

BRAC UNIVERSITY

STA201

ELEMENTS OF STATISTICS AND PROBABILITY

MIDTERM

Student Information:

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SECTION: 01



Inspiring Excellence

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STA-201 → MID

	M	W	L	T
10-20	48	(35)	14	97
20-30	(22) (55)	47	(26)	(128)
30-	(34)	51	(12)	97
40-	27	(42) (8)	7	26
F →	164	(175)	59	398

$$30-40 \rightarrow \frac{34}{97} \approx 0.3505$$

$$20-30 \neq \frac{(59-26)}{59} \Rightarrow \frac{33}{59} \Rightarrow 0.5593$$

$$20-30 \neq \frac{118-47}{128} \Rightarrow \frac{81}{128} \Rightarrow 0.6328$$

2

$$\Rightarrow \frac{3}{\frac{1}{20} + \frac{1}{20} + \frac{1}{2}} = 20$$

$$\Rightarrow n \Rightarrow 20 \text{ lit/min}$$

$$\frac{2}{\frac{1}{20} + \frac{1}{15}} = 17.1429$$

3

$$\begin{aligned} & \textcircled{2} \\ & \left(\frac{x}{2}\right) + 5 + 8 + 12 + \textcircled{4x-1} + 11 + (x+3) \\ & + \textcircled{\frac{3x}{2}} = \textcircled{\frac{264}{x}} \quad 66 \end{aligned}$$

$$\therefore \textcircled{x=4}$$

	Mid x_i	f_i	f_{in}
10-15	$\rightarrow 12.5$	2	
15-20	$\rightarrow 17.5$	5	
20-25	$\rightarrow 22.5$	8	
25-30	$\rightarrow 27.5$	12	
30-35	$\rightarrow 32.5$	(15)	
35-40	$\rightarrow 37.5$	11	
40-45	$\rightarrow 42.5$	7	
45-50	$\rightarrow 47.5$	6	2105

$$A.M \Rightarrow \frac{2105}{66} \Rightarrow 31.8939$$

Median class = 30-35 \rightarrow

$$M.e \Rightarrow 30 + \frac{\frac{66}{2} - 22}{15} \times 5$$

$$\Rightarrow 32$$

Sample variance

$$S^2 = \frac{\sum_{i=1}^k f_i (x_i - \bar{x})^2}{n-1}$$

$$= \frac{5325.288}{66-1}$$

$$= 81.9347$$

$$\text{Skp} = \frac{3(\text{Mean} - \text{Median})}{\text{SD}}$$

$$= \frac{3(31.8939 - 32)}{\sqrt{81.9347}}$$

$$\Rightarrow -0.03516$$

4

$$r = \frac{\sum_{i=1}^n x_i y_i - n \bar{x} \bar{y}}{\sqrt{\left(\sum_{i=1}^n x_i^2 - n \bar{x}^2 \right) \left(\sum_{i=1}^n y_i^2 - n \bar{y}^2 \right)}}$$

$$= 0.9416$$

$$\beta_1 = 1, \quad E(y) = 53.78 + 1.172x$$

$$77.22088$$

$$77.2205$$