

(1) $X: 3, 12, 18, 26, 26, 27, 29, 34, 35, 36, 43, 48$

$$\bar{X} = \frac{\sum X}{n} \quad X = \frac{337}{12} \approx \boxed{28.1}$$

\tilde{X} is middle value, n is even, midrange of 6th & 7th

$$\tilde{X} = \frac{27 + 29}{2} = \boxed{28}$$

$$\text{MID RANGE} = \frac{\text{MIN} + \text{MAX}}{2} = \frac{3 + 48}{2} = \boxed{25.5}$$

MODE MOST FREQUENT

$$\text{MODE} = \boxed{26}$$

(2) X: 5, 6, 10

$$\text{RANGE} = \text{MAX} - \text{MIN} \quad \text{RANGE} = 10 - 5 = \boxed{5}$$

X	$X - \bar{X}$	$(X - \bar{X})^2$	
5	-2	4	$\bar{X} = 7$
6	-1	1	$\sum (X - \bar{X})^2 = 14$
10	3	9	

$$S = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}} \quad S = \sqrt{\frac{14}{2}} = \sqrt{7} \approx \boxed{2.6}$$

$$S^2 = \frac{\sum (X - \bar{X})^2}{n-1} \quad S^2 = \frac{14}{2} = \boxed{7}$$

(3)

<u>LOWER CLASS BOUNDARY</u>	<u>LOWER CLASS LIMIT</u>	<u>UPPER CLASS LIMIT</u>	<u>UPPER CLASS BOUNDARY</u>	<u>L1 ↘ CLASS MID POINT</u>	<u>L2 ↘ FREQUENCY</u>
-0.5	0	21	21.5	10.5	2
21.5	22	43	43.5	32.5	5
43.5	44	65	65.5	54.5	8
65.5	66	87	87.5	76.5	12
87.5	88	109	109.5	98.5	14
109.5	110	131	131.5	120.5	20

1 Var Stats L1, L2

$$\bar{x} \approx \boxed{87.32}$$

$$s \approx \boxed{31.79}$$

(4)

$$\begin{aligned} (a) \quad P(\text{FAVOR OR OPPOSES}) &= P(\text{FAVORS}) + P(\text{OPPOSES}) \\ &= \frac{364}{653} + \frac{209}{653} = \frac{573}{653} \approx \boxed{0.877} \end{aligned}$$

$$\begin{aligned} (b) \quad P(\text{OPPOSES} \mid \text{STUDENT}) &= \frac{P(\text{STUDENT AND OPPOSES})}{P(\text{STUDENT})} \\ &= \frac{\frac{191}{653}}{\frac{619}{653}} = \frac{191}{619} \approx \boxed{0.309} \end{aligned}$$

$$\begin{aligned} (c) \quad P(\text{STUDENT OR NEUTRAL}) &= \\ &= P(\text{STUDENT}) + P(\text{NEUTRAL}) - P(\text{STUDENT AND NEUTRAL}) \\ &= \frac{619}{653} + \frac{80}{653} - \frac{75}{653} = \frac{624}{653} \approx \boxed{0.956} \end{aligned}$$

$$(d) \quad P(\text{FACULTY}) = \frac{34}{653} \approx \boxed{0.052}$$

(5) \checkmark F
 \checkmark I
 \checkmark T
 \checkmark CONSTANT } YES, BINOMIAL

(a) $n = 50, p = .65$

$P(x \geq 40) = 1 - \text{binomcdf}(50, .65, 39) \approx \boxed{0.016}$

(b) $\mu = np \quad \mu = (50)(.65) = \boxed{32.5}$

$\sigma = \sqrt{npq} \quad \sigma = \sqrt{(50)(.65)(.35)} \approx \boxed{3.4}$

(c) $n = 200, p = .35$ (NOT FREE OF PESTICIDES)

$P(x = 70) = \text{binompdf}(200, .35, 70) \approx \boxed{0.059}$

(d) $n = 100, p = .65 \quad \mu = (100)(.65) = 65$

$\mu \pm 2\sigma$

$65 \pm 2(4.8)$

$\sigma = \sqrt{(100)(.65)(.35)} \approx 4.8$

$55 < \text{USUAL} < 75$

OR

$P(x \geq 75) = 1 - \text{binomcdf}(100, .65, 74) \approx \boxed{0.021}$

YES, IT WOULD BE UNUSUAL, BECAUSE $\mu + 2\sigma$ IS APPROX. 74.5. SO ABOVE 74.5 WOULD BE UNUSUAL. ALSO THE $P(x \geq 75)$ IS LESS THAN 5% WHICH IS UNUSUAL.

(6)

<u>X</u>	<u>P(X)</u>	<u>X · P(X)</u>	<u>X² P(X)</u>	<u>X² · P(X)</u>
1	.1	.1	1	.1
2	.2	.4	4	.8
3	.3	.9	9	2.7
4	.2	.8	16	3.2
5	.2	1.0	25	5.0
		<u>3.2</u>		<u>11.8</u>

$$\mu = E = \sum X \cdot P(X) = \boxed{3.2}$$

$$\sigma = \sqrt{\sum X^2 \cdot P(X) - \mu^2} \quad \sigma = \sqrt{11.8 - (3.2)^2}$$

$$\sigma \approx \boxed{1.2} \quad 1.2489996$$

$$\sigma^2 = \sum X^2 P(X) - \mu^2$$

$$= 11.8 - (3.2)^2 = 11.8 - 10.24$$

$$= \boxed{1.56}$$

(7)

(a)

X	P(X)	X · P(X)
200	.40	80
0	.35	0
-50	.25	-12.50
		<u>67.5</u>

 $E = \sum x \cdot p(x) = \boxed{\$67.5}$

ON THE AVERAGE THE STUDENT WOULD EARN \$67.50. GIVEN THE RISK OF LOSING \$50 WITH PROBABILITY .25, I WOULD STILL SAY YES, TAKE THE JOB.

(b) $\mu \pm 2\sigma$

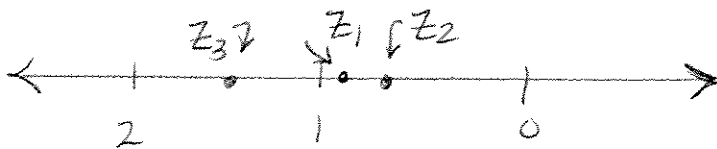
ABOVE 39.2
BELOW 20.8

(c) $P(\text{FEMALE AND FEMALE}) = \frac{3}{10} \cdot \frac{2}{9} = \frac{6}{90} = \frac{1}{15} \approx \boxed{0.067}$

NO, 6.7% IS NOT BELOW 5%, WHICH IS OUR 'RULE OF THUMB' FOR UNUSUAL.

(d) $Z_1 = \frac{3.2 - 4.6}{1.5}$ $Z_2 = \frac{630 - 800}{200}$ $Z_3 = \frac{43 - 50}{5}$

$Z_1 \approx -0.933$ $Z_2 = \boxed{-0.85}$ $Z_3 = -1.4$



SCORE 630 IS HIGHEST RELATIVE



SKewed TO THE LEFT.

(f) $P(\text{POSITIVE TEST} | \text{DID NOT USE}) = \frac{24}{178} \approx \boxed{0.135}$

YES, A FALSE POSITIVE SHOULD BE AN UNUSUAL EVENT. THIS EVENT IS NOT UNUSUAL, HENCE A PROBLEM.