Chapters 1–10 Final Exam Review **Statistics MATH 1342 – Instructor: David Katz**
Fall 2008

This post–test analysis lists the most frequently missed questions from the tests over chapters 1–8.

Remember: the questions on the final exam can come in any order. Be sure to study these questions and similar ones in a random order to best prepare for the final exam!

THE FINAL EXAM WILL ALSO HAVE ABOUT 5–6 QUESTIONS FROM CHS. 9–10. This material is NOT in this review packet. The topics to review are:

1) Compute a predicted value using y–hat or y–bar (see p.526 and p.546).
2) Construct an x–y scatter plot (section 10–2).
3) Construct a linear regression equation (section 10–3; hint: use **LinRegTTest** on your TI calculator).
4) Determine if data samples are independent or matched pairs (see #5–8, p.479).
5) Complete hypothesis test using the confidence interval for the difference of two means (section 9–3).
6) Complete hypothesis test using test statistic and critical value for matched pairs of data (section 9–4).

The final exam will have 25 questions. Fifteen of the questions will be chosen from the list below.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the mean of the data summarized in the given frequency distribution.

1) A company had 80 employees whose salaries are summarized in the frequency distribution below. Find the mean salary.

Salary ($)	Employees
5,001–10,000	12
10,001–15,000	12
15,001–20,000	17
20,001–25,000	12
25,001–30,000	27

A) $17,500 B) $21,313.05 C) $17,437.95 D) $19,375.50

Answer: D
Objective: (3.2) Find Mean of Frequency Distribution

Solve the problem.

2) A company performs quality control on its juice bottles. It finds that the volumes of juice in its 16 ounce bottles have a mean of 16.3 ounces and a standard deviation of 0.08 ounces. Estimate the minimum and maximum "usual" volumes.

A) 16.06 ounces, 16.54 ounces
B) 16.14 ounces, 16.46 ounces
C) 16.09 ounces, 16.19 ounces
D) 16.22 ounces, 16.38 ounces

Answer: B
Objective: (3.3) Use Range Rule of Thumb

Determine which score corresponds to the higher relative position.

3) Which score has a higher relative position, a score of 273.6 on a test for which $\bar{x} = 240$ and $s = 24.0$, or a score of 67.2 on a test for which $\bar{x} = 60$ and $s = 6.0$?

A) Both scores have the same relative position.
B) Impossible to determine
C) A score of 67.2
D) A score of 273.6

Answer: D
Objective: (3.4) Use z Score to Compare Relative Position

Find the percentile for the data point.

4) Data set: 116 128 120 114 122 124 114 112 119 116 120 130 112 116 118 113;
data point 122

A) 75 B) 62 C) 70 D) 85

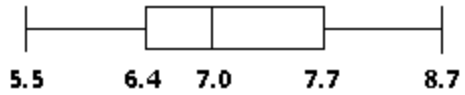
Answer: A

Objective: (3.4) Find Percentile Corresponding to Value

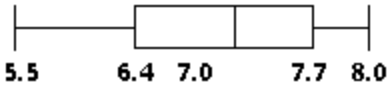
Construct a boxplot for the given data. Include values of the 5 –number summary in all boxplots.

5) The weights (in pounds) of 30 newborn babies are listed below. Construct a boxplot for the data set.
5.5 5.7 5.8 5.9 6.1 6.1 6.3 6.4 6.5 6.6 6.7 6.7 6.7 6.9 7.0
7.0 7.0 7.1 7.2 7.2 7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7

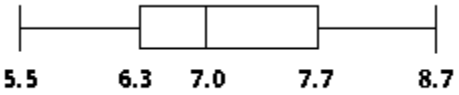
A)



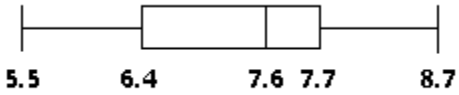
B)



C)



D)



Answer: A

Objective: (3.5) Construct Boxplot

Find the indicated probability.

6) The table below describes the smoking habits of a group of asthma sufferers.

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	340	48	65	35	488
Women	406	39	69	40	554
Total	746	87	134	75	1042

If one of the 1042 people is randomly selected, find the probability that the person is a man or a heavy smoker.

A) 0.540 B) 0.507 C) 0.467 D) 0.473

Answer: B

Objective: (4.3) Use Addition Rule (Events Not Mutually Exclusive)

7) In a certain large city, 48% of all voters are Democrats. If two voters are randomly selected for a survey, find the probability that they are both Democrats.

A) 0.480 B) 0.226 C) 0.960 D) 0.230

Answer: D

Objective: (4.4) Use Multiplication Rule (Independent Events)

8) In a blood testing procedure, blood samples from 4 people are combined into one mixture. The mixture will only test negative if all the individual samples are negative. If the probability that an individual sample tests positive is 0.1, what is the probability that the mixture will test positive?

A) 0.000100 B) 0.0100 C) 0.344 D) 1.00

Answer: C

Objective: (4.5) Find Probability of "At Least One"

9) The following table contains data from a study of two airlines which fly to Small Town, USA.

	Number of flights which were on time	Number of flights which were late
Podunk Airlines	33	6
Upstate Airlines	43	5

If one of the 87 flights is randomly selected, find the probability that the flight selected arrived on time given that it was an Upstate Airlines flight.

A) $\frac{11}{76}$ B) $\frac{43}{87}$

C) $\frac{43}{48}$ D) None of the above is correct.

Answer: C
Objective: (4.5) Use Table to Find Conditional Probability

Solve the problem.

10) A state lottery involves the random selection of six different numbers between 1 and 21. If you select one six number combination, what is the probability that it will be the winning combination?

A) $\frac{1}{720}$ B) $\frac{1}{39{,}070{,}080}$ C) $\frac{1}{85{,}766{,}121}$ D) $\frac{1}{54{,}264}$

Answer: D
Objective: (4.7) Find/Use Number of Combinations

11) The probabilities that a batch of 4 computers will contain 0, 1, 2, 3, and 4 defective computers are 0.5997, 0.3271, 0.0669, 0.0061, and 0.0002, respectively. Find the standard deviation for the probability distribution.

A) 0.65 B) 0.59 C) 0.81 D) 0.42

Answer: A
Objective: (5.2) Find Standard Deviation/Variance for Probability Distribution

12) Suppose you buy 1 ticket for $1 out of a lottery of 1,000 tickets where the prize for the one winning ticket is to be $500. What is your expected value?

A) $0.00 B) –$1.00 C) –$0.40 D) –$0.50

Answer: D
Objective: (5.2) Find Expected Value

Determine whether the given procedure results in a binomial distribution. If not, state the reason why.

13) Choosing 5 people (without replacement) from a group of 53 people, of which 15 are women, keeping track of the number of men chosen.

A) Not binomial: the trials are not independent.
B) Procedure results in a binomial distribution.
C) Not binomial: there are more than two outcomes for each trial.
D) Not binomial: there are too many trials.

Answer: A
Objective: (5.3) Det if Procedure Results in Binomial Distribution

Find the indicated probability.

14) In a certain college, 33% of the physics majors belong to ethnic minorities. If 10 students are selected at random from the physics majors, what is the probability that no more than 6 belong to an ethnic minority?

A) 0.913 B) 0.0547 C) 0.9846 D) 0.9815

Answer: D

Objective: (5.3) Solve Apps: Find Probability of at Least/at Most x Successes

15) An airline estimates that 90% of people booked on their flights actually show up. If the airline books 71 people on a flight for which the maximum number is 69, what is the probability that the number of people who show up will exceed the capacity of the plane?

A) 0.0044 B) 0.0006 C) 0.0050 D) 0.0223

Answer: C

Objective: (5.3) Solve Apps: Find Probability of at Least/at Most x Successes

In this binomial problem, use the given values of n and p to find the minimum usual value $\mu - 2\sigma$ and the maximum usual value $\mu + 2\sigma$.

16) $n = 345$, $p = \frac{2}{3}$

A) Minimum: 221.24; maximum: 238.76 B) Minimum: 212.49; maximum: 247.51

C) Minimum: 217.62; maximum: 242.38 D) Minimum: 247.51; maximum: 212.49

Answer: B

Objective: (5.4) Find Min/Max Value for Binomial Distribution

Solve the problem.

17) The probability that a person has immunity to a particular disease is 0.4. Find the mean number who have immunity in samples of size 23.

A) 0.4 B) 13.8 C) 9.2 D) 11.5

Answer: C

Objective: (5.4) Solve Apps: Means for Binomial Distribution

If Z is a standard normal variable, find the probability.

18) The probability that Z is greater than –1.82

A) 0.4656 B) 0.0344 C) –0.0344 D) 0.9656

Answer: D

Objective: (6.2) Use Standard Normal Distribution

19) $P(Z < 0.97)$

A) 0.8340 B) 0.1660 C) 0.8315 D) 0.8078

Answer: A

Objective: (6.2) Use Standard Normal Distribution

Assume that X has a normal distribution, and find the indicated probability.

20) The mean is $\mu = 60.0$ and the standard deviation is $\sigma = 4.0$.
Find the probability that X is less than 53.0.

A) 0.0802 B) 0.0401 C) 0.5589 D) 0.9599

Answer: B

Objective: (6.3) Find Probability for Nonstandard Normal Distribution

Solve the problem.

21) Human body temperatures are normally distributed with a mean of 98.20 °F and a standard deviation of 0.62°F. Find the temperature that separates the top 7% from the bottom 93%.

A) 97.28°F B) 98.78°F C) 99.12°F D) 98.40°F

Answer: C
Objective: (6.3) Find Percentile/Quartile

22) The serum cholesterol levels for men in one age group are normally distributed with a mean of 178.1 and a standard deviation of 40.6. All units are in mg/100 mL. Find the two levels that separate the top 9% and the bottom 9%.

A) 161.5 mg/100mL and 194.7 mg/100mL B) 165.1 mg/100mL and 191.09 mg/100mL
C) 123.7 mg/100mL and 232.5 mg/100mL D) 107.5 mg/100mL and 248.7 mg/100mL

Answer: C
Objective: (6.3) Find Percentile/Quartile

Find the indicated probability.

23) The lengths of human pregnancies are normally distributed with a mean of 268 days and a standard deviation of 15 days. What is the probability that a pregnancy lasts at least 300 days?

A) 0.4834 B) 0.0166 C) 0.9834 D) 0.0179

Answer: B
Objective: (6.3) Solve Apps: Find Probability for Nonstandard Normal Distribution

Solve the problem.

24) Assume that women's heights are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. If 90 women are randomly selected, find the probability that they have a mean height between 62.9 inches and 64.0 inches.

A) 0.0424 B) 0.1739 C) 0.9318 D) 0.7248

Answer: C
Objective: (6.5) Find Probability for Sample Mean I

25) For women aged 18–24, systolic blood pressures (in mm Hg) are normally distributed with a mean of 114.8 and a standard deviation of 13.1. If 23 women aged 18–24 are randomly selected, find the probability that their mean systolic blood pressure is between 119 and 122.

A) 0.0577 B) 0.3343 C) 0.9341 D) 0.0833

Answer: A
Objective: (6.5) Find Probability for Sample Mean I

Express the confidence interval in the form of $\hat{p} \pm E$.

26) $0.068 < p < 0.468$

A) $\hat{p} = 0.268 \pm 0.2$ B) $\hat{p} = 0.268 - 0.2$ C) $\hat{p} = 0.2 \pm 0.5$ D) $\hat{p} = 0.268 \pm 0.5$

Answer: A
Objective: (7.2) Express Confidence Interval in the Form of p Hat +/– E

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.

27) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the legislature. Construct the 95% confidence interval for the true proportion of all voters in the state who favor approval.

A) $0.471 < p < 0.472$ B) $0.438 < p < 0.505$ C) $0.435 < p < 0.508$ D) $0.444 < p < 0.500$

Answer: B
Objective: (7.2) Construct Confidence Interval for p

Solve the problem.

28) In a certain population, body weights are normally distributed with a mean of 152 pounds and a standard deviation of 26 pounds. How many people must be surveyed if we want to estimate the percentage who weigh more than 180 pounds? Assume that we want 96% confidence that the error is no more than 4.5 percentage points.

A) 396 B) 520 C) 183 D) 251

Answer: D

Objective: (7.2) Beyond the Basics: Est Population Proportion

Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation σ. Assume that the population has a normal distribution.

29) The daily intakes of milk (in ounces) for ten randomly selected people were:

22.3 12.9 23.1 26.3 10.8

26.8 27.4 29.7 19.0 19.9

Find a 99 percent confidence interval for the population standard deviation σ.

A) (0.89, 3.40) B) (3.87, 14.26) C) (3.74, 12.81) D) (3.87, 12.81)

Answer: B

Objective: (7.5) Solve Apps: Find Confidence Interval

Express the null hypothesis H_0 and the alternative hypothesis H_1 in symbolic form. Use the correct symbol (μ, p, σ)for the indicated parameter.

30) A cereal company claims that the mean weight of the cereal in its packets is at least 14 oz.

A) $H_0: \mu < 14$ B) $H_0: \mu = 14$ C) $H_0: \mu > 14$ D) $H_0: \mu = 14$

$H_1: \mu \geq 14$ $H_1: \mu > 14$ $H_1: \mu \leq 14$ $H_1: \mu < 14$

Answer: D

Objective: (8.2) Identify Null and Alternative Hypotheses

Assume that the data has a normal distribution and the number of observations is greater than fifty. Find the critical z value used to test a null hypothesis.

31) $\alpha = 0.09$ for a right–tailed test.

A) +1.34 B) +1.96 C) ±1.96 D) ±1.34

Answer: A

Objective: (8.2) Find Critical z Value

32) $\alpha = 0.08$; H_1 is $\mu \neq 3.24$

A) 1.41 B) ±1.41 C) ±1.75 D) 1.75

Answer: C

Objective: (8.2) Find Critical z Value

Formulate the indicated conclusion in nontechnical terms. Be sure to address the original claim.

33) An entomologist writes an article in a scientific journal which claims that fewer than 18 in ten thousand male fireflies are unable to produce light due to a genetic mutation. Assuming that a hypothesis test of the claim has been conducted and that the conclusion is to reject the null hypothesis, state the conclusion in nontechnical terms.

A) There is not sufficient evidence to support the claim that the true proportion is less than 18 in ten thousand.

B) There is not sufficient evidence to support the claim that the true proportion is greater than 18 in ten thousand.

C) There is sufficient evidence to support the claim that the true proportion is greater than 18 in ten thousand.

D) There is sufficient evidence to support the claim that the true proportion is less than 18 in ten thousand.

Answer: D

Objective: (8.2) Formulate Conclusion of Hypothesis Test

Find the P–value for the indicated hypothesis test.

34) In a sample of 88 children selected randomly from one town, it is found that 8 of them suffer from asthma. Find the P–value for a test of the claim that the proportion of all children in the town who suffer from asthma is equal to 11%.

A) 0.2157 B) –0.2843 C) 0.2843 D) 0.5686

Answer: D

Objective: (8.3) Find P–Value

Determine whether the hypothesis test involves a sampling distribution of means that is a normal distribution, Student t distribution, or neither.

35) Claim: $\mu = 973$. Sample data: $n = 20$, $\bar{x} = 958$, $s = 29$. The sample data appear to come from a normally distributed population with $\sigma = 28$.

A) Normal B) None of the Above C) Student t D) Chi–Square

Answer: A

Objective: (8.5) Use Correct Distribution