

Quiz tomorrow 31.10

Test Average = 75%

Go over #1, #2

If exam grade > term mark then
final grade = exam grade

STUDY TIPS

- 1) Re-read lecture notes
- 2) Do sugg HW when we finish a section

#1 $dy - x^3 e^{4x} dx - \frac{3}{x} y dx = 0$

LINEAR

1) $dy + P(x)y dx = Q(x) dx$

$dy - \frac{3}{x} y dx = x^3 e^{4x} dx$

2) I.F. = $e^{\int P(x) dx}$

$P(x) = -\frac{3}{x}$

$\int P(x) dx = -3 \ln x$

I.F. = $e^{-3 \ln x} = e^{\ln x^{-3}} = x^{-3}$

3) Multiply Standard Form by I.F.

$x^{-3} dy - 3x^{-4} y dx = e^{4x} dx$

$d(x^{-3} y) = e^{4x} dx$

4) Integrate:

$\int d(x^{-3} y) = \int e^{4x} dx$

$x^{-3} y = \frac{e^{4x}}{4} + C$

Solve for y:

$y = x^3 \left(\frac{e^{4x}}{4} + C \right)$

$$\#2 \quad \frac{dy}{dx} - \frac{y^2}{\sec 3x} = 0$$

$$y=3 \text{ when } x = \frac{\pi}{6}$$

Separable

$$\frac{dy}{dx} = \frac{y^2}{\sec 3x}$$

$$\frac{dy}{y^2 dx} = \frac{1}{\sec 3x}$$

$$\frac{dy}{y^2} = \frac{dx}{\sec 3x}$$

$$\int \frac{dy}{y^2} = \int \frac{dx}{\sec 3x}$$

$$\int y^{-2} dy = \int \cos 3x dx$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\frac{1}{\sec \theta} = \cos \theta$$

$$-y^{-1} = \frac{\sin 3x}{3} + C$$

$$y=3$$

$$x = \frac{\pi}{6}$$

$$-\frac{1}{3} = \frac{\sin(\frac{\pi}{2})}{3} + C$$

$$-\frac{2}{3} = C$$

$$-y^{-1} = \frac{\sin 3x}{3} - \frac{2}{3}$$

1. Collection and Representation of Data Cont'd

For large samples, data is grouped into classes.

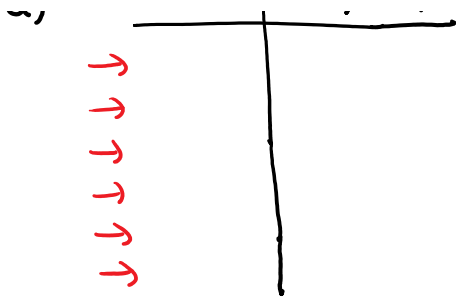
Ex 1. Loudness of jet engines at takeoff (decibels):

102, 115, 93, 105, 108, 110, 120, 94, 101, 103,
92, 110, 109, 101, 115, 119, 95, 108, 98, 114

- Create a frequency table with six classes
- Draw a histogram

a)

decibel	frequency
→	← # of measurements
→	



Min. value is 92

Max. " 120

$$\# \text{ values in the range} = 120 - 92 + 1 = 29$$

Aside:
7, 8, 9
 $\# \text{ values} = 9 - 7 + 1$

Add 91 to the data set

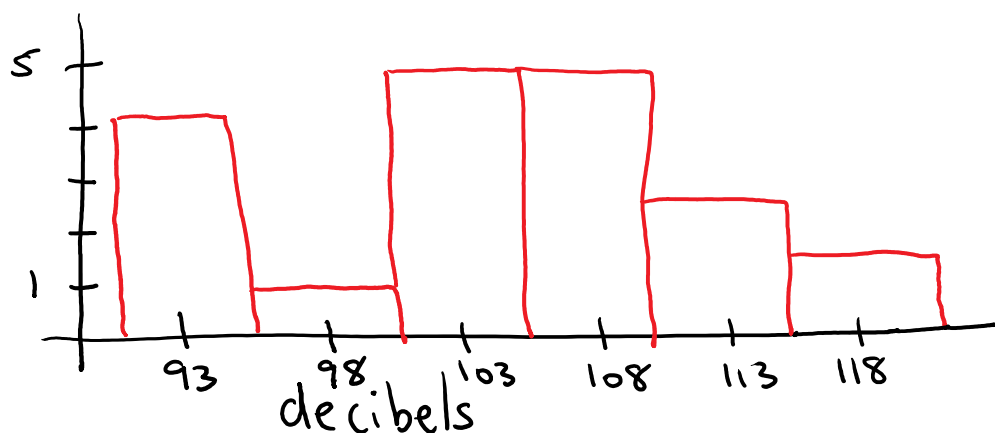
Now $\# \text{ values} = 30$

$$\# \text{ values in each class} = \frac{30 \text{ values}}{6 \text{ classes}} = 5 \text{ values/class}$$

decibels	frequency
91-95	4
96-100	1
101-105	5
106-110	5
111-115	3
116-120	2

b) Use middle of the class as the "class mark"

e.g. $\frac{91+95}{2} = 93$



2. Summarizing Data

We describe Centre with mean and median
" spread " standard deviation (SD)

Units of mean, median, SD are the same as original data.

The mean is the average value

$$\text{mean} = \frac{\text{sum}}{n}$$

of measurements

NOTATION:

μ is the population mean

\bar{x} " sample mean

Data is assumed to be a population unless "sample" is specified.

Ex 1. Find the mean of the sample 11, 9, 17, 19, 4, 15.

sample mean $\bar{x} = \frac{(11+9+\dots+15)}{6} = 12.5$