

# AP Statistics First Semester Exam Review

- d The median is only greater than the mean when the distribution is left skewed (negatively skewed).
- c  $mean = (36.5)(1.8) + 32$ ; standard deviation  $= 0.3(1.8) = 0.54$ .
- b The mean would still be 4, but the variance decreases because we add another child whose age does not vary from the mean at all. This means we divide the same numerator by a denominator larger by 1.
- c  $380 * 0.25 = 95$
- c The right tail pulls the mean to be greater than the median.
- c  $normalcdf(-0.3, 1.6, 0, 1) = 0.5631$
- c  $normalcdf(16.0, 16.1, 16.1, 0.1) = 0.3413$
- a The interquartile range is the middle 50% of data. Approximately 68% of the data lies within 1 standard deviation from the mean.
- e The probability of e is 0.9938
- c Since a grade of "B" is between 1 and 1.5 standard deviations above the mean, the lower limit is  $60 + 10 = 70$ , and the upper limit is  $60 + 15 = 75$ , so  $normalcdf(70, 75, 60, 10) = 0.0918$
- d This is the definition of a density curve.
- b 95% of the data lies within two standard deviations of the mean. These boundaries are 6 less than and 6 more than the mean, so one standard deviation would be 3.
- d  $invnorm(0.975, 845, 15) = 875$
- c  $\hat{y} = 64.93 + 0.63(22.5) = 79.105$ .  $y - \hat{y} = 80 - 79.105 = 0.895$
- a Linear models work well for linear patterns.
- d Gender is a categorical variable; correlation relates only to quantitative variables.
- b  $slope = r \left( \frac{s_y}{s_x} \right) = 0.86 \left( \frac{3.8}{2.1} \right) = 1.556$ .
- e  $y - \hat{y} = 140 - 145 = -5$
- b  $r^2 = (-0.4)^2 = 0.16$
- d A larger sample size decreases variability.
- e The sample taken is likely to be quite different if the sample is taken outside school hours, for example.
- e ~~38~~ | 68 | 35 | 02 | 79 | ~~38~~ | 22 | 40
- a The businesses in the college town were chosen randomly.
- e The results are restricted to the marketing design students only.

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25. b Randomization is used to make the groups as similar as possible (with regard to all other variables) to isolate the effects of the explanatory variable.
26. e If your sample is biased because of wording of the question, for example, the sample statistic could be very different from the population parameter you are trying to estimate. Statistical methods will reduce sampling error by adding precision, but they do not correct bias.
27. e Each person makes a pair with music/no music over the two months. (Lacking details like randomizations and other controls necessary for a matched pairs experiment.)
28. c  $P(\text{heart}) = \frac{13}{52} = 0.25$ ;  $P(\text{not heart}) = 1 - 0.25 = 0.75$ .
29. b Independent multiplication rule:  $P(\text{win} \cap \text{win}) = P(\text{win}) * P(\text{win}) = 0.6 * 0.6 = 0.36$ .
30. c  $P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.24 + 0.52 - (0.24)(0.52) = 0.6352$ .
31. c  $P(X \geq 7) = P(X = 7) + P(X = 8) + P(X = 9) = 0.1 + 0.1 + .01 = 0.3$ .
32. d Mutually exclusive events have no common outcomes.
33. e The total probability is already 1.
34. c Because each day is independent, previous days outcomes do not change daily probability.
35. d Five suspects:  $P(\text{negative}|\text{truth}) = (0.9)^5$ .
36. b  $P(\text{woman or not married}) = P(\text{woman}) + P(\text{not married}) - P(\text{woman and not married}) = 0.52 + 0.24 - 0.11 = 0.65$ .