WORKSHEET 22
MATH 2510
Mini Exam 2

1) Scores on a test are normally distributed with a mean of 102 and a standard deviation of 7. What is the z–score for an exam score of 108 ?

A) 0.86 B) 0.99 C) –0.99 D) 1.17

2) A final exam in Math 301 has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is greater than 71. Assume that the scores are approximately normally distributed.

A) 0.9012 B) 0.6012 C) 0.8962 D) 0.5036

3) Determine which distribution is applicable and compute the relevant critical value for a 98% confidence interval when $n = 7$, the population standard deviation is known to be $\sigma = 27$, and the population appears to be normally distributed.

A) Neither the standard normal nor the Student's t distribution applies.
B) The standard normal distribution applies and the critical z value is 2.05.
C) The standard normal distribution applies and the critical z value is 2.33.
D) The Student's t distribution applies and the critical t value is 2.61.
E) The Student's t distribution applies and the critical t value is 3.14.

4) Assume that adults have IQ scores that are normally distributed with a mean of 100 and a standard deviation of 15 (as on the Wechsler test). Find the probability that a randomly selected adult has an IQ between 90 and 120 (somewhere in the range of normal to bright normal).

A) 0.6977 B) 0.6227 C) 0.6014 D) 0.6568

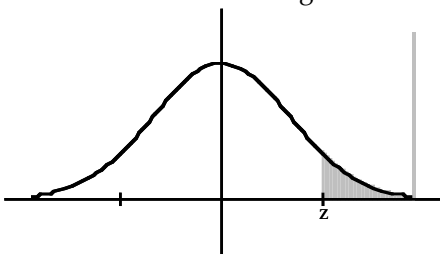
5) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the legislature. Construct the 95% confidence interval for the true proportion of all voters in the state who favor approval.

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

6) How many commuters must be randomly selected to estimate the mean driving time of Chicago commuters? We want 99% confidence that the sample mean is within 4 minutes of the population mean, and the population standard deviation is known to be 6 minutes.

A) 13 B) 9 C) 15 D) 7

7) Shown here is the standard normal curve.
Determine the value of z given that the area of the shaded area is 0.0694.



A) 1.48 B) 1.26 C) 1.45 D) 1.39

8) Assume that women have heights that are normally distributed with a mean of 63.6 inches and a standard deviation of 2.5 inches. Find the value of the quartile Q_3.

A) 66.1 inches B) 67.8 inches C) 64.3 inches D) 65.3 inches

9) A local eat–in pizza restaurant wants to investigate the possibility of starting to deliver pizzas. The owner of the store has determined that home delivery will not be successful if the average time spent on a delivery exceeds 28 minutes. The owner has randomly selected 26 customers and delivered pizzas to their homes. What hypotheses should the owner test to demonstrate that the pizza delivery will not be successful?

A) H_0: $\mu = 28$ vs. H_1: $\mu > 28$
B) H_0: $\mu < 28$ vs. H_1: $\mu = 28$
C) H_0: $\mu < 28$ vs. H_1: $\mu > 28$
D) H_0: $\mu = 28$ vs. H_1: $\mu < 28$

10) Carter Motor Company claims that its new sedan, the Libra, will average more than 30 miles per gallon in the city. Assuming that a hypothesis test of the claim has been conducted (with H_0: $\mu = 30$) 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 mean is less than 30 miles per gallon.
B) There is sufficient evidence to support the claim that the mean is greater than 30 miles per gallon.
C) There is not sufficient evidence to support the claim that the mean is greater than 30 miles per gallon.
D) There is sufficient evidence to support the claim that the mean is less than 30 miles per gallon.

11) A paint manufacturer wished to compare the drying times of two different types of paint. Independent simple random samples of 11 cans of type A and 9 cans of type B were selected and applied to similar surfaces. The drying times, in hours, were recorded. The summary statistics are as follows. (Assume that the distributions of drying times for both types of paint are normally shaped.)

Type A	Type B
$\bar{x}_1 = 75.7$ hrs	$\bar{x}_2 = 64.0$ hrs
$s_1 = 4.5$ hrs	$s_2 = 5.1$ hrs
$n_1 = 11$	$n_2 = 9$

a) Construct a 98% confidence interval for $\mu_1 - \mu_2$, the difference between the mean drying time for paint of type A and the mean drying time for paint of type B.

b) Based on the confidence interval that you found, what if anything can be concluded about the differences in the population means?

12) A physician claims that a person's diastolic blood pressure can be lowered if the person listens to a relaxation tape each evening. Ten subjects are randomly selected and pretested. Their blood pressures, measured in millimeters of mercury, are listed below. The 10 patients are given the tapes and told to listen to them each evening for one month. At the end of the month, their blood pressures are taken again. The data are listed below.

Test the physician's claim. Assume the samples are random and dependent, and the differences are normally distributed. Use $\alpha = 0.01$.

Patient	1	2	3	4	5	6	7	8	9	10
Before	85	96	92	83	80	91	79	98	93	96
After	82	90	92	75	74	80	82	88	89	80

a) State the null and alternate hypotheses necessary to test the claim.

b) Is this a right–, left–, or two–tailed test?

c) Compute the value of the sample test statisitic AND the P–value.

d) Interpret the results of the hypothesis test in the context of this physician's claim.

1) A
2) C
3) C
4) D
5) A
6) C
7) A
8) D
9) A
10) B
11) a) 6.08 hrs $< \mu_1 - \mu_2 <$ 17.32 hrs

b) Because the interval consists of only positive values which suggest that the mean drying time for Type A paint is greater than the mean drying time for Type B paint...that is, Type A paint dries more slowly.

12) a) H_0: $\mu_d = 0$

H_1: $\mu_d > 0$

b) right–tailed

c) test statistic $t \approx 3.490$; $P = 0.00341$

d) reject H_0; There is sufficient evidence to support the claim that the relaxation tape lowers blood pressure.