ST 110 Practice Exam #2 KEY

1. **Population:** All students who have taken a professors class.

Model: A's 21%, B's 32%, C's 25%, D's 14%, E's 8%.

Type of Test: χ^2 G.O.F test

Conditions: Random Sample ✓, 10n < Pop. Size ✓

No expected counts less than 5%. (Not technically met but OK)

Hypothesis: Ho: The professors grade distribution is correct

Ha: The professors grade dist. is NOT correct

Calculations: $\chi^2 = \sum \frac{(O-E)^2}{E}$ $n = 40$ $d.f = 4$

Formula $\chi^2 \approx 3.92$ p-value ≈ 0.418

	(OBS)	(EXP)	(cont. to χ^2)
A	7	8.4	0.233
B	10	12.8	0.613
C	14	10	1.600
D	4	5.6	0.457
F	5	3.2	1.013

Conclusion: Since the p-value is greater than 5% we fail to reject the Ho, which means we do not have enough evidence to suggest the professors grade distribution is not correct.

② C Not on exam!

③ $P(4 \text{ and Blue}) = \left(\frac{1}{6}\right)\left(\frac{8}{30}\right) = \frac{8}{180}$ or $\frac{4}{90}$ or $\frac{2}{45}$

④ (a) $P(\text{Even or } \#>75) = P(\text{Even}) + P(\#>75) - P(\text{Even \& } \#>75)$

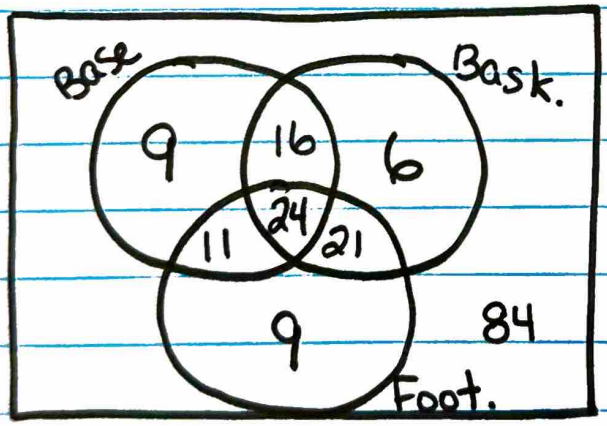
$$= \frac{50}{100} + \frac{25}{100} - \frac{13}{100}$$

(b) NOT DISJOINT $= \frac{62}{100}$ or $\frac{31}{50}$ or 0.62

⑤ $P(R \text{ and } R)$ or $P(B \text{ and } B)$

$$\left(\frac{6}{16}\right)\left(\frac{5}{15}\right) + \left(\frac{10}{16}\right)\left(\frac{9}{15}\right) = \frac{30}{240} + \frac{90}{240} = \frac{120}{240} = \frac{1}{2}$$

⑥

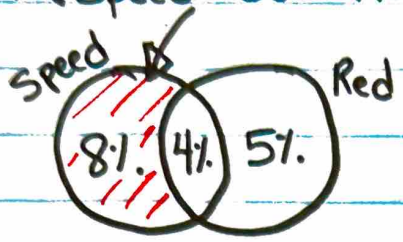


- $P(\text{No sports}) = \frac{24}{180}$
- $P(\text{Just Football}) = \frac{9}{180}$
- $P(\text{Two exactly two sports}) = \frac{48}{180} \cdot \frac{47}{179} = \frac{2256}{32220}$

6. Multiple Choice: $P(\text{Red and Red}) = \frac{20}{50} \cdot \frac{19}{49} \approx .1551$

(A)

⑦ P(Speed but NOT Red light) = 8% or 0.08



⑧ $\widehat{\#\text{SOLD}} = 0.537 + 6.524(\text{Hours})$

ⓐ

ⓑ Strong, Linear, Positive Correlation

ⓒ $\widehat{\#\text{SOLD}} = 0.537 + 6.524(7) \approx 46.205$

ⓓ Obs - predicted: $8 - 7.061 \approx 0.939$

Residuals

$24 - 26.633 \approx -2.633$

$31 - 33.157 \approx -2.157$

$50 - 52.729 \approx -2.729$

$67 - 65.777 = 1.223$