

Provide an appropriate response.

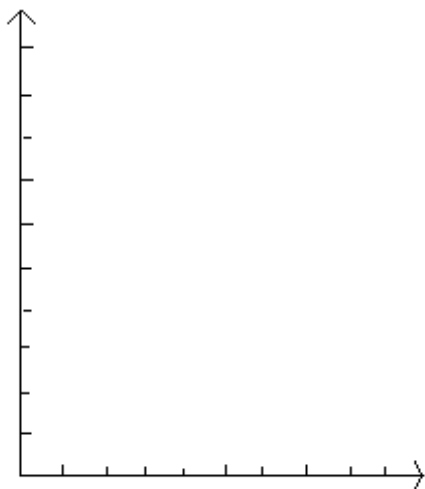
- 1) The frequency distribution for the weekly incomes of students with part-time jobs is given below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary.

Income (\$)	Frequency
200-300	55
301-400	70
401-500	73
501-600	68
More than 600	10

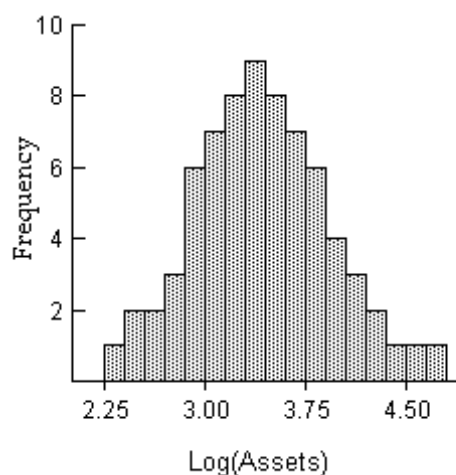
- 2) The frequency table below shows the number of days off in a given year for 30 police detectives.

Days off	Frequency
0-2	10
3-5	1
6-8	7
9-11	7
12-14	1
15-17	4

Construct a histogram. Use the class midpoints for the horizontal scale. Does the result appear to be a normal distribution? Why or why not?



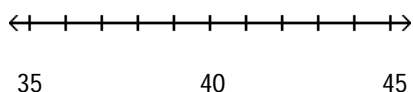
- 3) The histogram below shows the distribution of the assets (in millions of dollars) of 71 companies. Does the distribution appear to be normal?



Construct the dotplot for the given data.

- 4) The following data represent the number of cars passing through a toll booth during a certain time period over a number of days.

38 39 37 37 44 38 41 38 39 35 42 39 43 37 41



Find the mean for the given sample data. Unless indicated otherwise, round your answer to one more decimal place than is present in the original data values.

- 5) The students in Hugh Logan's math class took the Scholastic Aptitude Test. Their math scores are shown below.

Find the mean score.

516 608 356 352 496
349 350 525 470 482

- 6) Listed below are the amounts of weight change (in pounds) for 12 women during their first year of work after graduating from college. Positive values correspond to women who gained weight and negative values correspond to women who lost weight. What is the mean weight change?

3 -8 3 -9 11 -9 14 0 13 -5 14 7

Find the median for the given sample data.

- 7) The ages (in years) of the eight passengers on a bus are listed below.

9 1 29 11 22 46 40 35

Find the median age.

Find the standard deviation for the given sample data. Round your answer to one more decimal place than is present in the original data.

- 8) The top nine scores on the organic chemistry midterm are as follows.

47, 55, 71, 41, 82, 57, 25, 66, 81

Use the empirical rule to solve the problem.

- 9) At one college, GPA's are normally distributed with a mean of 3 and a standard deviation of 0.6. What percentage of students at the college have a GPA between 2.4 and 3.6?

Determine which score corresponds to the higher relative position.

- 10) Which is better, a score of 92 on a test with a mean of 71 and a standard deviation of 15, or a score of 688 on a test with a mean of 493 and a standard deviation of 150?

Find the indicated measure.

- 11) Use the given sample data to find Q_3 .

49 52 52 52 74 67 55 55

Find the indicated probability.

- 12) The data set represents the income levels of the members of a country club. Find the probability that a randomly selected member earns at least \$77,000. Round your answers to the nearest tenth.

93,000 109,000 75,000 117,000 76,000 93,000 77,000 73,000 133,000 173,000
74,000 85,000 125,000 76,000 109,000 101,000 77,000 141,000 72,000 101,000

- 13) Refer to the table which summarizes the results of testing for a certain disease.

	Positive Test Result	Negative Test Result
Subject has the disease	85	7
Subject does not have the disease	28	153

If one of the results is randomly selected, what is the probability that it is a false positive (test indicates the person has the disease when in fact they don't)? What does this probability suggest about the accuracy of the test?

Estimate the probability of the event.

- 14) A polling firm, hired to estimate the likelihood of the passage of an up-coming referendum, obtained the set of survey responses to make its estimate. The encoding system for the data is: 0 = FOR, 1 = AGAINST. If the referendum were held today, estimate the probability that it would pass.

0, 1, 1, 0, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0

Find the indicated probability.

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

	Nonsmoker	Occasional smoker	Regular smoker	Heavy smoker	Total
Men	334	50	68	32	484
Women	357	30	89	37	513
Total	691	80	157	69	997

If one of the 997 people is randomly selected, find the probability of getting a regular or heavy smoker.

- 16) A bin contains 64 light bulbs of which 10 are defective. If 5 light bulbs are randomly selected from the bin with replacement, find the probability that all the bulbs selected are good ones. Round to the nearest thousandth if necessary.

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

		Light	Heavy	
	Nonsmoker	smoker	smoker	Total
Men	390	34	42	466
Women	446	35	44	525
Total	836	69	86	991

If two different people are randomly selected from the 991 subjects, find the probability that they are both heavy smokers. Round to six decimal places.

Provide an appropriate response.

18) A 28-year-old man pays \$181 for a one-year life insurance policy with coverage of \$150,000. If the probability that he will live through the year is 0.9994, what is the expected value for the insurance policy?

Find the indicated probability. Round to three decimal places.

19) A machine has 11 identical components which function independently. The probability that a component will fail is 0.2. The machine will stop working if more than three components fail. Find the probability that the machine will be working.

20) An airline estimates that 94% of people booked on their flights actually show up. If the airline books 73 people on a flight for which the maximum number is 71, what is the probability that the number of people who show up will exceed the capacity of the plane?

Find the indicated probability.

21) The brand name of a certain chain of coffee shops has a 46% recognition rate in the town of Coffleton. An executive from the company wants to verify the recognition rate as the company is interested in opening a coffee shop in the town. He selects a random sample of 8 Coffleton residents. Find the probability that exactly 4 of the 8 Coffleton residents recognize the brand name.

Solve the problem.

22) The amount of snowfall falling in a certain mountain range is normally distributed with a mean of 70 inches, and a standard deviation of 10 inches. What is the probability that the mean annual snowfall during 25 randomly picked years will exceed 72.8 inches?

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

23) A survey of 300 union members in New York State reveals that 112 favor the Republican candidate for governor. Construct the 98% confidence interval for the true population proportion of all New York State union members who favor the Republican candidate.

Solve the problem.

24) 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 percentage points.

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.

- 25) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were:

7.0 10.8 9.5 8.0 11.5

7.5 6.4 11.3 10.2 12.6

Determine a 95% confidence interval for the mean time for all players.

Use the given information to find the minimum sample size required to estimate an unknown population mean μ .

- 26) How many students must be randomly selected to estimate the mean weekly earnings of students at one college? We want 95% confidence that the sample mean is within \$2 of the population mean, and the population standard deviation is known to be \$60.

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

- 27) An article in a journal reports that 34% of American fathers take no responsibility for child care. A researcher claims that the figure is higher for fathers in the town of Littleton. A random sample of 234 fathers from Littleton yielded 96 who did not help with child care. Test the researcher's claim at the 0.05 significance level.

Assume that a simple random sample has been selected from a normally distributed population. Find the test statistic, P-value, critical value(s), and state the final conclusion.

- 28) Test the claim that for the adult population of one town, the mean annual salary is given by $\mu = \$30,000$. Sample data are summarized as $n = 17$, $\bar{x} = \$22,298$, and $s = \$14,200$. Use a significance level of $\alpha = 0.05$.

Test the indicated claim about the means of two populations. Assume that the two samples are independent simple random samples selected from normally distributed populations. Do not assume that the population standard deviations are equal. Use the traditional method or P-value method as indicated.

- 29) A researcher was interested in comparing the GPAs of students at two different colleges. Independent random samples of 8 students from college A and 13 students from college B yielded the following GPAs:

College A	College B
3.7	3.8 2.8
3.2	3.2 4.0
3.0	3.0 3.6
2.5	3.9 2.6
2.7	3.8 4.0
3.6	2.5 3.6
2.8	3.9
3.4	

Use a 0.10 significance level to test the claim that the mean GPA of students at college A is different from the mean GPA of students at college B. Use the P-value method of hypothesis testing.

(Note: $\bar{x}_1 = 3.1125$, $\bar{x}_2 = 3.4385$, $s_1 = 0.4357$, $s_2 = 0.5485$.)

Use the traditional method of hypothesis testing to test the given claim about the means of two populations. Assume that two dependent samples have been randomly selected from normally distributed populations.

- 30) Five students took a math test before and after tutoring. Their scores were as follows.

Subject	A	B	C	D	E
Before	71	66	67	77	75
After	75	75	65	80	87

Using a 0.01 level of significance, test the claim that the tutoring has an effect on the math scores.

Find the value of the linear correlation coefficient r .

- 31) Managers rate employees according to job performance and attitude. The results for several randomly selected employees are given below.

Performance	59	63	65	69	58	77	76	69	70	64
Attitude	72	67	78	82	75	87	92	83	87	78

Use the given data to find the best predicted value of the response variable.

- 32) Four pairs of data yield $r = 0.942$ and the regression equation $\hat{y} = 3x$. Also, $\bar{y} = 12.75$. What is the best predicted value of y for $x = 4.6$?

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

33)

x	3	5	7	15	16
y	8	11	7	14	20

Perform the indicated goodness-of-fit test.

- 34) Using the data below and a 0.05 significance level, test the claim that the responses occur with percentages of 15%, 20%, 25%, 25%, and 15% respectively.

Response	A	B	C	D	E
Frequency	12	15	16	18	19

- 35) Among the four northwestern states, Washington has 51% of the total population, Oregon has 30%, Idaho has 11%, and Montana has 8%. A market researcher selects a sample of 1000 subjects, with 450 in Washington, 340 in Oregon, 150 in Idaho, and 60 in Montana. At the 0.05 significance level, test the claim that the sample of 1000 subjects has a distribution that agrees with the distribution of state populations.

Test the claim that the samples come from populations with the same mean. Assume that the populations are normally distributed with the same variance.

- 36) Given the sample data below, test the claim that the populations have the same mean. Use a significance level of 0.05.

Brand A	Brand B	Brand C
$n = 10$	$n = 10$	$n = 10$
$\bar{x} = 32.1$	$\bar{x} = 32.6$	$\bar{x} = 27.2$
$s^2 = 4.37$	$s^2 = 3.61$	$s^2 = 3.34$

- 37) At the 0.025 significance level, test the claim that the four brands have the same mean if the following sample results have been obtained.

Brand A	Brand B	Brand C	Brand D
17	18	21	22
20	18	24	25
21	23	25	27
22	25	26	29
21	26	29	35
		29	36
			37

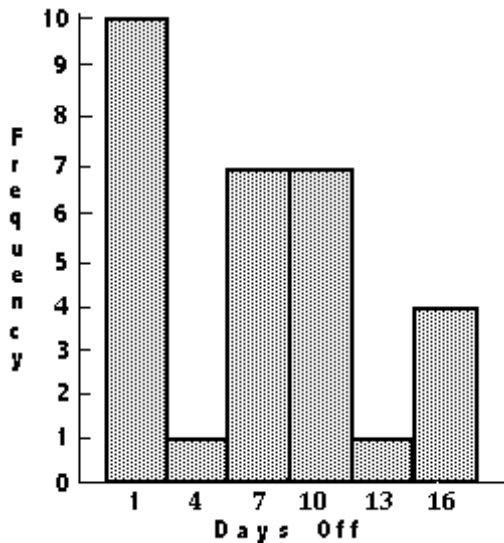
Answer Key

Testname: FINALPRACTICEEXAMMATH110

1)

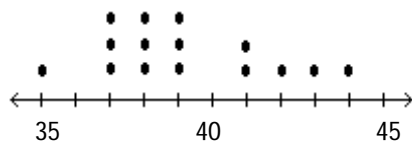
Income (\$)	Relative Frequency
200-300	19.93%
301-400	25.36%
401-500	26.45%
501-600	24.64%
More than 600	3.62%

2) The distribution does not appear to be normal. It is not bell-shaped and it is not symmetric.



3) Yes, it appears to be normal.

4)



5) 450.4

6) 2.8 lb

7) 25.5 yr

8) 18.9

9) 68%

10) A score of 92

11) 61.0

12) 0.7

13) 0.103; The probability of this error is high so the test is not very accurate.

14) 0.6

15) 0.227

16) 0.428

17) 0.007451

18) -\$91.00

19) 0.839

20) 0.062

21) 0.267

22) 0.0808

Answer Key

Testname: FINALPRACTICEEXAMMATH110

23) $0.308 < p < 0.438$

24) 658

25) $8.03 \text{ min} < \mu < 10.93 \text{ min}$

26) 3458

27) $H_0: p = 0.34$. $H_1: p > 0.34$. Test statistic: $z = 2.27$. P-value: $p = 0.0116$.

Critical value: $z = 1.645$. Reject null hypothesis. There is sufficient evidence to support the researcher's claim that the proportion for fathers in Littleton is higher than 34%.

28) $\alpha = 0.05$

Test statistic: $t = -2.236$

P-value: $p = 0.0399$

Critical values: $t = \pm 2.120$

Because the test statistic, $t < -2.120$, we reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that $\mu = \$30,000$.

29) $H_0: \mu_1 = \mu_2$

$H_1: \mu_1 \neq \mu_2$

Test statistic: $t = -1.506$

$0.1 < P\text{-value} < 0.2$

Do not reject H_0 . At the 10% significance level, there is not sufficient evidence to support the claim that the mean GPA of students at college A is different from the mean GPA of students at college B.

30) $H_0: \mu_d = 0$. $H_1: \mu_d \neq 0$. Test statistic: $t = -2.134$. Critical values: $t = 4.604, -4.604$.

Fail to reject H_0 . There is not sufficient evidence to support the claim that the tutoring has an effect.

31) 0.863

32) 12.75

33) $\hat{y} = 5.07 + 0.753x$

34) H_0 : The responses occur according to the stated percentages.

H_1 : The responses do not occur according to the stated percentages.

Test statistic: $\chi^2 = 5.146$. Critical value: $\chi^2 = 9.488$. Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that the responses occur according to the stated percentages.

35) H_0 : The distribution of the sample agrees with the population distribution.

H_1 : It does not agree.

Test statistic: $\chi^2 = 31.938$. Critical value: $\chi^2 = 7.815$. Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that the distribution of the sample agrees with the distribution of the state populations.

36) Test statistic: $F = 23.595$. Critical value: $F = 3.35$.

Reject the claim of equal means. The different brands do not appear to have the same mean.

37) $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$. H_1 : The means are not all equal. P-value: $p = 0.00285$.

Test statistic: $F = 6.6983$. Critical value: $F = 3.9034$.

Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that the four brands have the same mean.