Final Practice:
Disclaimer...The actual test differs

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

**Find the standard deviation for the given data. Round your answer to one more decimal place than the original data.**

1) 22, 29, 21, 24, 27, 28, 25, 36

**Find the range, variance, and standard deviation for each of the two samples, then compare the two sets of results.**

2) When investigating times required for drive–through service, the following results (in seconds) were obtained.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Restaurant A | 120 | 67 | 89 | 97 | 124 | 68 | 72 | 96 |
| Restaurant B | 115 | 126 | 49 | 56 | 98 | 76 | 78 | 95 |

**Find the z–score corresponding to the given value and use the z–score to determine whether the value is unusual. Consider a score to be unusual if its z–score is less than –2.00 or greater than 2.00. Round the z–score to the nearest tenth if necessary.**

3) A body temperature of 96.8° F given that human body temperatures have a mean of 98.20° F and a standard deviation of 0.62°.

**Find the percentile for the data point.**

4) In a data set with a range of 61.3 to 115.7 and 500 observations, there are 345 data points with values less than 85.4. Find the percentile for 85.4.

5) Data set: 6 3 21 15 6 15 30 27 33 9 3 30 18 3 30;
data point 21

**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 | 362 | 50 | 66 | 45 | 523 |
| Women | 448 | 34 | 86 | 49 | 617 |
| Total | 810 | 84 | 152 | 94 | 1140 |

If one of the 1140 people is randomly selected, find the probability that the person is a man or a heavy smoker.

7) A card is drawn from a well–shuffled deck of 52 cards. Find P(drawing a face card or a 4).

8) A bag contains 5 red marbles, 3 blue marbles, and 1 green marble. Find P(not blue).

9) The probability that an event will occur is 0.2. What is the probability that the event will not occur?

**Find the mean of the given probability distribution.**

10) The number of golf balls ordered by customers of a pro shop has the following probability distribution.

| x | 3 | 6 | 9 | 12 | 15 |
|---|---|---|---|---|---|
| p(x) | 0.14 | 0.11 | 0.36 | 0.29 | 0.10 |

**Solve the problem.**

11) Find the variance for the given probability distribution.

| x | P(x) |
|---|---|
| 0 | 0.17 |
| 1 | 0.28 |
| 2 | 0.05 |
| 3 | 0.15 |
| 4 | 0.35 |

**Find the mean, μ, for the binomial distribution which has the stated values of n and p. Round answer to the nearest tenth.**

12) $n = 665$; $p = .7$

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

13) The probability that Z is less than 1.13

14) The probability that Z lies between –1.10 and –0.36

**Use the confidence level and sample data to find the margin of error E.**

15) Replacement times for washing machines: 90% confidence; $n = 36$, $\bar{x} = 10.0$ years, $\sigma = 2.1$ years

16) College students' annual earnings: 99% confidence; $n = 71$, $\bar{x} = \$3660$, $\sigma = \$879$

**Use the confidence level and sample data to find a confidence interval for estimating the population μ.**

17) Test scores: $n = 109$, $\bar{x} = 79.1$, $\sigma = 6.9$; 99 percent

18) A random sample of 78 light bulbs had a mean life of $\bar{x} = 571$ hours with a standard deviation of $\sigma = 34$ hours. Construct a 90 percent confidence interval for the mean life, μ, of all light bulbs of this type.

**Use the margin of error, confidence level, and standard deviation σ to find the minimum sample size required to estimate an unknown population mean μ.**

19) Margin of error: \$140, confidence level: 95%, $\sigma = \$519$

**Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ. Assume that the population has a normal distribution.**

20) $n = 10$, $\bar{x} = 12.8$, $s = 4.9$, 95 percent

**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.**

21) Weights of men: 90% confidence; $n = 14$, $\bar{x} = 160.9$ lb, $s = 12.6$ lb

**Solve the problem.**

22) A manufacturer finds that in a random sample of 100 of its CD players, 96% have no defects. The manufacturer wishes to make a claim about the percentage of nondefective CD players and is prepared to exaggerate. What is the highest rate of nondefective CD players that the manufacturer could claim under the following condition?

His claim would not be rejected at the 0.05 significance level if this sample data were used. Assume that a left–tailed hypothesis test would be performed.

**Identify the null hypothesis, alternative hypothesis, test statistic, P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.**

23) The health of employees is monitored by periodically weighing them in. A sample of 54 employees has a mean weight of 183.9 lb. Assuming that $\sigma$ is known to be 121.2 lb, use a 0.10 significance level to test the claim that the population mean of all such employees weights is less than 200 lb.

**Test the given claim using the traditional method of hypothesis testing. Assume that the sample has been randomly selected from a population with a normal distribution.**

24) Use a significance level of $\alpha = 0.01$ to test the claim that $\mu > 2.85$. The sample data consists of 9 scores for which $\bar{x} = 3.25$ and $s = 0.53$.

25) In tests of a computer component, it is found that the mean time between failures is 520 hours. A modification is made which is supposed to increase the time between failures. Tests on a random sample of 10 modified components resulted in the following times (in hours) between failures.

| | | | | |
|---|---|---|---|---|
| 518 | 548 | 561 | 523 | 536 |
| 499 | 538 | 557 | 528 | 563 |

At the 0.05 significance level, test the claim that for the modified components, the mean time between failures is greater than 520 hours.

**Use the traditional method to test the given hypothesis. Assume that the population is normally distributed and that the sample has been randomly selected.**

26) When 12 bolts are tested for hardness, their indexes have a standard deviation of 41.7. Test the claim that the standard deviation of the hardness indexes for all such bolts is greater than 30.0. Use a 0.025 level of significance.

**Use the traditional method to test the given hypothesis. Assume that the samples are independent and that they have been randomly selected**

27) Use the given sample data to test the claim that $p_1 < p_2$. Use a significance level of 0.10.

| Sample 1 | Sample 2 |
|---|---|
| $n_1 = 462$ | $n_2 = 380$ |
| $x_1 = 84$ | $x_2 = 95$ |

**Test the indicated claim about the means of two populations. Assume that the two samples are independent and that they have been randomly selected.**

28) A researcher wishes to determine whether people with high blood pressure can reduce their blood pressure by following a particular diet. Use the sample data below to test the claim that the treatment population mean $\mu_1$ is smaller than the control population mean $\mu_2$. Test the claim using a significance level of 0.01.

| Treatment Group | Control Group |
|---|---|
| $n_1 = 85$ | $n_2 = 75$ |
| $\overline{x}_1 = 189.1$ | $\overline{x}_2 = 203.7$ |
| $s_1 = 38.7$ | $s_2 = 39.2$ |

**Given the linear correlation coefficient r and the sample size n, determine the critical values of r and use your finding to state whether or not the given r represents a significant linear correlation. Use a significance level of 0.05.**

29) $r = 0.786$, $n = 25$

**Find the value of the linear correlation coefficient r.**

30)

| x | 21.5 | 10.8 | 34.9 | 48.6 | 45.3 |
|---|---|---|---|---|---|
| y | 5 | 2 | 7 | 5 | 7 |

**Find the best predicted value of y corresponding to the given value of x.**

31) Four pairs of data yield $r = 0.942$ and the regression equation $\hat{y} = 3x$. Also, $\overline{y} = 12.75$. What is the best predicted value of y for $x = 2.8$?

32) Eight pairs of data yield $r = 0.708$ and the regression equation $\hat{y} = 55.8 + 2.79x$. Also, $\overline{y} = 71.125$. What is the best predicted value of y for $x = 5.2$?

**Use the given data to find the equation of the regression line. Round the final values to three significant digits, if necessary.**

33)

| x | 0 | 3 | 4 | 5 | 12 |
|---|---|---|---|---|---|
| y | 8 | 2 | 6 | 9 | 12 |

1) 4.8
2) Restaurant A: 57; 493.98; 22.23
   Restaurant B: 77; 727.98; 26.98
3) –2.3; unusual
4) 69
5) 60
6) 0.502
7) $\frac{4}{13}$
8) $\frac{2}{3}$
9) 0.8
10) 9.3
11) 2.46
12) $\mu = 465.5$
13) 0.8708
14) 0.2237
15) 0.6 years
16) $269
17) $77.4 < \mu < 80.8$
18) $565 < \mu < 577$
19) 53
20) $9.29 < \mu < 16.31$
21) 9.6 lb $< \sigma <$ 18.7 lb
22) 98.2%
23) $H_0$: $\mu = 200$; $H_1$: $\mu < 200$; Test statistic: $z = -0.98$. P–value: 0.1635. Fail to reject $H_0$. There is not sufficient evidence to warrrant the rejection of the claim that the mean equals 200.
24) Test statistic: $t = 2.26$. Critical value: $t = 2.896$. Fail to reject $H_0$: $\mu = 2.85$. There is not sufficient evidence to support the claim that the mean is greater than 2.85.
25) Test statistic: $t = 2.612$. Critical value: $t = 1.833$. Reject $H_0$. There is sufficient evidence to support the claim that the mean is greater than 520 hours.
26) Test statistic: $X^2 = 21.253$. Critical value: $X^2 = 21.920$. Fail to reject the null hypothesis. There is not sufficient evidence to support the claim that the standard deviation is greater than 30.0.
27) $H_0$: $p_1 = p_2$. $H_1$: $p_1 < p_2$.
   Test statistic: $z = -2.41$. Critical value: $z = -1.28$.
   Reject the null hypothesis. There is sufficient evidence to support the claim that $p_1 < p_2$.
28) $H_0$: $\mu_1 = \mu_2$. $H_1$: $\mu_1 < \mu_2$.
   Test statistic $t = -2.365$. Critical value: $t = -2.377$.
   Fail to reject the null hypothesis. There is not sufficient evidence to support the claim that the treatment population mean $\mu 1$ is smaller than the control population $\mu_2$.
29) Critical values: $r = \pm 0.396$, significant linear correlation
30) 0.732
31) 12.75
32) 70.31
33) $\hat{y} = 4.88 + 0.525x$