Math 121 Quiz #7 Answers Fall 2008

$(0, 8, 10, 13, 17)$, $\overline{x} = 10.2 = \text{F}$.

p. 481: 69. (10 pts) $(0, 0, 4, 7, 10)$, $\overline{x} = 4.4 = \text{F}$.

The SAT scores are normal with mean 1170 and standard deviation 80. Therefore, X is $N(1170, 80)$.

(a) So

$$\begin{aligned} P(1050 < X < 1250) &= \texttt{normalcdf(1050,1250,1170,80)} \\ &= 0.7745. \end{aligned}$$

(b) i. To be in the top 2.5%, an applicant must attain at least the 97.5^{th} percentile.

ii. The 97.5^{th} percentile of X is given by

$$\texttt{invNorm(.975,1170,80)} = 1326.8.$$

You could round this off to 1327, or you could round it off to 1330 because SAT scores are always multiples of 10.

p. 526: 4. $(0, 4, 6, 7, 10)$, $\overline{x} = 5.8 = \text{F}$.

(a) As the sample size n increases, the standard deviation of the sampling distribution (i) **decreases**. We know this because we have seen the distribution get narrower as n increases. Also, the Central Limit Theorem says that the standard deviation of $\hat{p}$ is $\sqrt{\dfrac{p(1-p)}{n}}$, which gets smaller as n gets larger because n is in the denominator.

(b) As the sample size n increases, the mean of the sampling distribution (iii) **stays the same**. We have seen in our examples that the distribution does not drift, but remains centered in the same place. According to the Central Limit Theorem, that place is the mean of $\hat{p}$, which is p, a fixed number independent of the sample size.

(c) As the sample size n increases, the sampling distribution (ii) looks more and more like a normal distribution and (iii) becomes more and more tightly clustered about its mean. Therefore, the best answer is (iv).