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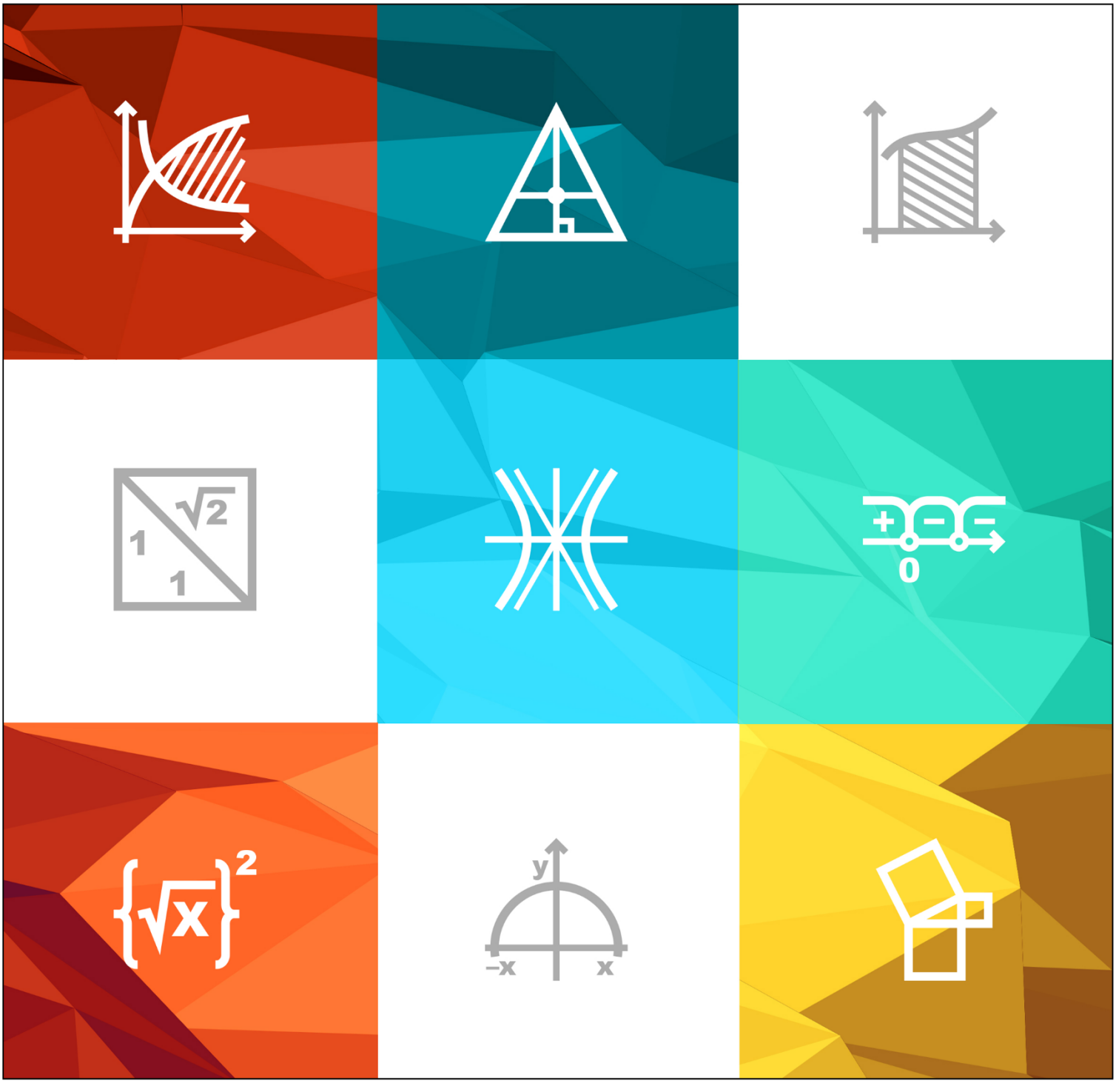
Workbook



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Statement Exercises

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Questions:

The following is a list of statements. Determine whether each statement is true or false, and explain your answer (an answer without an explanation will not be accepted).

1) In a series in which all the observations are equal to each other, the variance is 0.

2) The standard score of the median is always 0.

3) The standard score of the 70^{th} percentile in a right (positive) asymmetric probability will always be positive.

4) If we add an observation to a series of observations, this will necessarily increase the average in the series.

5) The median in a series is 80. Two observations, 79 and 100, are added to the series. The median will therefore increase.

6) If we add the value 4 to all the observations, then the standard deviation will not change.

7) If we divide all the observations in a probability distribution by 2, the variance will be halved.

8) If we increase the average salary of employees in a company, the variance will increase.

9) A real estate agent converts apartment prices from dollars to English Pounds. Assume that the pound-dollar exchange rate is $£3.50/\$$. If the real estate agent calculates the Pearson Measure of Association between the price of an apartment in pounds and the price of an apartment in dollars, he will get 1.

10) For a series of data, it was found that $\overline{X}=\overline{Y}=6$, and $S_x=S_y=1$, the Pearson Measure of Association is therefore 1.

11) If the variance of error (the unexplained variance) is 0, then the Pearson correlation coefficient is 1.

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12) If the Pearson correlation coefficient between two variables is 1, the variance of error (the unexplained variance) is 0.

13) If the covariance of X and Y is 0, the Pearson correlation coefficient is 0.

14) In a series of 13 observations, the average is 40 and the variance is 100. Two new observations are added: 35 and 45. As a result, the average of the new series (of 15 observations) will decrease and the variance will decrease.

15) In a series of 61 observations, the average is 120 and the median is 110.
Two more observations are added to the series: 100 and 140.
As a result, the average and median of the series of 63 observations do not change.

16) In a series of 100 observations, the average is 75 and the standard deviation is 10.
Two observations, each 75, are added to the series.
As a result, the new average (of 102 observations) does not change, and the standard deviation decreases.

17) In a series of 10 observations, the average is 25 and the standard deviation is 2.
The series is symmetric around the average. At a later stage, three observations are added to the series: 23, 25, and 27.
As a result, the standard deviation of the 13 observations does not change.

18) In a positive asymmetric probability distribution, the standard score of the 30^{th} - percentile is necessarily negative.

19) The standard deviation of a series always increases if a constant is added to all the data in the series.

20) A study is conducted on the number of employees in a food company, compared with a communications company. The median and average are both 8.
Therefore, the mode is the same for both companies.

21) According to a study, the temperature during the winter in a certain region in Ohio has a normal probability distribution with an expectation of 14 and a standard deviation of 4.
The probability that the temperature in the region is higher than 17 degrees in winter is less than 0.5.

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22) In a certain factory, the average level of employee seniority is 12 years, and the standard deviation is 8 years. In three more years, if all the employees continue working at the factory, and no new employees are added, the average seniority will be 15 years and the standard deviation will be 8 years.

23) A series of four observations is given. The following are the deviations from the average for three of the four observations: 4, 3, -2.
The variance of the four observations is therefore 7.25.

24) 70% of the households live in their own houses. Of these, 50% are paying a mortgage on their house. 20 householders were randomly selected. The expectation of the number of households with the owners living in them and paying a mortgage is 7.

25) In a normal probability distribution, the higher the standard deviation, the greater the percentage of cases below the average.

26) The average mark of five students is 78. Four of the student received the following marks: 70, 86, 72, 74. The mark of the fifth student is 76.

27) There are 10 shares in the portfolio of a beginning investor. The chances of a share rising on a given day are 0.6. Assume that the shares are independent of each other.
The standard deviation of the number of shares in the investment portfolio rising on a given day is 2.4.

28) The Spearman correlation coefficient between two variables was calculated to be 1.
If the Pearson Measure of Association is calculated, it will therefore also be 1.

29) The Pearson correlation coefficient is calculated for two variables and found to be 1.
If the Spearman Measure of Association is calculated, it will be found to be 1.

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Answer Key:

Question	Answer
1)	True
2)	False
3)	False
4)	False
5)	False
6)	True
7)	False
8)	False
9)	True
10)	False
11)	False
12)	True
13)	True
14)	False
15)	True
16)	True
17)	False
18)	True
19)	False
20)	False
21)	True
22)	True
23)	False
24)	True
25)	False
26)	False
27)	False
28)	False
29)	True

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