EXAM UNIT 12 (STATISTICS)

1. Find two examples of each: (2 points)

   a) non ordered qualitative characters

   b) ordered qualitative characters

   c) discrete quantitative character

   d) continuous quantitative character

2. Following are the data represent the lives of a model of refrigerators: (5 p)

Life (years)	[0,4)	[4,8)	[8,12)	[12,16)	[16,20)
Refrigerators	2	7	16	13	2

   a) Prepare a frequency table.

   b) Find the modal and median classes.

   c) Find the mean and the range.

   d) Find the variance and standard deviation.

   e) Build a histogram and the frequency polygon to represent the data.

   f) What is the percentage of refrigerators that last less than 8 years?

3. Solve the following equations: (2 p)

a) $(x+4)^2 - (2x-1)^2 = 24x$ b) $\dfrac{3x+2}{5} - \dfrac{4x-1}{10} + \dfrac{5x-2}{8} = \dfrac{x+1}{4}$

4. Solve the following system by two different methods: graphing and addition or substitution.

$$\left. \begin{array}{l} x+y=0 \\ \dfrac{x+3}{4} + 2y = -1 \end{array} \right\}$$

SOLUTION

1. Find two examples of each:

   a) non ordered qualitative characters: Place of birth, professions.

   b) ordered qualitative characters: Months of birth,

   c) discrete quantitative character: Number of brothers and sisters, number of rooms in a group of houses.

   d) continuous quantitative character: weight and age of people from Seville .

2. Following are the data represent the lives of a model of refrigerators:

Life (years)					
Refrigerators					

   a) Prepare a frequency table.

| Interval	x_i	f_i	F_i	$x_i \cdot f_i$	$x_i^2 \cdot f_i$
[0,4)	2	2	2	4	8
[4,8)	6	7	9	42	252
[8,12)	10	16	25	160	1600
[12,16)	14	13	38	182	2548
[16,20)	18	2	40	36	648
		N=40		424	5056

   b) Find the modal and median classes. $M_o = [8,12)$; $M_e = [8,12)$

   c) Find the mean and the range. $r = 20 - 0 = 20$; $\overline{x} = \dfrac{424}{40} = 10.6$ years

   d) Find the variance and standard deviation.

$$o^2 = \frac{\Sigma x_i^2 f_i}{N} - \overline{x}^2 = \frac{5056}{40} - 10.6^2 = 14.04 \rightarrow \sigma = 3.75 \text{ years}$$

e) Build a histogram and the frequency polygon to represent the data.
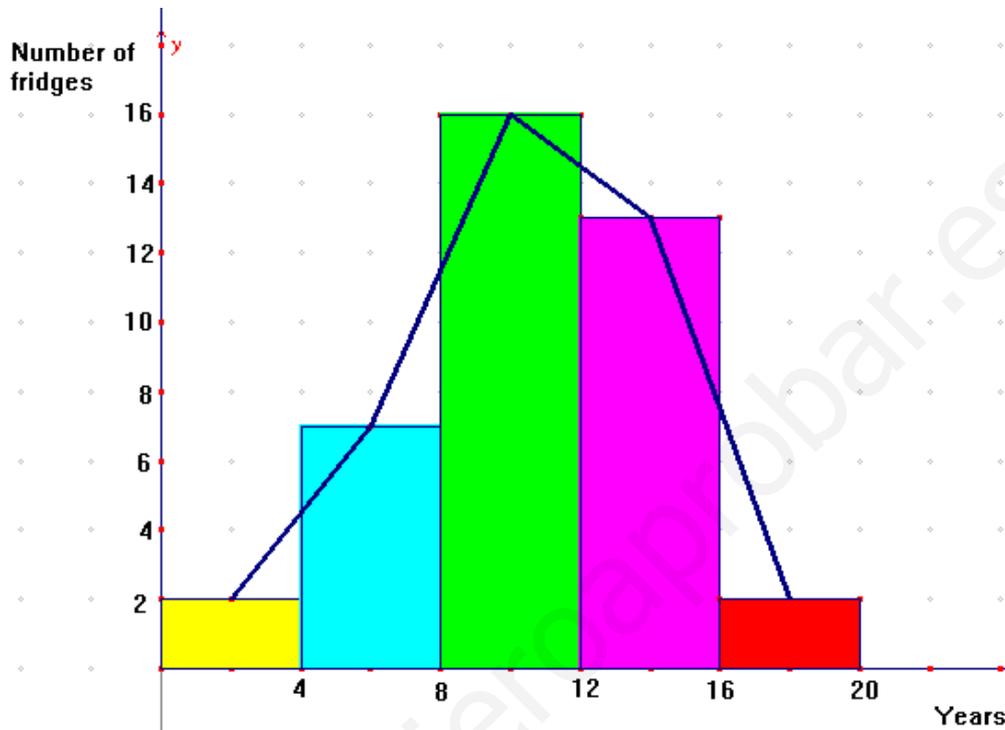
f) What is the percentage of refrigerators that last less than 8 years?

Less than 8 years: 2 + 7 = 9

$$\frac{x}{100} = \frac{7}{40} \rightarrow x = \frac{700}{40} = 17.5\ \% \text{ of the fridges last less than 8 years}$$

3. Solve the following equations:

a) $(x+4)^2 - (2x-1)^2 = 24x \rightarrow x^2 + 8x + 16 - 4x^2 + 4x - 1 = 24x$

$$-3x^2 - 12x + 15 = 0 \rightarrow x = \frac{12 \pm \sqrt{144 + 180}}{-6} = \frac{12 \pm 18}{-6} = \begin{cases} -5 \\ 1 \end{cases}$$

b) $\dfrac{3x+2}{5} - \dfrac{4x-1}{10} + \dfrac{5x-2}{8} = \dfrac{x+1}{4} \rightarrow \dfrac{24x+16}{40} - \dfrac{16x-4}{40} + \dfrac{25x-10}{40} = \dfrac{10x+10}{40}$

$24x + 16 - 16x + 4 + 25x - 10 = 10x + 10 \rightarrow 23x = 0 \rightarrow x = 0$

4. Solve the following system by two different methods: graphing and addition or substitution.

$$\left. \begin{array}{l} x+y=0 \\ \dfrac{x+3}{4}+2y=-1 \end{array} \right\} \rightarrow \left. \begin{array}{l} y=-x \\ x+3+8y=-4 \end{array} \right\} \rightarrow \left. \begin{array}{l} y=-x \\ y=\dfrac{-x-7}{8} \end{array} \right\}$$

Substitution:

$$\left. \begin{array}{l} y=-x \\ x+3+8y=-4 \end{array} \right\} \rightarrow x+3-8x=-4$$

$$-7x=-7 \Rightarrow x=1$$
$$y=-x \rightarrow y=-1$$

Solution:

$$x=1$$
$$y=-1$$