einthoven's Law—Simulated Confirmation: Lead I + Lead III = Lead II**

Table 6.1 Supine

Lead	*Same Single Cardiac Cycle*	mV*
Lead I	1 Delta	
Lead III	2 Delta	
Lead II	40 Delta	

*Include the polarity (+ or -) of the Delta result since R-waves may be inverted on some of the leads.

B. **Mean Electrical Axis of the Ventricles (QRS Axis) and Mean Ventricular Potential—Graphical Estimate**

Use Table 6.2 to record measurements from the Data Analysis section:

Table 6.2

CONDITION	QRS	
	Lead I 1 Delta	Lead III 2 Delta
Supine		
Seated		
Start of inhale		
Start of exhale		

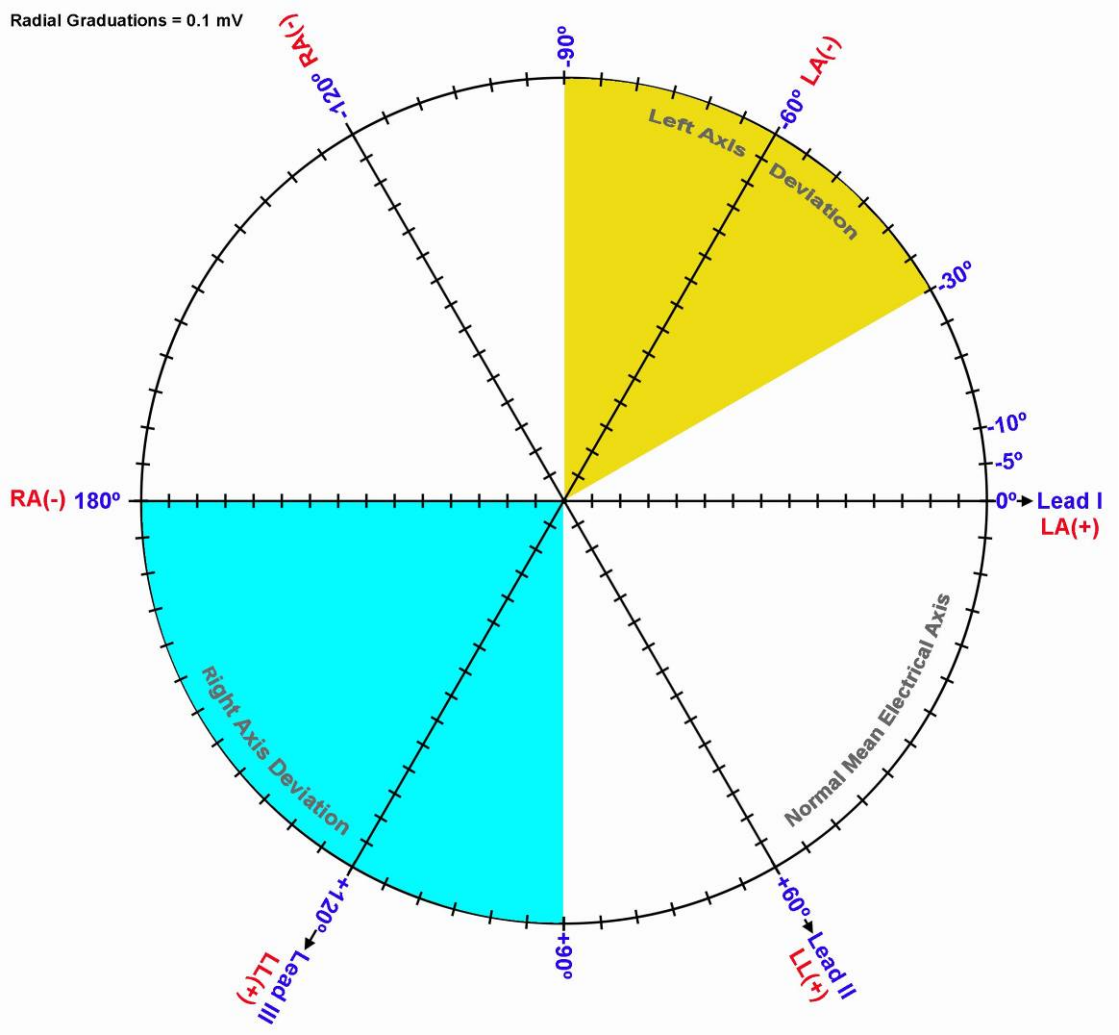
One way to approximate the mean electrical axis in the frontal plane is to plot the magnitude of the R wave from Lead I and Lead III, as shown in the Introduction (Fig. 6.4).

1. Draw a perpendicular line from the ends of the vectors (right angles to the axis of the Lead) using a protractor or right angle guide.
2. Determine the point of intersection of these two perpendicular lines.
3. Draw a new vector from point 0.0 to the point of intersection.

The direction of this resulting vector approximates the mean electrical axis (QRS Axis) of the ventricles. The length of this vector approximates the mean ventricular potential.

Create two plots on each of the following graphs, using data from Table 6.2. Use a different color pencil or pen for each plot.

Graph 1: *Supine and Seated*



From the above graph, find the following values:

Condition	Mean Ventricular Potential	Mean Ventricular (QRS) Axis
Supine	_____	_____
Seated	_____	_____

Explain the difference (if any) in Mean Ventricular Potential and Axis under the two conditions:

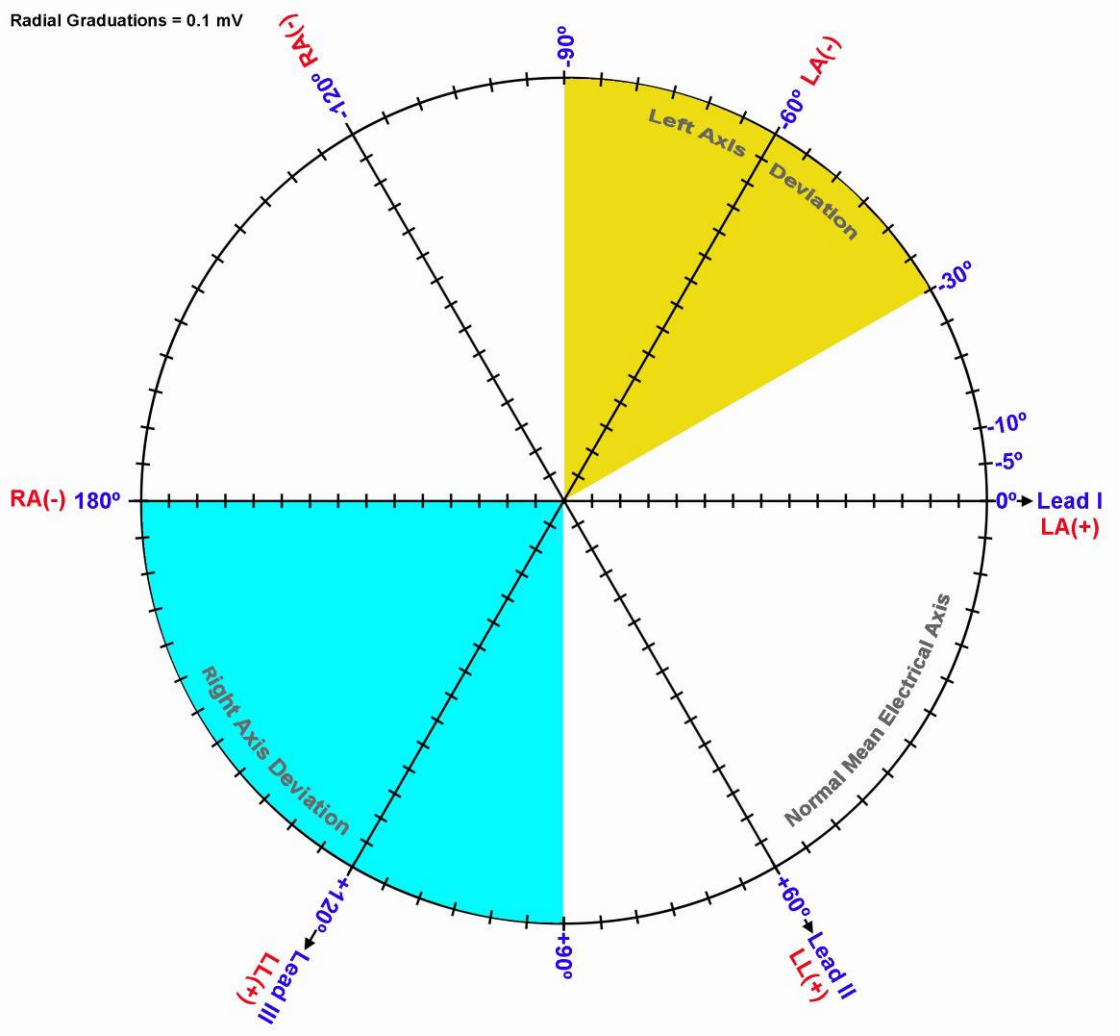
_____

_____

_____

_____

Graph 2: *Inhale /Exhale*



From the above graph, find the following values:

Condition	Mean Ventricular Potential	Mean Ventricular (QRS) Axis
Start of inhale	_____	_____
Start of exhale	_____	_____

Explain the difference (if any) in Mean Ventricular Potential and Axis under the two conditions:

_____

_____

_____

_____

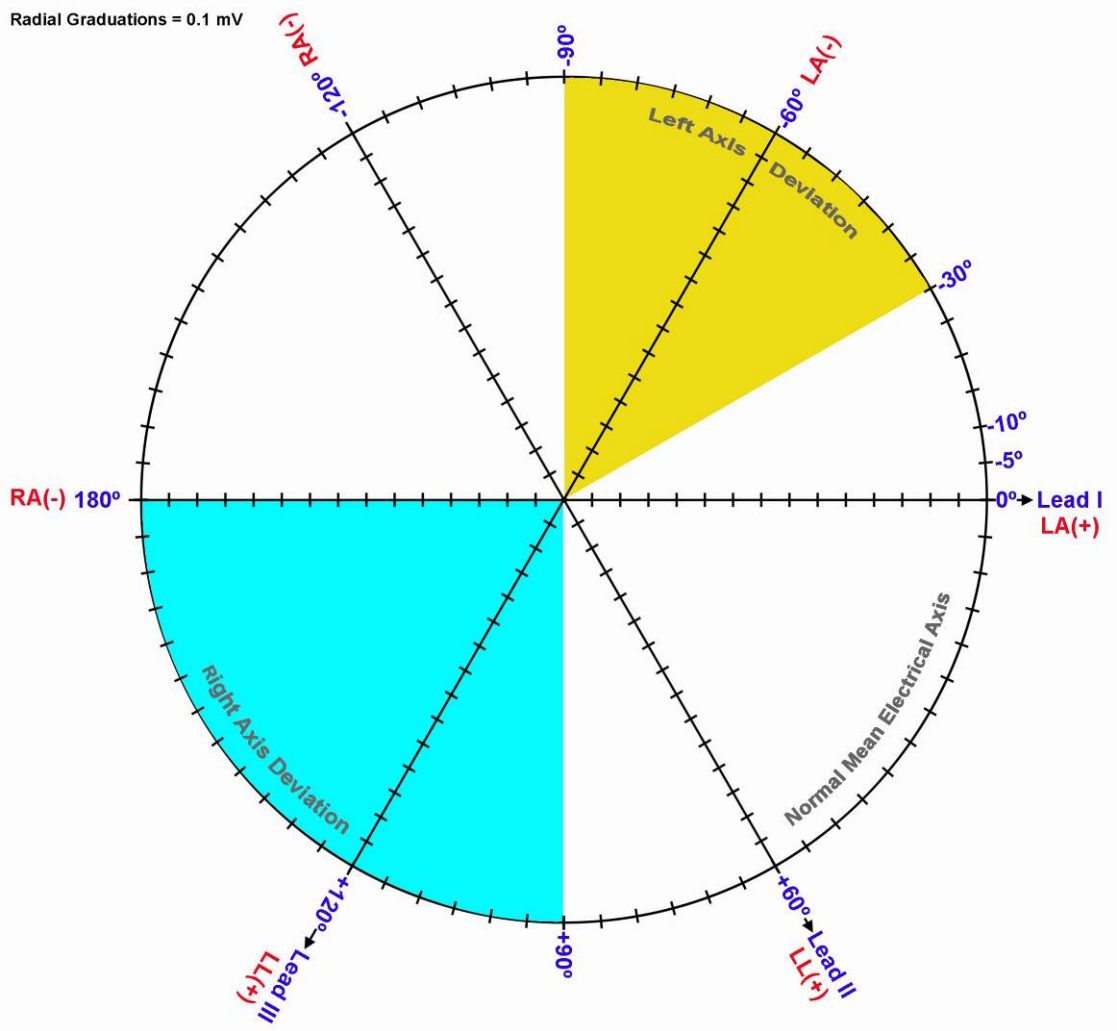
C. **Mean Electrical Axis of the Ventricles (QRS Axis) and Mean Ventricular Potential—More Accurate Approximation**

Use Table 6.3 to add the Q, R, and S potentials to obtain net potentials for Recording 1—Supine.

Table 6.3

POTENTIAL	QRS	
	Lead I 1 Delta	Lead III 2 Delta
Q		
R		
S		
QRS Net		

Graph 3: *Supine*



From the above graph, find the following values:

Condition	Mean Ventricular Potential	Mean Ventricular (QRS) Axis
Supine	_____	_____

Explain the difference in Mean Ventricular Potential and Axis for the Supine data in this plot (Graph 3) and the first plot (Graph 1).

_____

_____

_____

II. Questions

D. Define **ECG**.

E. Define **Einthoven's Law**.

F. Define **Einthoven's Triangle** and give an example of its application.

G. What normal factors effect a change the orientation of the **Mean Ventricular (QRS) Axis**?

H. Define **Left Axis Deviation (LAD)** and its causes.

I. Define **Right Axis Deviation (RAD)** and its causes.

J. What factors affect the amplitude of the R wave recorded on the different leads?

III. OPTIONAL Active Learning Portion

A. ***Hypothesis***

B. ***Materials***

C. ***Method***

D. ***Set Up***

E. ***Experimental Results***

End of Lesson 6 Data Report