

The following 20 multiple choice questions are worth 6 points each.

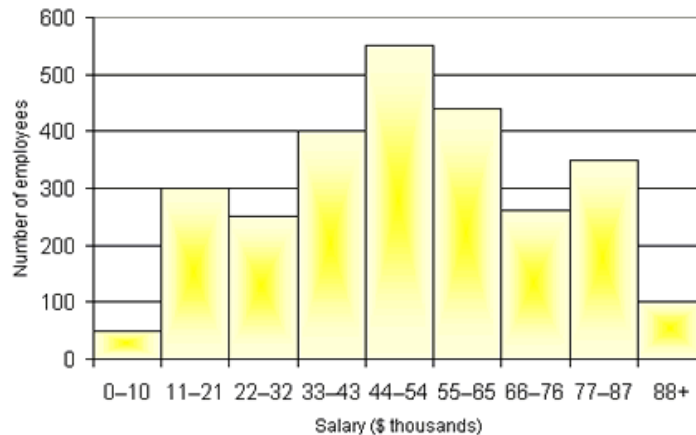
1. Which of the following statements is/are true?

- I. Individuals are the characteristics to be measured or observed.
- II. A quantitative variable has a value or numerical measurement for which operations such as addition and averaging make sense.
- III. Inferential statistics involves methods of using information from a sample to draw conclusions regarding the population.

- a. Only II is true.
- b. Only I and II are true.
- c. Only II and III are true.
- d. All are true.
- e. None are true.

2. Which term **best** describes the histogram below?

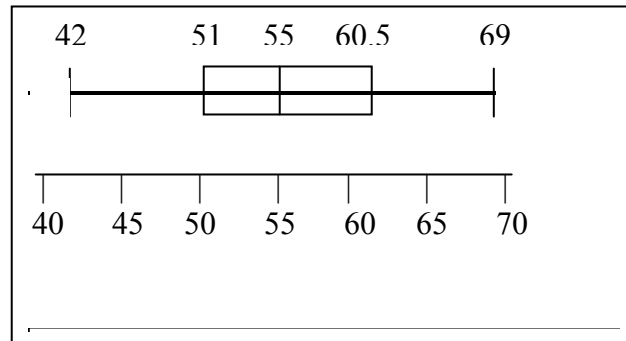
Distribution of salaries of the Acme Corporation



- a. skewed left
- b. bimodal
- c. uniform
- d. symmetrical
- e. Pareto

3. Scores for 6 quizzes were as follows: 9, 8, 4, 5, 10, 9. If the lowest score is changed from 4 to zero, which of the following measures(s) of central tendency will also change?
- a. median
b. mode
c. mean
d. mean and median
e. no measure will change

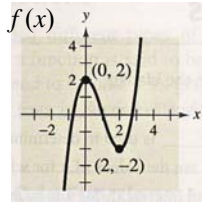
4. For the box-and-whisker plot below, which of the following statement(s) is/are true?



- I. The mean of the data is 55.
II. Approximately 25 % of the data lie above 60.5.
III. Approximately 50% of the data are between 51 and 55.
- a. All the statements are true.
b. Only II is true.
c. Only I is true.
d. Only I and II are true.
e. Only II and III are true.
5. Fuel efficiency for the Dessert Dog sports utility vehicle is approximately normally distributed. The manufacturer claims that the mean gas mileage is 22 mpg with a standard deviation of 8 mpg. Find the probability that a Dessert Dog vehicle chosen at random will have gasoline mileage between 10 mpg and 22 mpg.
- a. 1.5
b. 0.4332
c. 0.9332
d. 0.5668
e. 0.2794

9. A rock is dropped from the top of a 200-foot cliff that overhangs the ocean. How long will it take the rock to hit the water? (The position equation of a falling object is $s = -16t^2 + v_0t + s_0$.)
- a. 3.5 sec
 - b. 12.5 sec
 - c. 2.5 sec
 - d. 25 sec
 - e. None of the above
10. A business purchases a piece of equipment for \$850. After 5 years the equipment will have no value. Write a linear equation giving the value V of the equipment during the 5 years.
- a. $V = -170t + 850$
 - b. $V = -850t + 170$
 - c. $V = -170t$
 - d. $V = 850t - 170$
 - e. $V = 170t - 850$
11. $f(x) = x^2 + 3x$. Find $f(x + 4)$.
- a. $x^2 + 11x + 28$
 - b. $x^2 + 3x + 4$
 - c. $x^2 + 3x + 28$
 - d. $x^2 + 3x + 20$
 - e. None of the above

12. The graph of a function f is shown below. On what interval(s) is the function increasing?

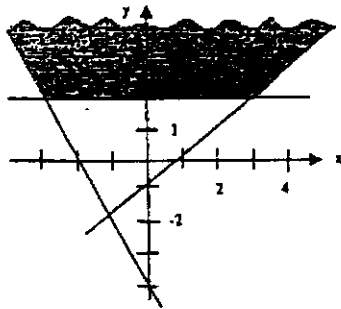


- a. $(-\infty, 2) \cup (-2, \infty)$
- b. $(-\infty, \infty)$
- c. $(2, \infty)$
- d. $(-\infty, 0) \cup (2, \infty)$
- e. $(-1, 1) \cup (3, \infty)$
13. A textile manufacturer has daily production costs give by the function $C(x) = 10,000 - 110x + 0.045x^2$. How many units should be produced each day to yield a minimum cost? (Round your answer to the nearest integer.)
- a. 57,222
- b. 10,000
- c. 1222
- d. 55
- e. None of the above
14. Polly Kost deposited \$8000 in an account that pays 6% interest, compounded annually. Polly has pledged the entire amount in this account to the Cancer Research Institute at the end of 45 years. How much money will be in the account at that time?
- a. \$111,037.85
- b. \$110,116.89
- c. \$119,037.85
- d. \$102,116.89
- e. \$29,600.00

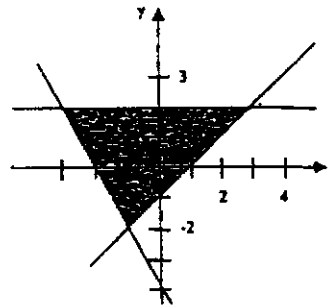
18. Which shaded region below best represents the solution to the following system of inequalities?

$$\begin{cases} x - y \geq 1 \\ 2x + y \geq -4 \\ y \geq 2 \end{cases}$$

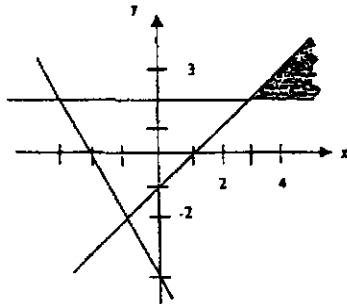
a.



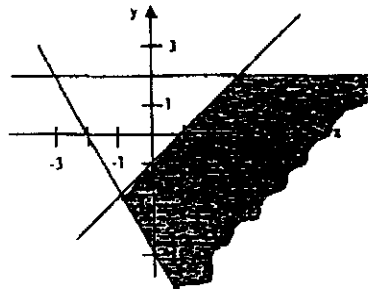
c.



b.



d.



Use the following information for problems 19 and 20 .

The costs to a merchant for two models of color televisions are \$270 and \$455. The \$270 model yields a profit of \$30 and the \$455 model yields a profit of \$45. The merchant estimates that the total monthly demand will not exceed 100 units. Assume that the merchant does not want to invest more than \$36,250 in color television inventory.

Let x = number of \$270 color televisions, y = number of \$455 color televisions, and P = total profit.

19. Determine the **constraints** that will provide an optimal solution to this linear programming problem.

a. $x + y \leq 36,250$
 $270x + 455y \leq 100$
 $x \geq 0, y \geq 0$

c. $x + y \leq 100$
 $270x + 455y \leq 36,250$
 $x \geq 0, y \geq 0$

b. $x + y \leq 36,250$
 $30x + 45y \leq 100$
 $x \geq 0, y \geq 0$

d. $x + y \leq 100$
 $30x + 45y \leq 36,250$
 $x \geq 0, y \geq 0$

e. $30x + 45y \leq 100$
 $270x + 455y \leq 36,250$
 $x \geq 0, y \geq 0$

20. Determine the objective function so that the merchant can maximize his profit.

a. $P = 45x + 30y$

c. $P = 270x + 455y$

b. $P = 30x + 45y$

d. $P = 455x + 270y$

Name: _____ Section: _____

Instructor: _____

Please show all work to receive credit.

21. The distribution of heights of adult American men is normal, with mean 69 inches and standard deviation 2.5 inches. (10 points)

a. Sketch the normal curve. Locate the values of this mean and one and two standard deviations above and below the mean on the normal curve.

b. What percent of men are shorter than 64 inches?

c. What percent of men are taller than 67.5 inches?

22. The population of a certain city grows according to the formula $y = 500,000e^{0.02t}$, where t is the time in years. How long will it take for the population to reach 800,000? Round your answer to the nearest tenth. (10 points)

23. The SAT mean math scores of college-bound female seniors are given in the following table. (10 points)

SAT Mean Math Score of College-Bound Female Seniors
(Let $t = 5$ correspond to the year 1995.)

Year, t	1995	1996	1997	2000	2003
Math Score	490	492	494	498	503

Source: College Board

Determine each regression equation. Round to three decimal places.

- a. Linear: _____
- b. Quadratic: _____
- c. Exponential: _____
- d. Which model do you think is the best fit for this data? (Note: For the benefit of users of the TI-82 graphing calculator, for quadratic regression $R^2 = 0.9963878773$).

Multiple Choice Key
M114 Final Exam

1. C
2. D
3. C
4. B
5. B
6. A
7. B
8. C
9. A
10. A
11. A
12. D
13. C
14. B
15. D
16. A
17. D
18. B
19. C
20. B

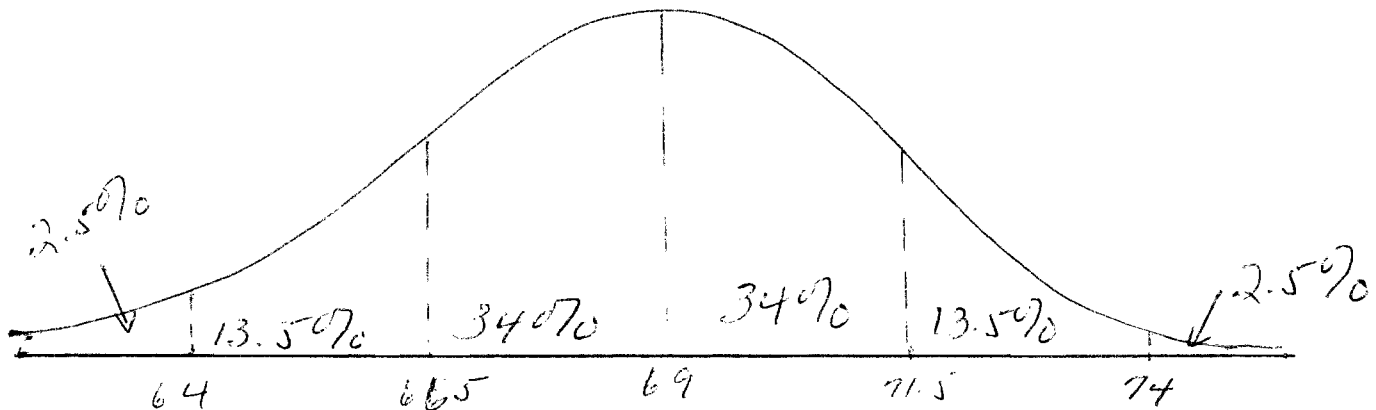
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- b. What percent of men are shorter than 64 inches?

$$2.5\%$$

- c. What percent of men are taller than 67.5 inches?

$$z = \frac{67.5 - 69}{2.5} = -0.6$$

$$\text{Area} = 0.2743$$

$$\begin{aligned} P(x \geq 67.5) &= P(z \geq -0.6) = 1 - 0.2743 \\ &= 0.7257 \\ &= 72.57\% \end{aligned}$$

22. The population of a certain city grows according to the formula $y = 500,000e^{0.02t}$, where t is the time in years. How long will it take for the population to reach 800,000? Round your answer to the nearest tenth. (10 points)

$$y = 500,000 e^{0.02t}$$

$$800,000 = 500,000 e^{0.02t}$$

$$\frac{8}{5} = e^{0.02t}$$

$$\ln\left(\frac{8}{5}\right) = \ln e^{0.02t}$$

$$\ln\left(\frac{8}{5}\right) = 0.02t$$

$$\frac{\ln\left(\frac{8}{5}\right)}{0.02} = t$$

$$t = 23.5 \text{ yr}$$

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Math Score	490	492	494	498	503

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Determine each regression equation. Round to three decimal places.

- a. Linear: $y = 1.579x + 482.449$ $r = 0.99799\dots$
- b. Quadratic: $y = -0.015x^2 + 1.853x + 481.355$ $r = 0.99819\dots$
- c. Exponential: $y = 482.626(1.003)^x$ $r = 0.99789\dots$
- d. Which model do you think is the best fit for this data? (Note: For the benefit of users of the TI-82 graphing calculator, for quadratic regression $R^2 = 0.9963878773$).

The quadratic model is the best fit as the value of r is closest to 1.

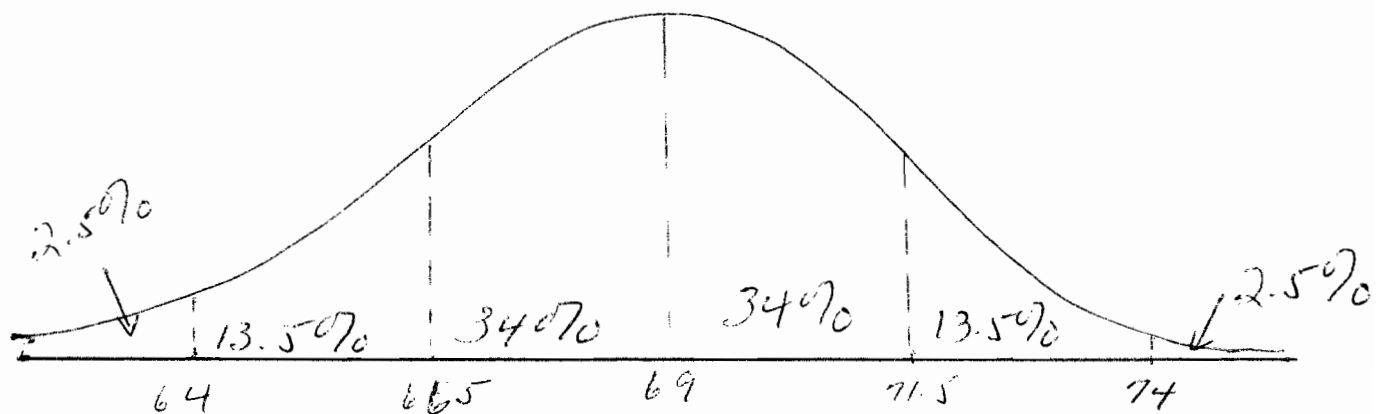
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