5.7-1. Let the distribution of $Y \sim Bin(25, 0.5)$. Find the given probabilities in two ways:

i) Exactly using the binomial distribution
ii) Approximately using normal approximation to the binomial (with continuity correction)

(a) $P(10 < Y \le 12)$. **(b)** $P(12 \le Y < 15)$. **(c)** $P(Y = 12)$.

5.7-10. In the casino game roulette, the probability of winning with a bet on red is $p = 18/38$. Let Y equal the number of winning bets out of 1000 independent bets that are placed. Find $P(Y > 500)$, approximately.

5.7-9. Let $X_1, X_2, \ldots, X_{30}$ be a random sample of size 30 from a Poisson distribution with a mean of 2/3. Approximate

(a) $P\left(15 < \sum_{i=1}^{30} X_i \le 22\right)$. **(b)** $P\left(21 \le \sum_{i=1}^{30} X_i < 27\right)$.

7.1-7. Thirteen tons of cheese, including "22-pound" wheels (label weight), is stored in some old gypsum mines. A random sample of $n = 9$ of these wheels yielded the following weights in pounds:

21.50	18.95	18.55	19.40	19.15
22.35	22.90	22.20	23.10	

Assuming that the distribution of the weights of the wheels of cheese is $N(\mu, \sigma^2)$, find

(a) Find a 95% CI for μ
(b) Find a 90% CI for μ

8.56 In a Gallup Poll of n = 800 randomly chosen adults, 45% indicated that movies were getting better.
(a) Find a 98% confidence interval for p, the overall proportion of adults who say that movies are getting better.
(b) Does the interval include the value $p = .50$? Do you think that a majority of adults say that movies are getting better?

7.1-9. During the Friday night shift, $n = 35$ mints were selected at random from a production line and weighed. They had an average weight of $\bar{x} = 21.45$ grams and a standard deviation of $s = 0.31$ grams.
(a) Find a 90% lower bound CI for μ
(b) Find a 90% upper bound CI for μ

8.61 A small amount of some vitamin is considered essential to good health. Suppose that independent random samples of $n_1 = n_2 = 32$ adults were selected from two regions of the United States and the daily intake was recorded for each person. The results (in mg) for each region are summarized below:

$$\bar{x}_1 = 167.1, s_1 = 24.3 \qquad \bar{x}_2 = 140.9, s_2 = 17.6$$

(a) Find an 85% confidence interval for the difference in the mean vitamin intake for the two regions.
(b) Can we conclude one region gets more of this vitamin than the other?

10.27 Results for the proportion of non-native English-speaking elementary students who have become fluent in English for two school districts in southern California are shown below.

District	Riverside	Palm Springs
Number of students tested	6124	5512
Percentage fluent	40	37

Do the data indicate a significant difference in the 2003 proportions of students who are fluent in English for the two districts? Use α = .01.

(a) Perform the test using the 'traditional method' (with the RR). Can we conclude which region has a higher proportion?
(b) Confirm the result in (a) by calculating the p-value and comparing to **α**.

8.1-0 Refer to problem **8.56**. Do the data provide sufficient evidence that the true proportion of adults who say movies are getting better is greater than 0.42. Use α = .05.

(a) Perform the test using the 'traditional method' (with the RR).
(b) Confirm the result in (a) by calculating the p-value and comparing to **α**.

8.1-01 Refer to problem **8.61**. Suppose now $n_1 = n_2 = 10$ and vitamin intake from both regions is approximately normally distributed with common variance σ^2. Do the data provide sufficient evidence that region 1 has a higher average vitamin intake than region 2? Use α = .02 (and use the same sample means and standard deviations)

(a) Perform the test using the 'traditional method' (with the RR).
(b) Confirm the result in (a) by calculating the p-value and comparing to **α**.

7.4-0 Refer to problem **7.1-9**. Assuming $s^2 = 0.31^2$ is a good estimate of σ^2, how large of a sample is needed to estimate the mean number of mints within a max margin of error of
(a) $\epsilon = 0.05$ wtih 90% confidence
(b) $\epsilon = 0.07$ with 95% confidence

7.4-01 Refer to problem **8.56**. For next year's survey, how large of a sample would be needed to estimate the proportion of adults who say movies are getting better within
(a) $\epsilon = 0.04$ with 98% confidence, using the current sample information
(b) $\epsilon = 0.04$ with 98% confidence, but for the teen population where we aren't sure about the prior info

Answers

*** answers may vary slightly due to rounding, but should be close*

5.7-1
(a) Normal: 0.288
Binomial: 0.2878
(b) Normal: 0.4436
Binomial: 0.4428
(c) Normal: 0.1554
Binomial: 0.1550

5.7-10
0.0447

5.7-9
(a) 0.5548
(b) 0.3824

7.1-7
(a) [19.471, 22.329]
(b) [19.748, 22.052]

8.56
(a) [0.40908, 0.49092]

7.1-9
(a) [21.383, infty)
(b) [0, 21.517]

8.61
(a) [18.565, 33.835]

10.27
(a) TS = -0.12
(b) p-value = 0.904

8.1-0
(a) TS = 1.719
(b) p-value = 0.0428

8.1-01
(a) TS = 2.761
(b) p-value = 0.0064

7.4-0
(a) 105
(b) 76

7.4-01
(a) 838
(b) 846