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Class	Frequency (f)	Mid value (x)	$f(x)$	$f \log x$	$\frac{f}{x}$	$x_i - \bar{x}$ ($\bar{x} = \frac{75}{20} = 3.75$)	$f_i\lvert x_i - \bar{x}\rvert$	$f_i(x-\bar{x})^2$
1-2	1	1.5	1.5	0.176	0.66	-2.25	2.25	5.06
2-3	3	2.5	7.5	1.194	1.2	-1.25	3.75	4.687
3-4	8	3.5	28	4.352	2.286	-0.75	2	0.5
4-5	6	4.5	27	3.919	1.33	0.75	4.5	3.375
5-6	2	5.5	11	1.48	0.384	1.75	3.5	6.125
Total	20(n)		75	11.12	5.87		16	19.75

a) Arithmetic mean, $AM = \frac{1}{n}\sum_{i=0}^{n} f_i x_i = \frac{75}{20} = 3.75$

b) Geometric mean, $GM = \text{Antilog}\left(\frac{1}{n}\sum_{i=1}^{n} f_i \log x_i\right)$

$= \text{Antilog}\left(\frac{11.12}{20}\right)$

$= 3.597$

Harmonic mean, $HM = \frac{n}{\sum_{i=1}^{n} \frac{f_i}{x_i}} = \frac{20}{5.87} = 3.41$

b)

Class	Frequency (f)	Cumulative frequency (c)
1-2	1	1
2-3	3	4
3-4	8	12
4-5	6	18
5-6	2	20

Median $= L + \frac{\frac{n}{2} - c}{f} \times h = 3 + \frac{\frac{20}{2} - 4}{8} \times 1 = 3.75$

Mode $= L + \frac{f_m - f_2}{2f_m - f_1 - f_2} \times h = 3 + \frac{8-3}{8\times 2 - 3 - 6} \times 1 = 3.71$

c) As Mean > Median > mode, it is positively skewed.

d) Mean deviation, $MD = \frac{1}{n} \sum_{i=1}^{n} f_i |x_i - \bar{x}| = \frac{16}{20} = 0.8$

e) Variance, $\sigma^2 = \frac{1}{n} \sum_{i=1}^{n} f_i (x_i - \bar{x})^2 = \frac{19.75}{20} = 0.9875$

Standard deviation, $\sigma = \sqrt{\sigma^2} = 0.99$

f) Coefficient of variation, $CV = \frac{\sigma}{\bar{x}} = \frac{0.99}{3.75} \times 100\%$

$= 26.5\%$

3.1/ Let, A = multiple of 3 = {3, 6, 9, 12, 15, 18}

B = " " 5 = {5, 10, 15, 20}

$\therefore P(A) = \frac{6}{20}$; $P(B) = \frac{4}{20}$

$\therefore A \cap B = \{15\}$ $\therefore P(A \cap B) = \frac{1}{20}$

$\therefore P(A \cup B) = \frac{6}{20} + \frac{4}{20} - \frac{1}{20} = \frac{9}{20}$ Ans

3.2/ Total students = 15 + 10 = 25

probability of selecting 1 girl and 2 boys = $\frac{{}^{10}C_1 \times {}^{15}C_2}{{}^{25}C_3}$

$= \frac{21}{46}$ Ans

3.3/ Total number of balls = 4 + 5 + 6 = 15

probability of getting all red = $\frac{{}^{5}C_3}{{}^{15}C_3} = \frac{2}{91}$ Ans

3.4/ Total engineers = 5 + 6 = 11

a) $\frac{{}^{5}C_4}{{}^{11}C_4} = \frac{1}{16}$

b) $\frac{{}^{5}C_2 \, {}^{6}C_2}{{}^{11}C_4} = \frac{5}{11}$ Ans