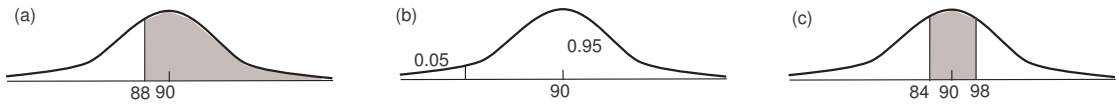
Keys to Version A of Midterm Test 1 in MA 180/418, Fall 2010

Q1: **b** Q2: **c** Q3: **a** Q4: **a** Q5: **c**

Q6: Mean: $\bar{x} = 58.083$, round off to 58.1
Median: $m = 58$
St.Deviation: $s = 18.535$, round off to 18.5
Variance: $18.535^2 = 343.538$, round off to 343.5
Minimal usual value=21.014
Maximal usual value=95.153
Unusual values: 21 and 99

Q7: (a) $\mu = \sum x \cdot P(x)$, $\mu = 1.42$ (by calculator), round off to 1.4
$\sigma = \sqrt{\sum[x^2 \cdot P(x)] - \mu^2}$, $\sigma = 1.2424$ (by calculator), round off to 1.2
(b) $x = 4$ is not unusual, because $P(4 \text{ or more}) = 0.06 > 0.05$.

Q8: (a) by Table A-2: $z = (88 - 90)/16 = -0.13$, $P = 1 - 0.4483 = 0.5517$
by calculator: **normalcdf(88,999,90,16)**=0.5497
(b) by Table A-2: $z = -1.645$, $x = 90 + 16 \times (-1.645) = 63.68$
by calculator: **invNorm(0.05,90,16)**=63.68
(c) by Table A-2: $z = (98 - 90)/(16/4) = 2$ and $z = (84 - 90)/(16/4) = -1.5$
$P = 0.9772 - 0.0668 = 0.9104$
by calculator: **normalcdf(84,98,90,16/4)**=0.9104
(d) because the population is normally distributed




Q9: (a) 0.12; (b) 0.51; (c) $0.12 \times (11/99) = 0.013$ (d) $0.12^2 = 0.014$

Q10: (a) $\mu = 60 \times 0.25 = 15$, $\sigma = \sqrt{60 \times 0.25 \times 0.75} = 3.354$, round off to 3.4
(b) maximum usual value is $15 + 2 \times 3.354 = 21.708$, so 22 is unusual
(c) binomial: **binomialpdf(60,0.25,15)**=0.1182
normal: **normalcdf(14.5,15.5,15,3.354)**=0.1185
(d) binomial: **binomialcdf(60,0.25,14)**=0.4506, then $P = 1 - 0.4506 = 0.5494$
normal: **normalcdf(14.5,999,15,3.354)**=0.5593