

Name Solution Key

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

Identify the distribution as symmetric, left-skewed, or right-skewed.

1) The amounts of tax paid by U.S. residents

A) Right-skewed

B) Symmetric

C) Left-skewed

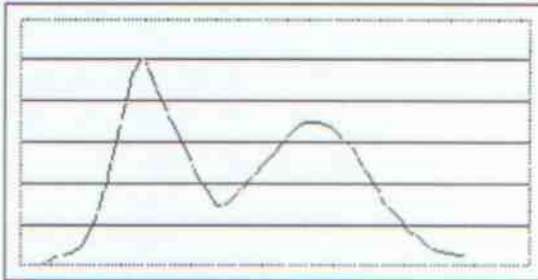
1) A

Select the requested distribution.

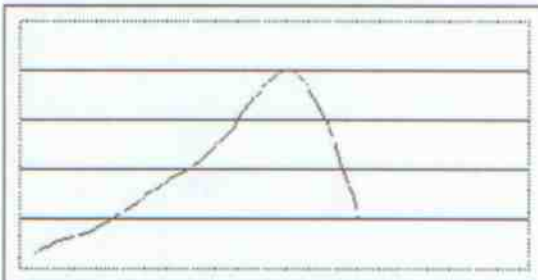
2) Which of the distributions is skewed to the right?

2) D

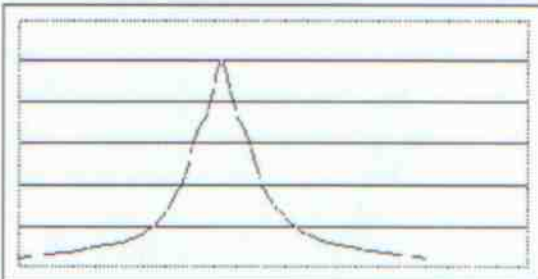
A)



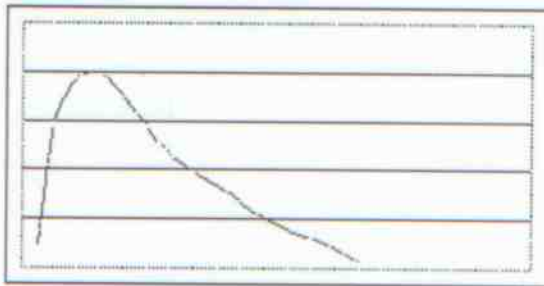
B)



C)



(D)



Find the median for the given sample data.

3) 2, 8, 11, 21, 30, 30, 49

Find the median for the data.

(A) 21

B) 11

C) 25.5

D) 30

3) A

Obtain the five-number summary for the given data.

4) The test scores of 15 students are listed below.

42 46 48 53 59

63 66 68 74 77

85 87 90 94 95

(A) 42, 53, 68, 87, 95

B) 42, 51.75, 68, 85.5, 95

C) 42, 51.75, 71.0, 85.5, 95

D) 42, 53, 71.0, 87, 95

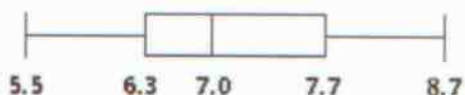
4) A

Construct a boxplot as requested.

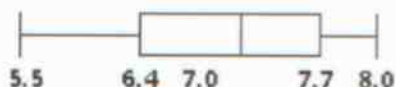
5) The weights (in pounds) of 30 newborn babies are listed below. Construct a boxplot for the data set. 5) C

5.5 5.7 5.8 5.9 6.1 6.1 6.3 6.4 6.5 6.6  
6.7 6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2  
7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7

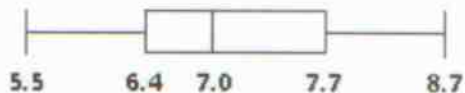
A)



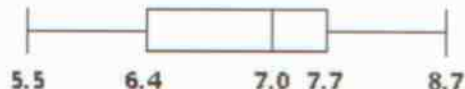
B)



C)



D)



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

6) 9, 10, 20, 12, 20, 16, 15, 19, 7

A) 4.7

B) 4.9

C) 1.8

D) 5.3

6) B

Use the range rule of thumb to approximate the standard deviation.

7) 15, 42, 53, 7, 9, 12, 14, 28, 47

A) 29.1

B) 16.6

C) 11.5

D) 15.8

7) C

$$SD = \frac{H-L}{4} = \frac{53-7}{4} = \frac{46}{4} = 11.5$$

Provide an appropriate response.

8) True or False? Suppose you had a magic bank account in which your balance doubled each day. If you started with just \$2, you'd be a billionaire in less than a month. 8) B

A) False

B) True

$$8 = 2^t$$

$$3 \quad t = 30 \text{ days} \implies 8 = 2^{30} = 1,073,741,824$$

Different types of shelves =  $2 \times 6 \times 5 = 90$

Solve the problem.

9) At a lumber company, shelves are sold in 3 types of wood, 5 different widths and 6 different lengths. How many different types of shelves could be ordered?

9) C

- A) 45                      B) 14                      C) 90                      D) 48

Find the indicated probability. Round your answer to 6 decimal places when necessary.

10) A die with 8 sides is rolled. What is the probability of rolling a number less than 7?

10) D

- A) 6                      B)  $\frac{1}{8}$                       C)  $\frac{7}{8}$                       D)  $\frac{3}{4}$

$P(< 7) = 1 - \frac{2}{8} = 1 - \frac{1}{4} = \frac{3}{4}$

11) Two 6-sided dice are rolled. What is the probability that the sum of the two numbers on the dice will be 4?

11) B

- A)  $\frac{11}{12}$                       B)  $\frac{1}{12}$                       C)  $\frac{2}{3}$                       D) 3

$P(\text{Sum of } 4) = \frac{3}{36} = \frac{1}{12}$

12) You are dealt one card from a 52-card deck. Find the probability that you are not dealt a 6.

12) D

- A)  $\frac{1}{10}$                       B)  $\frac{1}{13}$                       C)  $\frac{9}{10}$                       D)  $\frac{12}{13}$

$P(\text{Not a } 6) = 1 - \frac{4}{52} = \frac{48}{52} = \frac{12}{13}$

13) In a poll of registered voters shortly before a mayoral election, people were asked which candidate they were planning to vote for. The results are shown in the table.

13) C

Candidate	Frequency
Ford	235
Anderson	618
Garcia	470
Wong	395

$P(\text{Anderson}) = \frac{618}{(235 + 618 + 470 + 395)} = 0.36$

Find the empirical probability that a randomly selected registered voter is planning to vote for Anderson.

- A) 0.002                      B) 0.467                      C) 0.36                      D) 618

Solve the problem.

14) Find the odds against drawing a club when a card is drawn at random from a normal deck of 52 playing cards.

14) B

- A) 1 to 3                      B) 3 to 1                      C) 1 to 4                      D) 4 to 1

Solve.

odds against a club are 3 to 1

15) Using the chessboard parable, find the total number of grains when all squares up to and including 19 are filled?

15) B

- A) 262,144 grains                      B) 524,287 grains                      C) 36 grains                      D) 131,072 grains

Total No. of grains up to & including square 19 =  $2^{19} - 1 = 524287$

16) Using the chessboard parable, how many grains of wheat should be placed on square 19 of the chessboard?

16) A

- A) 262,144 grains                      B) 131,072 grains                      C) 524,288 grains                      D) 36 grains

No. of grains on square 19 =  $2^{(19-1)} = 2^{18} = 262144$

Provide an appropriate response.

- 17) C growth occurs when a quantity grows by the same relative amount in each unit of time.  
 A) Linear  
 B) Static  
 C) Exponential  
 D) None of the above

17) C

Determine whether the growth (or decay) is linear or exponential, and answer the associated question.

- 18) The value of your house is rising by 28% per year. If it is worth \$275,659 today, what will it be worth in three years?  
 A) Linear; \$507,212.56  
 B) Exponential; \$578,098.82  
 C) Exponential; \$360,271.53  
 D) Linear; \$430,028.04

18) B

$$\text{Value of House} = 275,659 (1 + 0.28)^3 = 457,098.82$$

Provide an appropriate response.

- 19) Suppose a radioactive substance has a half-life of 2000 years. What fraction will be left after 8000 years?

19) C

- A) 16  
 B) 8  
 C)  $\frac{1}{16}$   
 D)  $\frac{1}{8}$

$$\frac{A(t)}{A_0} = \left(\frac{1}{2}\right)^{\frac{t}{2000}}, \text{ when } t = 8000 \Rightarrow \frac{A(t)}{A_0} = \left(\frac{1}{2}\right)^4 = \frac{1}{16}$$

- 20) The current population of a threatened animal species is 1 million, but it is declining with a half-life of 23 years. How many animals will be left in 62 years?

20) B

- A) 154 animals  
 B) 154,358 animals  
 C) 772 animals  
 D) 77,179 animals

$$A(t) = 1 \cdot \left(\frac{1}{2}\right)^{\frac{t}{23}} \Rightarrow \text{when } t = 62 \text{ years, } A(t) = 1 \cdot \left(\frac{1}{2}\right)^{\frac{62}{23}} = 154,357.5 \approx 154,358$$

- 21) In 2000, the population of Littleton was 17 thousand. Use the given doubling time to predict the population in 2010. Assume a double time of 26 years.

21) C

- A) 1.3 thousand  
 B) 29.0 thousand  
 C) 22.2 thousand  
 D) 4420 thousand

$$P(t) = 17 \cdot (2)^{\frac{t}{26}} = 17 \cdot (2)^{10/26} = 22.2 \text{ thousand}$$

- 22) True or False?  $10^{-0.874}$  is between 0 and 1.

22) B

- A) False  
 B) True

- 23) Urban encroachment is causing the area of a forest to decline at a rate of 9% per year. Use the approximate half-life formula to determine the fraction that remains in 40 years.

23) D

- A) 0.672950  
 B) 2.571429  
 C) 0.914737  
 D) 0.028304

$$T_{\text{half}} \approx \frac{70}{9} = 77.78, \quad \frac{A(t)}{A_0} = \left(\frac{1}{2}\right)^{\frac{t}{77.78}} \Rightarrow \text{when } t = 40, \quad \frac{A(t)}{A_0} = \left(\frac{1}{2}\right)^{\frac{40}{77.78}} = 0.0283$$

Use the given growth rate to find the approximate doubling time and to predict the population in 2050 of a growing suburban town (based on a 2000 population of 100,000).

- 24) Use the average growth rate between 1970 and 2000, which was about 0.9%.

24) B

- A) 88 years; 2050 population = 142,829  
 B) 78 years; 2050 population = 156,142  
 C) 80 years; 2050 population = 170,696  
 D) 73 years; 2050 population = 130,651

$$T_{\text{double}} \approx \frac{70}{0.9} = 77.78 \text{ years}$$

$$P(t) = 100,000 (2)^{\frac{t}{77.78}} \Rightarrow \text{when } t = 50, \quad P(t) = 100,000 (2)^{\frac{50}{77.78}} = 156,139.8$$