7 4. $\mu = 2.78$

$\bar{x} = 2.93$

$P(\hat{p} \leq 0.081) = P(z \leq -1) = 0.01587$

6. No, because this sample is not a good representation of the population. ~~Their heights~~ ~~of the team~~ In this way, it has a tendency to produce a untrue, larger value, so there would be bias.

40. $SE = \sqrt{\frac{4\%(1-4\%)}{300}} \approx 0.0113$ $\quad SE = \sqrt{\frac{4\%(1-4\%)2}{300}} \approx 0.913$

$\frac{15}{8}$ ~~$\frac{15}{14}$~~

$\quad 15 \div 300 = 0.05$

$\quad 4\% \times 300 = 12$

for $\hat{p} = 15$, $z = \frac{0.05 - 0.04}{0.0113} \approx 0.88$

$\therefore P(\hat{p} \geq 15) = P(z \geq 0.88) = 0.1894$

14. This is not a good method because each student does not have equal probability of being selected in the sample. There would be a sequence in which they toss coin, and the students ~~toss~~ in the first 10 positions have ~~high~~ larger probabilities of being chosen into the sample.

48. a. $\frac{663}{1004} = 0.6604$

b. Randomness and Independent: the people being polled is randomly selected and each person's answer does not influence others' answer, so it is random and independent.

Large Sample: $n(1-p) = 1004(1 - 0.6604) \approx 341$ > 10

$np \approx 663 > 0$ $\quad \therefore$ it fullfills Large Sample

Big Population: the total number of adults in U.S. is larger than $10040 = 10 \times 1004$

$\therefore$ it fullfills Big Population.

22. No, because the sample only consists of students taking traditional courses. It is not a good representation of the population since the students taking online courses may ~~tend to~~ have a different mean age from the students taking traditional courses.

c. $SE = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

$= \sqrt{\frac{0.660(1 - 0.660)}{1004}}$

≈ 0.015

26. a. $9\% \times 1000 = 90$ We should expect 90.

b. $SE = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{0.09(1-0.09)}{1000}} \approx 0.009$

c. 9%, 0.9%

$P(z \leq 1.96) - P(z \leq -1.96) = 0.9750 - 0.0250$

$= 0.9500$

$\therefore SE = 0.660 + 1.96 \cdot 0.015$

$= 0.6898$

$0.6604 - 1.96 \cdot SE = 0.6310$

$\therefore$ The confidence interval is $(0.6310, 0.6898)$

28. C has the largest sample size and A has the smallest sample size.

50. a. $49\% - 3\% = 46\%$, $49\% + 3\% = 52\%$

$\therefore$ The 95% confidence interval is $(46\%, 52\%)$

$\therefore$ We are 95% confident that the true precentage of voters planned to support Measure X is between 46% and 52%.

36. $z = \frac{0.081 - 0.09}{0.009} = -1$ for $\hat{p} = 0.081$

b. No, because ~~since~~ the true percentage of voters planned to support Measure~~ment~~ X is between 46% and 52%, it is possible that it is larger or equal to 50%.

c. The results are likely to be biased because the sample only consists of people in Miami, it does not consider other voters ~~people~~ in Florida outside Miami. Therefore, the sample is not a good representation of the population (all voters in Florida).

58. a. 50% × 30 = 15
    $\underbrace{}_{p \cdot n =}$

b. ~~30~~ 1 − 80% × 30 = ~~30~~ 1 − 24 = 6 ~~since~~
   ~~the expected~~ since 80% × 30 gives us the expected number of intervals that capture 50%, 30 − 80% × 30 is the number of intervals expected to not capture 50%.
   ~~etc~~

62. a. $\hat{p} = 203 \div 1974 \approx$ ~~0~~ 0.10284

b. $SE = \sqrt{\frac{\hat{p}(1-\hat{p})}{1974}} = \sqrt{\frac{0.10284 \cdot (1-0.10284)}{1974}} \approx 0.0068$

   $p(\blacksquare -1.96 \le z \le 1.96) = 0.9750 - 0.0250 = 0.9500$

   $0.10284 - 1.96 \cdot SE = 0.08951$
   $0.10284 + 1.96 \cdot SE = 0.11617$

   ∴ The 95% confidence interval is (0.08951, 0.11617)

c. That is not plausible, because
   $0.30 \notin (0.08951, 0.11617)$

64. This confidence interval means that we are 95% confidence that the true value of the difference for the proportions of Republicans and Democrats $\underbrace{\text{is between −13%}}$
   who agreed with the statement

and −2%.
If the interval contains 0, it means that ~~we~~ the true value ~~can~~ can be 0 within the 95% confidence, and in this case there are the same proportions of Democrats and Republicans who agreed with the statement.
A positive value means that there is a larger proportion of Democrats who agreed with the statement than the Republicans.
A negative value means that there is a larger proportion of Republicans who agreed with the statement than the Democrats.

68. a. for Preschool group, $\frac{16}{16+16} = 50\%$
   for No Preschool group, $\frac{21}{21+18} \approx 53.8\%$
   This does not suggest that preschool is linked with a higher graduation rate since the percentage of the Preschool group is smaller.

b. Random and Independent: it is given that the samples are random and independent.
   Large sample: $50\% \cdot 32 = (1-50\%) \cdot 32 = 16 \ge 10$
   $53.8\% \cdot 39 \approx 20.982 \ge 10$, $(1-53.8\%) \cdot 39 = 18.018 \ge 10$
   ~~It satisfies large sample~~

   Big Population: There are over 320 boys who ~~for~~ took preschool and over 390 boys who did not take preschool. ~~so the people~~
   ~~fulfill~~

c. iii is true

d. It would ~~be not~~ be wider.