MAT 121 Final Exam Fall 2004 Answer Sheet 1

1. (a) nominal (b) ratio

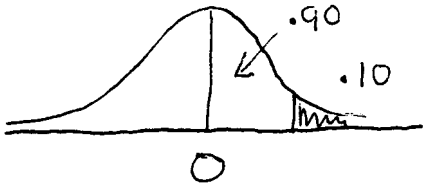
2. (a) cluster (b) convenience

3. $p = .05$, $n = 9$

(a) $P(X=2) = 0.063$ from table A-1

(b) $P(X<2) = P(0) + P(1)$, again using table A-1

$= 0.630 + 0.299 = 0.929$

4. 

in table A-2 the closest value (in the body) to .90 is .8997 which corresponds to $z = 1.28$

$X = \mu + z\sigma = 7.3 + 1.28(2.1) = 9.988 \approx 10.0$

5. $z_{\frac{\alpha}{2}} = 2.575$ $E = z_{\frac{\alpha}{2}}\sqrt{\frac{\hat{p}\hat{q}}{n}} = 2.575\sqrt{\frac{\frac{800}{1400}\cdot\frac{600}{1400}}{1400}}$

$= 0.03405695367$

$\hat{p} - E < p < \hat{p} + E$ $\frac{800}{1400} - .0340569537 < p < \frac{800}{1400} + .0340569537$

$0.5373716177 < p < 0.6054855251$

round to $0.537 < p < 0.605$

in % $53.7\% < p < 60.5\%$

6. $z_{\frac{\alpha}{2}} = 1.96$ $n = \left[\frac{z_{\frac{\alpha}{2}}\,\sigma}{E}\right]^2 = \left[\frac{1.96(420)}{20}\right]^2$

$= 1694.1456$ round up to 1695

7.

weight	f	x	f·x	$f \cdot x^2$
0-4	3	2	6	12
5-9	8	7	56	392
10-14	8	12	96	1152
15-19	1	17	17	289
Σ	20		175	1845

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7. (a) $\bar{x} = \frac{\Sigma f \cdot x}{n} = \frac{175}{20} = 8.75 \approx 8.8$

(b) $s = \sqrt{\frac{n[\Sigma(f \cdot x^2) - [\Sigma(f \cdot x)]^2}{n(n-1)}} = \sqrt{\frac{20(1845) - 175^2}{20(19)}}$

$= \sqrt{\frac{36900 - 30625}{380}} = \sqrt{16.513157} = 4.0636383$

≈ 4.1

8. $\bar{x} = \frac{52+52+52+56+56+62+65+65+67+76+78+87+87+88+89+98}{16}$

$= \frac{1130}{16} = 70.625 \approx 70.6$

median $\frac{16}{2} = 8$ $\frac{8\text{th}+9\text{th}}{2} = \frac{65+67}{2} = 66$

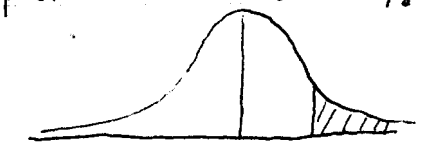
mode 52

midrange $\frac{52+98}{2} = 75$

9. (a) combinations $\frac{8!}{3!\,5!} = \frac{8 \cdot 7 \cdot 6}{3 \cdot 2} = 8 \cdot 7 = 56$

(b) permutations $\frac{8!}{4!} = 8 \cdot 7 \cdot 6 \cdot 5 = 1680$

10.



$z = \frac{x - \mu_{\bar{x}}}{\frac{\sigma}{\sqrt{n}}} = \frac{28 - 27.2}{\frac{4.2}{\sqrt{60}}}$

$= \frac{0.8}{\frac{4.2}{7.7459666}} = 1.4754215$

Look up 1.48 on side of table A-2 .9306

$1 - .9306 = 0.0694$