

IED Semester Exam Review

Name _____

Date and time of my exam _____

Per _____ Date _____

You will be given a clean formula sheet for the test. You will need to have your calculator for the test also. The following lists cover most of the topics on the Exam. It's not exhaustive.

Unit 1-Design Process:

- 6 steps
- Brainstorm
- Models
- Prototype/Mock Up
- Design Brief
- Engineer's Notebook
- Portfolio
- Technical Report
- Deliverables
- Constraints
- Decision Matrix

Unit 2-Technical Sketching and Drawing:

- Perspective
- Exploded
- Assembly
- Oblique
- Isometric
- # of needed views
- Multiview
- Orthographic
- Best front view
- Annotated Sketch
- Detailed Drawing

Unit 3-Measurement and Statistics:

- SI and English Units
- Estimating Measures
- Convert within
- Convert between
- Dimensioning rules
- Size and Location
- Mean, Median, Mode, Range
- Standard Deviation
- + or - sigma w/normal distributions
- Precision & Accuracy
- Line Types:
 - Center
 - Hidden
 - Object
 - Leader
 - Construction
 - Extension
 - Dimension
 - Hole & Thread
 - Arrowheads
 - Center Mark

Unit 4-Modeling Skills:

Basic Inventor Skills:

- Browser
- Ribbon
- Drawing
- Assembly
- Part
- Presentation
- Dimensioning Guidelines
- Constraints (mate, angle, etc)

Parts of a Drawing sheet:

- Balloons
- Projected Views
- Base Views
- Parts List
- Title Block
- Border
- Sheet
- Dimensions

Applied Stats & Unit Conversions (Unit 3)

Applied Statistics

1

The following is from the 2012 Engineering Formula Sheet :

If two values occur with maximum frequency the data is bi-modal

If three or more values occur with maximum frequency the data is multi-modal

List the following data sets as “one-mode”, bi-modal, or multi-modal THEN **EXPLAIN** why

a) 24, 24.5, 26, 29, 30, 30, 30, 33.8, 40, 40, 40, 45, 46, 47, 47 50 bi-modal

Explain why:

b) 6, 7, 9, 10, 10, 11, 17, 18, 19, 19, 21, 21.5, 24, 24, 27, 30 multi-modal

Explain why:

c) 117, 117, 123, 125, 125, 125, 128, 128, 130, 131, 133, 133 single-mode

Explain why:

2

Standard Deviation is a measure of the “Spread” of data values. **Population** standard deviation is used when you have a data value for every member of the particular population.

Sample standard deviation is an estimate of the spread of data within a larger population – it is used when you have a sample of the data and generalize the results to a larger population.

The following is also from the Formula Sheet

Standard Deviation

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}} \quad (\text{Population}) \quad (1.5a)$$

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}} \quad (\text{Sample}) \quad (1.5b)$$

Determine the std. dev. type below:

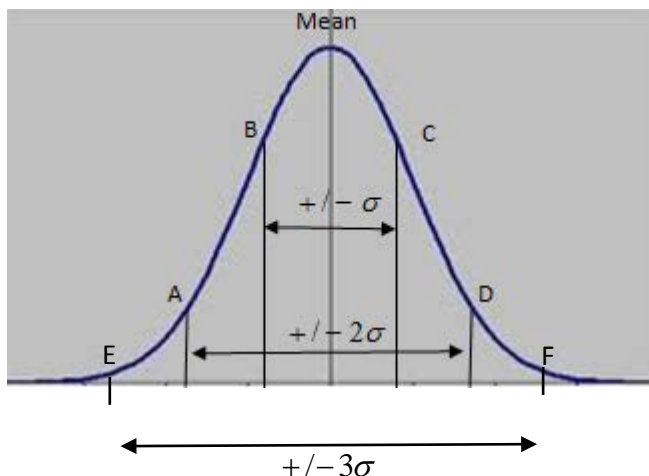
a) Mr. Jones uses exam scores from three of his IED Classes to calculate the spread of all three of his IED exam scores.

population Std. deviation. Why?

b) Mr. Jones uses exam scores from three of his IED Classes to determine the spread of all six of his IED classes

sample Std. deviation. Why?

3



Using the Normal Distribution Graph at left:

a) What % of data is expected to fall:
Between B & C 68

Between A & D 95

Between E & F 99.7

- b). If the standard deviation of a set of data is 3.62 and the mean is 21.5 find the range that 95% of the data would be expected to be. Express your range as a compound inequality.

$$14.26 \leq \text{mean} \leq 28.74$$

- c). The results of a 40-point Biology Quiz from 14 students is

22, 25, 25, 27, 28, 32, 33, 34, 34, 34, 35, 36, 36, 36,

- i). Find the Mean, Median, Mode and Range

Mean (round to hundredth): 31.21

Median: 33.5

Mode: 34 and 36

Classify the data as "one-mode", bi-modal, or multi-modal bi-modal

Range: 14

- ii). The mean from this data (from the question above) should be 31.21

Since this was a 40-point quiz what percent score is the mean? 78%

- iii). The standard deviation of the above 14 scores is 4.81

What percent of the scores could be expected to be in +/- 1 Standard Deviation range? 68%

Now find the +/- 1 Std Dev. Range (written as an inequality) AND find the actual percent of scores within this range

Show work:

$$26.4 \leq \text{mean} \leq 36.02$$

11 out of 14 scores are in this range, which is 78.5%

4

The following conversions may need use of your PLTW Formula Sheet. Show work, round answers to nearest hundredth if applicable, include units.

- a) Convert 2.5 million deciliters into hectoliters

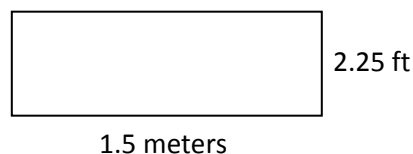
2500 hl

- b) One of the weights in the Weight Room says "4.54 kg"

Find how many ounces this is.

159.8 oz.

- c) Find the perimeter of the following rectangle - give your answer in centimeters



Perimeter = 437.16 cm

d) One kilogram is how many milligrams?

1,000,000 mg