

# AP Statistics Practice Examination 1

## *Multiple Choice* *Statistics* *Section I*

**Time: 1 hour and 30 minutes**

**Number of questions: 40**

**Percent of total grade: 50**

**Directions:** Solve each of the following problems using the available space for scratchwork. Decide which is the best of the choices given and fill in the corresponding oval on the answer sheet. No credit will be given for anything written in the test book. Do not spend too much time on any one problem.

1. A random sample of 25 birthweights (in ounces) is taken, yielding the following summary statistics:

Variable	N	Mean	Median	TrMean	StDev	SE Mean
Birthwt	25	129.40	129.00	128.35	17.41	3.48
Variable	Minimum	Maximum	Q1	Q3		
Birthwt	96.00	187.00	119.50	135.50		

What can be said about the number of outliers for this data set?

- (A) 0
- (B) At least 1
- (C) No more than 1
- (D) At least 2
- (E) No more than 2

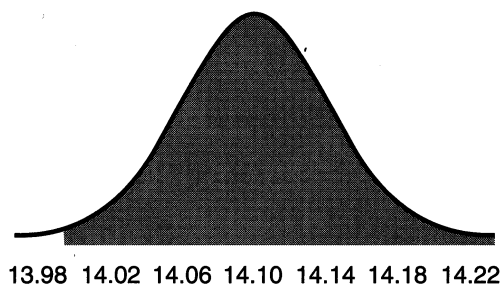
**EXAM 1**

2. Given two events,  $A$  and  $B$ , if  $P(A) = 0.43$ ,  $P(B) = 0.26$ , and  $P(A \cup B) = 0.68$ , then the two events are
- (A) mutually exclusive but not independent.
  - (B) independent but not mutually exclusive.
  - (C) mutually exclusive and independent.
  - (D) neither mutually exclusive nor independent.
  - (E) Not enough information is given to determine whether  $A$  and  $B$  are mutually exclusive or independent.
3. In a certain county, a newspaper reports that the average family income in the county is \$45,000. First-time home buyers believe that the average income is less than reported. Which of the following hypotheses would be appropriate for a significance test?
- (A)  $H_0: \mu = 45,000$ ;  $H_a: \mu \neq 45,000$
  - (B)  $H_0: \mu = 45,000$ ;  $H_a: \mu > 45,000$
  - (C)  $H_0: \mu = 45,000$ ;  $H_a: \mu < 45,000$
  - (D)  $H_0: \mu \neq 45,000$ ;  $H_a: \mu = 45,000$
  - (E)  $H_0: \mu > 45,000$ ;  $H_a: \mu = 45,000$

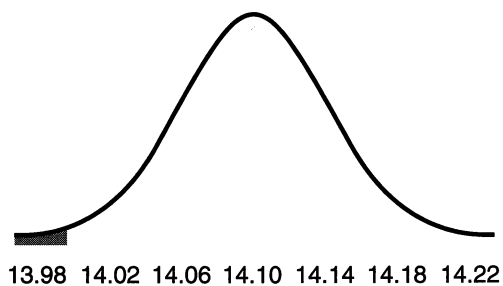
**EXAM 1**

4. Weights for a box of cereal are normally distributed with a mean of 14.10 oz and a standard deviation of 0.04 oz. Which of the following illustrates the probability of selecting a box with at *least* the advertised weight of 14 oz?

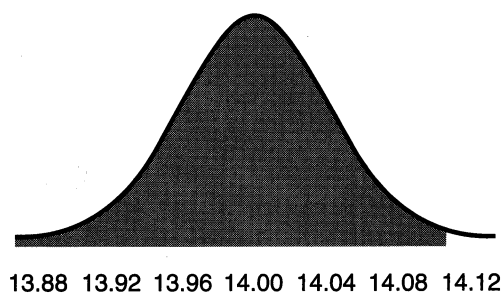
(A)



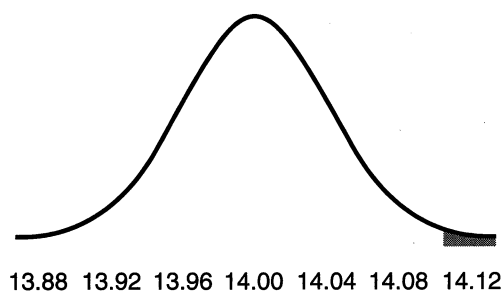
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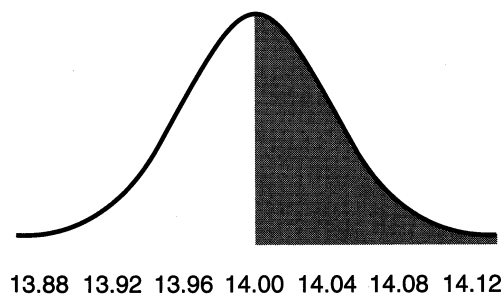
(C)



(D)

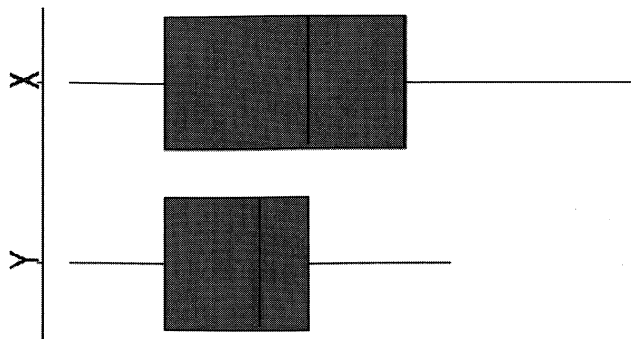


(E)



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5. The boxplots below summarize two data sets,  $X$  and  $Y$ . Which of the following **MUST** be true?



- (A) Set  $X$  and set  $Y$  have the same number of data points.  
(B) The box of set  $X$  contains more data points than the box of set  $Y$ .  
(C) The data in set  $X$  have a larger range than the data in set  $Y$ .  
(D) About 50% of the values in set  $X$  are greater than about 75% of the values in set  $Y$ .  
(E) The median of set  $X$  is less than the median of set  $Y$ .
6. A newlywed couple is trying to choose one of two neighborhood supermarkets for their grocery shopping. They decide to randomly select 20 items, check their prices at each store, then conduct a test to determine if one store is significantly less expensive than the other. What test should they conduct?
- (A) Two-sample  $z$ -test  
(B) Two-sample  $t$ -test  
(C) Matched-pairs  $t$ -test  
(D)  $\chi^2$  goodness-of-fit test  
(E) Linear regression  $t$ -test

7. In a certain community, 20% of cable subscribers also subscribe to the company's broadband service for their Internet connection. You would like to design a simulation to estimate the probability that one of six randomly selected subscribers has the broadband service. Using digits 0 through 9, which of the following assignments would be appropriate to model this situation?
- (A) Assign even digits to broadband subscribers and odd digits to cable-only subscribers.
- (B) Assign 0 and 1 to broadband subscribers and 2, 3, 4, 5, 6, 7, 8, and 9 to cable-only subscribers.
- (C) Assign 0, 1, and 2 to broadband subscribers and 3, 4, 5, 6, 7, 8, and 9 to a cable-only subscribers.
- (D) Assign 1, 2, 3, 4, 5, and 6 to broadband subscribers and 7, 8, 9, and 0 to cable-only subscribers.
- (E) Assign 0, 1, and 2 to broadband subscribers; 3, 4, 5, and 6 to cable-only subscribers; and ignore digits 7, 8, and 9.
8. The number of T-shirts a school store sells monthly has the following probability distribution:

# of T-shirts, $X$	0	1	2	3	4	5	6	7	8	9	10
$P(x)$	0.02	0.15	0.18	0.21	0.14	0.08	0.08	0.04	0.03	0.02	0.05

If each T-shirt sells for \$10 but costs the store \$4 to purchase, what is the expected monthly T-shirt *profit*?

- (A) \$ 3.78
- (B) \$15.12
- (C) \$22.68
- (D) \$30.00
- (E) \$37.80

9. A population has a distribution that is strongly skewed right. For the sampling distribution of means for samples of size 5, which of the following are true about the shape, center, and spread of the sampling distribution?

<u>Shape</u>	<u>Mean</u>	<u>Standard Deviation</u>
(A) Skewed right	Equal to that of the population	Less than that of the population
(B) Skewed right	Equal to that of the population	Equal to that of the population
(C) Skewed right	Equal to that of the population	Greater than that of the population
(D) Approximately normal	Equal to that of the population	Less than that of the population
(E) Approximately normal	Equal to that of the population	Equal to that of the population

10. A young woman works two jobs and receives tips for both jobs. As a hairdresser, her distribution of weekly tips has mean \$65 and standard deviation \$5.75. As a waitress, her distribution of weekly tips has mean \$154 and standard deviation \$8.02. What are the mean and standard deviation of her combined weekly tips? (Assume independence for the two jobs.)

- (A) mean \$167.16; standard deviation \$9.87
- (B) mean \$167.16; standard deviation \$13.77
- (C) mean \$219.00; standard deviation \$2.27
- (D) mean \$219.00; standard deviation \$9.87
- (E) mean \$219.00; standard deviation \$13.77

11. A cause-and-effect relationship between two variables can best be determined from which of the following?

- (A) A survey conducted using a simple random sample of individuals
- (B) A survey conducted using a stratified random sample of individuals
- (C) When the two variables have a correlation coefficient near 1 or  $-1$
- (D) An observational study where the observational units are chosen randomly
- (E) A controlled experiment where the observational units are assigned randomly

12. Moving times (in minutes) and weights (in pounds) were recorded for a random sample of 20 moving jobs requiring three-man crews, and the results of the regression analysis are shown below.

Predictor	Coef	StDev	T	P
Constant	21.84	25.54	0.86	0.404
Weight	0.036538	0.002977	12.27	0.000

$S = 30.32$      $R - Sq = 89.3\%$      $R - Sq(adj) = 88.7\%$

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	138434	138434	150.60	0.000
Residual Error	18	16546	919		
Total	19	154980			

The equation for the least squares regression line is

- (A)  $\widehat{\text{Weight}} = 21.84 + 0.037(\text{Time})$ .
- (B)  $\widehat{\text{Time}} = 21.84 + 0.037(\text{Weight})$ .
- (C)  $\widehat{\text{Weight}} = 25.54 + 0.003(\text{Time})$ .
- (D)  $\widehat{\text{Time}} = 25.54 + 0.003(\text{Weight})$ .
- (E)  $\widehat{\text{Time}} = 0.037 + 21.84(\text{Weight})$ .
13. Which of the following is *not* a condition for a geometric setting?
- (A) There are only two possible outcomes for each trial.
- (B) The probability of success is the same for each trial.
- (C) The trials are independent.
- (D) There are a fixed number of observations.
- (E) The variable of interest is the number of trials required to reach the first success.

14. Two random samples of American adults are taken, and the religious affiliations of the individuals involved are recorded. In the first sample of 200 adults, 66 of the individuals are Christians. In the second sample of 140 adults, 12 of the individuals are Buddhists. Assume the two samples are independent. Which of the following should be used to construct a 95% confidence interval for the difference in proportions for adult Americans who practice the two religions?
- (A)  $0.0786 \pm 1.96\sqrt{0.0005}$
  - (B)  $0.2443 \pm 1.96\sqrt{0.0017}$
  - (C)  $0.33 \pm 1.96\sqrt{0.0011}$
  - (D) The conditions necessary for computing a confidence interval have not been met; therefore, a confidence interval should not be computed.
  - (E) Because the sample sizes for the two proportions are not equal, a confidence interval cannot be computed.
15. For a set of values, suppose the mean is 10 and the standard deviation is 2. If each value is multiplied by 9, what will be the mean and standard deviation for this new set of values?
- (A) mean 10; standard deviation 2
  - (B) mean 10; standard deviation 18
  - (C) mean 90; standard deviation 2
  - (D) mean 90; standard deviation 6
  - (E) mean 90; standard deviation 18
16. Two measures,  $x$  and  $y$ , are taken on numerous subjects, and a least squares regression equation is computed. The resulting equation is:  $\hat{y} = 382.1 - 12.25x$ . A correct interpretation for the slope and intercept is
- (A) for every increase of 100 units in  $x$ ,  $y$  increases approximately 1225 units; when  $x = 0$ ,  $y$  is predicted to be 382.1.
  - (B) for every increase of 100 units in  $x$ ,  $y$  decreases approximately 1225 units; when  $x = 0$ ,  $y$  is predicted to be 382.1.
  - (C) for every increase of 100 units in  $x$ ,  $y$  increases approximately 32,810 units; when  $x = 0$ ,  $y$  is predicted to be 12.25.
  - (D) for every increase of 100 units in  $x$ ,  $y$  decreases approximately 32,810 units; when  $x = 0$ ,  $y$  is predicted to be 12.25.
  - (E) for every increase of 100 units in  $x$ ,  $y$  increases approximately 32,810 units; when  $x = 0$ ,  $y$  is predicted to be  $-12.25$ .



17. High school students on a closed campus recently petitioned their school board to allow students to leave the campus for lunch. In order to support their opinion, the students randomly polled students and teachers with the following question: "Do you think that students should be allowed to leave campus for lunch?" The results are as follows:

	Agree	Disagree	No Opinion	Total
Students	123	37	4	164
Teachers	16	3	3	22
Total	139	40	7	186

Which of the following best describes the responses of students and teachers on the issue?

- (A) There is insufficient evidence that students and teachers have different opinions on the issue.
- (B) There is evidence that students and teachers have different opinions on the issue at the 0.10 level but not at the 0.05 level.
- (C) There is evidence that students and teachers have different opinions on the issue at the 0.05 level but not at the 0.01 level.
- (D) There is evidence that students and teachers have different opinions on the issue at the 0.01 level but not at the 0.001 level.
- (E) The conditions for conducting an appropriate test of homogeneity between students and teachers on the issue have not been met.
18. A random sample of fireworks shows was selected, and the number of shells used for each show (Shells), along with the length of the show (Length), were recorded. The following output was generated:

**Bivariate Fit of Length By Shells**

**Linear Fit**

$$\text{Length} = 20.162164 + 0.0002513 \text{ Shells}$$

**Summary of Fit**

RSquare	0.073444
RSquare Adj	0.021969
Root Mean Square Error	5.116423
Mean of Response	22.85
Observations (or Sum Wgts)	20

What is the correlation between the number of shells and the length of the show?

- (A) 0.022
- (B) 0.073
- (C) 0.148
- (D) 0.271
- (E) Not enough information is given to determine the correlation.

19. Two friends become roommates. Before deciding whether or not to combine their grocery shopping, they examine a random sample of previous weekly grocery bills for each to determine whether one spends significantly more money on groceries than the other. Assume all conditions for conducting a significance test have been met. The results of the test are:

$H_0$ : Population mean of roommate A equals that of roommate B

$H_a$ : Population mean of roommate A is greater than that of roommate B

	Roommate A	Roommate B
Count:	10	10
Mean:	38	32
Std dev:	8.56	8.56
Std error:	2.70	2.70

Using **unpooled variances**

Student's  $t$ : 1.567

$df$ : 18

$P$ -value: 0.067

Based upon the results of the test, which of the following conclusions should the roommates make?

- (A) The results show that roommate A spends more than roommate B approximately 6.7% of the time.
- (B) The results show that roommate A spends more than roommate B approximately 93.3% of the time.
- (C) The results show that roommate A spends more than roommate B at the 0.10 level. If the null hypothesis is true, one could expect to get a test statistic at least as extreme as that observed 6.7% of the time.
- (D) The results show that roommate A spends more than roommate B at the 0.10 level. If the null hypothesis is true, one could expect to get a test statistic at least as extreme as that observed 93.3% of the time.
- (E) The results do not show that roommate A spends more than roommate B at any of the commonly accepted significance levels.

20. In a game of chance, three fair coins are tossed simultaneously. If all three coins show heads, then the player wins \$15. If all three coins show tails, then the player wins \$10. If it costs \$5 to play the game, what is the player's expected net gain or loss at the end of two games?
- (A) The player can expect to gain \$15 after two games.  
 (B) The player can expect to gain \$1.88 after two games.  
 (C) The player can expect to gain \$3.75 after two games.  
 (D) The player can expect to lose \$1.88 after two games.  
 (E) The player can expect to lose \$3.75 after two games.
21. Senior citizens make up about 12.4% of the American population. If a random sample of 200 Americans is selected, what is the probability that more than 180 of them are *not* senior citizens?

(A)  $\binom{200}{180}(0.124)^{180}(0.876)^{20}$

(B)  $\binom{200}{180}(0.876)^{180}(0.124)^{20}$

(C)  $P\left(z > \frac{180 - 175.2}{\frac{0.124}{\sqrt{200}}}\right)$

(D)  $P\left(z > \frac{0.9 - 0.124}{\sqrt{\frac{(0.124)(0.876)}{200}}}\right)$

(E)  $P\left(z > \frac{0.9 - 0.876}{\sqrt{\frac{(0.124)(0.876)}{200}}}\right)$

22. An avid tennis fan wishes to determine the average number of points per game in tennis. He takes a random sample of 20 games and finds the mean length to be 5.65 points with a standard deviation of 1.69 points. Which of the following would yield a 95% confidence interval for  $\mu$ ?

(A)  $5.65 \pm 1.96 \frac{1.69}{\sqrt{20}}$

(B)  $5.65 \pm 2.086 \frac{1.69}{\sqrt{20}}$

(C)  $5.65 \pm 2.093 \frac{1.69}{\sqrt{20}}$

(D)  $5.65 \pm 2.086 \frac{1.69}{\sqrt{19}}$

(E)  $5.65 \pm 2.093 \frac{1.69}{\sqrt{19}}$

23. In this year's county mathematics competition, a student scored 40; in last year's competition, the student scored 35. The average score this year was 38 with a standard deviation of 2. Last year's average score was 34 with a standard deviation of 1. In which year did the student score better?

(A) The student scored better on this year's exam.

(B) The student scored better on last year's exam.

(C) The student scored equally well on both exams.

(D) Without knowing the number of test items, it is impossible to determine the better score.

(E) Without knowing the number of students taking the exam in the county, it is impossible to determine the better score.

24. There are 39 known moons orbiting the planet Jupiter. The diameter (in kilometers) and distance from Jupiter (in thousands of kilometers) are recorded for the moons discovered prior to May 2002. The conditions for regression analysis were met and the results follow.

Dependent variable is **Distance (in 1000 km)**  
 No Selector  
 R squared = 29.6%      R squared (adjusted) = 26.9%  
 s = 8358 with 28 - 2 = 26 degrees of freedom

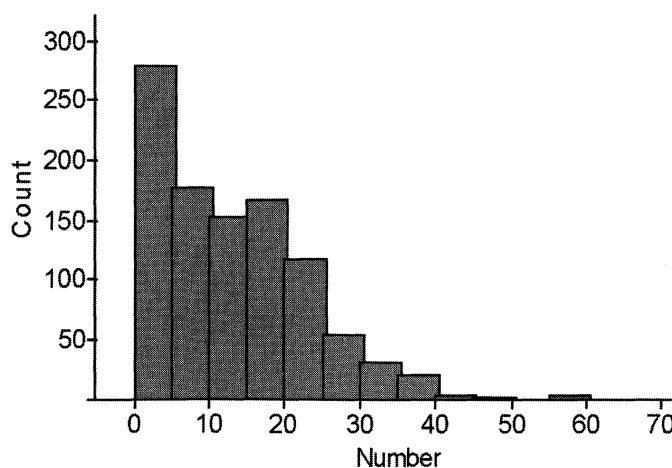
Source	Sum of Squares	df	Mean Square	F-ratio
Regression	763.35e6	1	763.35e6	10.9
Residual	1.81616e9	26	69.8524e6	

Variable	Coefficient	s.e. of Coeff	t-ratio	prob
Constant	16053.1	1714	9.37	≤ 0.0001
Diameter	-3.48571	1.054	-3.31	0.0028

Is there evidence of a relationship between diameter and distance?

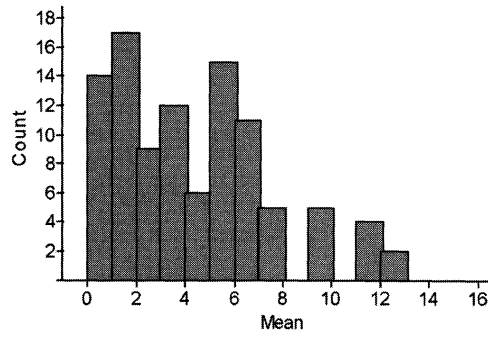
- (A) There is no evidence of a relationship between diameter and distance at any of the commonly accepted levels.
- (B) There is evidence of a relationship between diameter and distance at the 0.10 level but not at the 0.05 level.
- (C) There is evidence of a relationship between diameter and distance at the 0.05 level but not at the 0.01 level.
- (D) There is evidence of a relationship between diameter and distance at the 0.01 level but not at the 0.001 level.
- (E) There is evidence of a relationship between diameter and distance at the 0.001 level.
25. Shown below is a distribution with mean 12.262 and standard deviation 9.610.



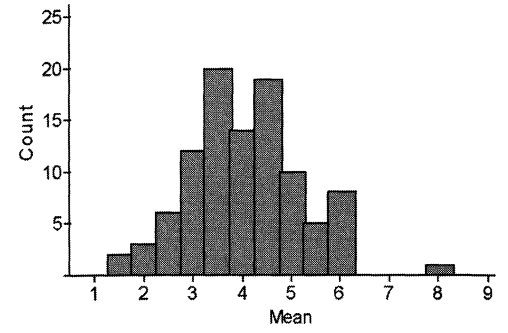
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One hundred samples of size 9 are drawn from this population, and the sample means are recorded. Which of the following is most likely to represent this distribution of sample means?

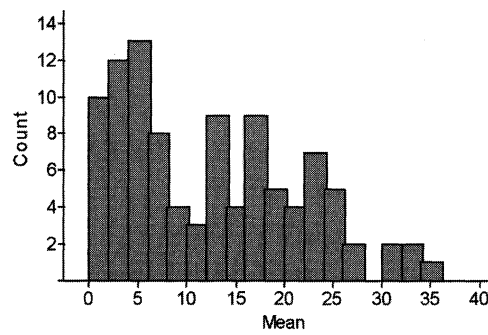
(A)



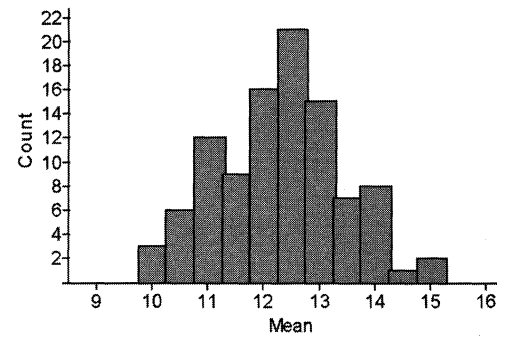
(B)



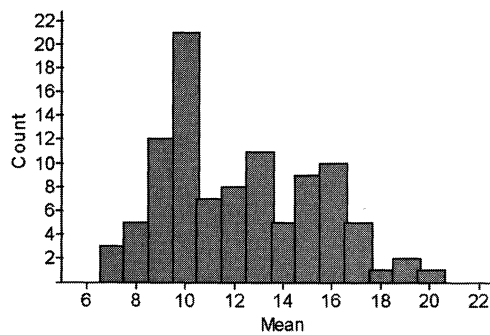
(C)



(D)



(E)



26. Boiling and melting points (in degrees Celsius) are recorded for selected substances, and regression analysis is used to describe the relationship between them. The results of the analysis are shown below:

Dependent variable is **Boiling Point**

No Selector

R squared = 73.4% R squared (adjusted) = 72.0%

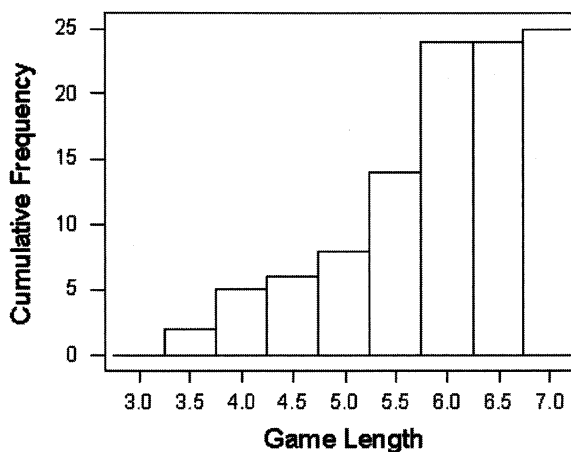
S = 626.4 with 21 - 2 = 19 degrees of freedom

Source	Sum of Squares	df	Mean Square	F-ratio
Regression	20.5469e6	1	20.5469e6	52.4
Residual	7.45573e6	19	392407	

Variable	Coefficient	s.e. of Coeff	t-ratio	prob
Constant	309.914	146.7	2.11	0.0481
Melting Point	0.959388	0.1326	7.24	≤ 0.0001

Assuming all of the conditions for regression have been met, which of the following gives the 95% confidence interval for the slope of the regression line?

- (A)  $0.959388 \pm 1.729(0.1326)$   
 (B)  $0.959388 \pm 1.96(0.1326)$   
 (C)  $0.959388 \pm 2.093(0.1326)$   
 (D)  $309.914 \pm 1.729(146.7)$   
 (E)  $309.914 \pm 2.093(626.4)$
27. The lengths (in innings) of 25 randomly selected Little League baseball games were recorded, and a *cumulative* frequency histogram was created from the results. What is the best conclusion that can be made from the graph?

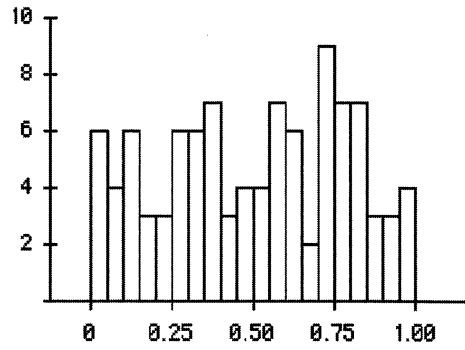


- (A) The median game length is 5 innings.  
 (B) Fourteen games lasted 5.5 innings.  
 (C) A majority of the games lasted 6 or more innings.  
 (D) The distribution of game lengths is severely skewed left.  
 (E) Games lasting more than 6 innings occurred least frequently.

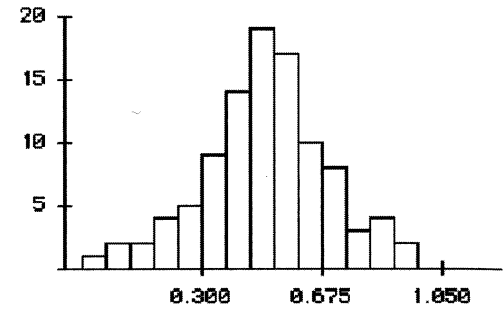
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28. For which of the following distributions is the mean greater than the median?

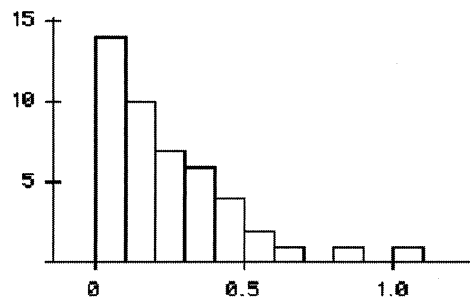
(A)



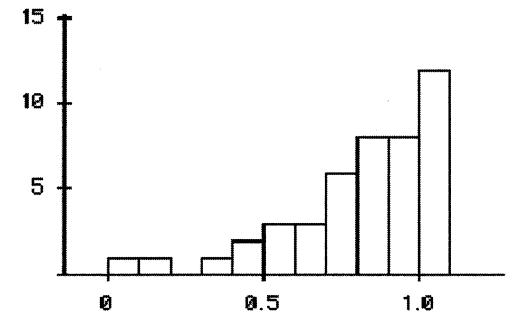
(B)



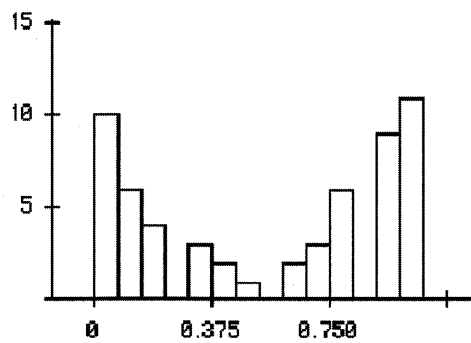
(C)



(D)



(E)





29. A young couple plans to purchase a business. In order to avoid bankruptcy, the couple needs to average more than \$15,000 in sales each month. Before signing the deal, they take a random sample (size 30) from previous months' sales and conduct a test of significance. Use the hypotheses

$$H_0: \mu = 15000$$

$$H_a: \mu > 15000$$

to describe a Type I Error and its consequence for the couple.

- (A) The couple, believing the average sales will be more than \$15,000, will purchase the business and may end up in bankruptcy.
  - (B) The couple, believing the average sales will be more than \$15,000, will purchase the business and may end up with a successful business.
  - (C) The couple, believing the average sales will be \$15,000 or less, will not purchase the business when they may have succeeded had they purchased the business.
  - (D) The couple, believing the average sales will be \$15,000 or less, will not purchase the business because they would have gone bankrupt with the business.
  - (E) The consequence of a Type I Error cannot be assessed unless we are given the  $\alpha$  level.
30. Based upon a random sample of 30 seniors in a high school, a guidance counselor finds that 20 of these seniors plan to attend an institution of higher learning. A 90% confidence interval constructed from this information yields (0.5251, 0.80823). Which of the following is a correct interpretation for this interval?
- (A) We can be 90% confident that 52.51% to 80.82% of our sample seniors plan to attend an institution of higher learning.
  - (B) We can be 90% confident that 52.51% to 80.82% of seniors at this high school plan to attend an institution of higher learning.
  - (C) We can be 90% confident that 52.51% to 80.82% of seniors in any school plan to attend an institution of higher learning.
  - (D) This interval will capture the true proportion of seniors from this high school who plan to attend an institution of higher learning 90% of the time.
  - (E) This interval will capture the proportion of seniors in our sample who plan to attend an institution of higher learning 90% of the time.

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31. As a promotional gimmick, a cereal manufacturer packages boxes of cereal with CD-ROMs of popular games. There are five different games, but the purchasers do not know which game they are receiving when they purchase the cereal. A child would like to receive one game in particular. What is the probability that the child opens three boxes of cereal before receiving the desired game?
- (A)  $\binom{5}{3}(0.2)^3(0.8)^2$   
(B)  $\binom{5}{3}(0.2)^2(0.8)^3$   
(C)  $\binom{5}{1}(0.6)(0.4)^4$   
(D)  $(0.8)^2(0.2)$   
(E)  $(0.2)^2(0.8)$
32. A random variable has a standard deviation of 1.3. A new variable is created by transforming the values of the random variable using the following rule: Multiply each value by 2 and then add 5. What is the value of the standard deviation for this transformed variable?
- (A) 1.3  
(B) 2.6  
(C) 6.3  
(D) 7.6  
(E) 8.5
33. Suppose the probability of encountering an American who practices a particular religion is 0.014. What are the mean and standard deviation for the *number* of Americans in a random sample of 500 who practice this religion?
- (A) mean 0.014; standard deviation 0.0006  
(B) mean 0.014; standard deviation 0.0053  
(C) mean 7; standard deviation 0.0006  
(D) mean 7; standard deviation 0.0053  
(E) mean 7; standard deviation 2.627

34. A manufacturer constructs a 95% confidence interval for the average weight of the items he manufactures. His results need to be included in a report to his superiors, and the resulting interval is wider than he would like. In order to decrease the size of the interval the *most*, the manufacturer should take a new sample and
- (A) increase the confidence level and increase the sample size.
  - (B) decrease the confidence level and increase the sample size.
  - (C) increase the confidence level and decrease the sample size.
  - (D) decrease the confidence level and decrease the sample size.
  - (E) The manufacturer will not be able to decrease the size of the interval.
35. A least squares regression line was fitted to the weekly cost of groceries in dollars (cost) versus the number of household members (number) for a group of families. The resulting equation is

$$\widehat{\text{cost}} = -33.22 + 44.77 (\text{number}).$$

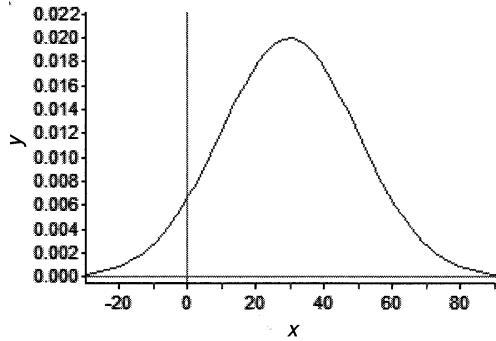
A randomly selected family of four spends \$135 on groceries in an average week. What is the difference between this family's actual cost and the predicted average family cost?

- (A) -\$10.86
  - (B) -\$0.24
  - (C) \$ 0.24
  - (D) \$ 10.86
  - (E) \$ 145.86
36. A random sample of adults is taken in a rural county. Of the 120 adults sampled, 16 live in poverty. The poverty rate for the entire state is 8.9%. Is there statistical evidence to show that the poverty rate of this county is higher than that of the state?
- (A) Since 13.33% is greater than 8.9%, there is sufficient evidence at the  $\alpha = 0.05$  level to show that the poverty rate of the county is higher than that of the state.
  - (B) Since 4.40% is less than 8.9%, there is insufficient evidence at the  $\alpha = 0.05$  level to show that the poverty rate of the county is higher than that of the state.
  - (C) Since 1.706 is less than 8.9, there is insufficient evidence at the  $\alpha = 0.05$  level to show that the poverty rate of the county is higher than that of the state.
  - (D) Since 1.706 is greater than 1.645, there is sufficient evidence at the  $\alpha = 0.05$  level to show that the poverty rate of the county is higher than that of the state.
  - (E) Since 0.044 is less than 0.05, there is insufficient evidence at the  $\alpha = 0.05$  level to show that the poverty rate of the county is higher than that of the state.

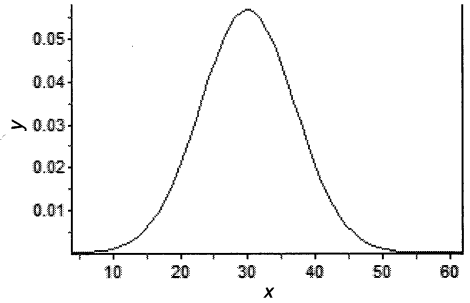
**EXAM 1**

37. Which of the following distributions has a mean of 30 and a standard deviation of 7?

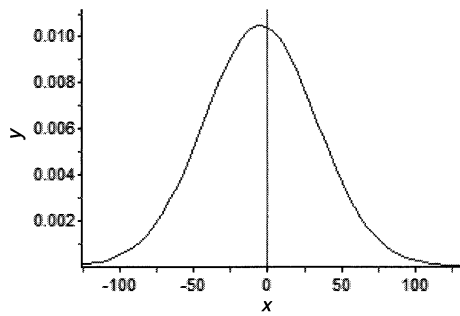
(A)



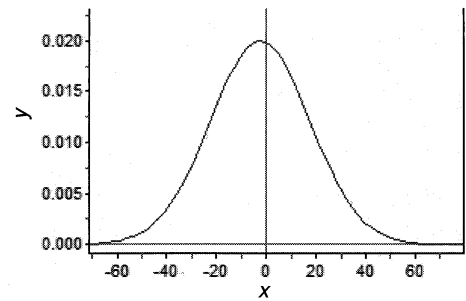
(B)



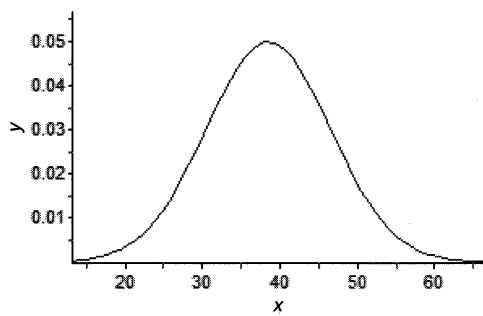
(C)



(D)



(E)



38. Two manufacturers of canned goods add different amounts of water to their canned vegetables. For a 15.25-oz can of vegetables, one manufacturer adds a mean of 4.5 oz with a standard deviation of 0.63 oz. The other manufacturer adds a mean of 5.1 oz with a standard deviation of 0.57 oz. What are the mean and standard deviation for the difference in the amount of water added? (Assume independence for the manufacturers.)
- (A) mean 0.6 oz; standard deviation 0.06 oz  
 (B) mean 0.6 oz; standard deviation 0.85 oz  
 (C) mean 0.6 oz; standard deviation 0.072 oz  
 (D) mean 9.6 oz; standard deviation 0.06 oz  
 (E) mean 9.6 oz; standard deviation 1.20 oz

39. An airline has an ontime probability of 82.4%. What is the probability that if you travel on this airline, no more than 3 of your next 10 flights will *not* be on time?

- (A)  $\binom{10}{3}(0.176)^3(0.824)^7$   
 (B)  $\binom{10}{3}(0.824)^3(0.176)^7$   
 (C)  $\binom{10}{0}(0.176)^0(0.824)^{10} + \binom{10}{1}(0.176)^1(0.824)^9 + \binom{10}{2}(0.176)^2(0.824)^8$   
 (D)  $\binom{10}{0}(0.824)^0(0.176)^{10} + \binom{10}{1}(0.824)^1(0.176)^9 + \binom{10}{2}(0.824)^2(0.176)^8$   
 (E)  $\binom{10}{0}(0.176)^0(0.824)^{10} + \binom{10}{1}(0.176)^1(0.824)^9 + \binom{10}{2}(0.176)^2(0.824)^8 + \binom{10}{3}(0.176)^3(0.824)^7$

**EXAM 1**

40. A no-appointment haircutter advertises an average wait time of 15 minutes for customers. A consumer advocacy group has received several complaints from customers who believe the wait time is really 30 minutes. The advocacy group randomly selects 30 customers, records wait times, and calculates the power of the test to be 50%. In order to increase the power of the test *as much as possible*, the advocacy group should
- (A) increase the sample size and increase the value of  $\alpha$ .
  - (B) increase the sample size and decrease the value of  $\alpha$ .
  - (C) increase the sample size but keep the same value for  $\alpha$ .
  - (D) decrease the sample size and increase the value of  $\alpha$ .
  - (E) decrease the sample size and decrease the value of  $\alpha$ .