ExamPath

CLASS 9 MATHEMATICS · FBISE · UNIT 11

Unit 11: Basic Statistics — Advanced Practice

20 multiple-choice questions Suggested time: **20 minutes** 1 mark each

Name: Date: Score: / 20

Circle one answer for each question. The answer key with explanations is on the last pages, so try every question before you check. These are practice questions, not official FBISE papers.

1. The expected frequency of an event in n trials with probability p is:

(A) $p \div n$
(B) $n + p$
(C) $n \times p$
(D) $n \div p$

2. The mode of grouped data is given by:

(A) $l + (f_m - f_1)h / (2f_m - f_1 - f_2)$
(B) $l + (f_m - f_1)h / (f_m - f_1 - f_2)$
(C) $l + (f_m + f_1)h / (2f_m + f_1 + f_2)$
(D) $l + (f_m - f_1)h / (2f_m - f_1 + f_2)$

3. A fair die is rolled 120 times, and the expected frequency of a six is 20. Which statement is correct?

(A) Exactly 20 sixes must occur
(B) About 20 sixes are expected, but the actual number may differ
(C) No more than 20 sixes can occur
(D) At least 20 sixes must occur

4. The median of grouped data is given by:

(A) $l - (h/f)(n/2 - c)$
(B) $l + (f/h)(n/2 - c)$
(C) $l + (h/f)(n/2 + c)$
(D) $l + (h/f)(n/2 - c)$

5. In a frequency polygon, the points that are plotted and joined are:

(A) class marks against frequencies
(B) frequencies against cumulative frequencies
(C) lower boundaries against upper boundaries
(D) class limits against class marks

6. Why can P(E) = 0.6 and P(E′) = 0.6 not both be true?

(A) Both must be exactly 0.5
(B) P(E′) must always be smaller than P(E)
(C) Probabilities cannot be decimals
(D) Their sum would be 1.2, but it must be 1

7. The mean of 8 values is 25. Seven of them are 10, 22, 30, 18, 27, 35 and 20. Find the eighth value.

(A) 25
(B) 162
(C) 38
(D) 200

8. The arithmetic mean of grouped data with class marks x and frequencies f is:

(A) $\Sigma f / \Sigma x$
(B) $\Sigma fx \times \Sigma f$
(C) $\Sigma fx / \Sigma f$
(D) $\Sigma x / n$

9. A student says, "The mean of 10 values is 35.5, so the sum of the values is 35.5 + 10 = 45.5." What is the mistake?

(A) The sum is mean × n = 355
(B) The sum equals the mean
(C) There is no mistake
(D) The sum is mean ÷ n = 3.55

10. A final exam counts for 70% of a grade and a quiz for 30%. Why is the simple mean of the two scores not a fair result?

(A) A mean can use only one score
(B) The two scores are not equally important, so weights are needed
(C) The quiz score must be ignored
(D) The exam score must be doubled

11. A student scores 50, 70 and 90 in three tests with weights 2, 3 and 5. Find the weighted mean.

(A) 760
(B) 74
(C) 70
(D) 76

12. The probability that a bulb is defective is 0.02. How many defective bulbs are expected in 5000 bulbs?

(A) 10
(B) 250
(C) 100
(D) 1000

13. A shoe shop wants to decide which size to stock the most. Which average is most useful, and why?

(A) The mean, because it always gives a size that exists in the shop
(B) The mode, because it shows the size sold most often
(C) The weighted mean, because large sizes are always more important
(D) The median, because it is the largest size

14. The relative frequency of a six is 0.20 in 50 rolls of a die and 0.168 in 5000 rolls. Which is the better estimate of the theoretical probability $1/6 \approx 0.1667$?

(A) The 5000-roll value, because more trials bring relative frequency closer to the theoretical probability
(B) Neither, because relative frequency cannot estimate probability
(C) Both are equally good
(D) The 50-roll value, because it is larger

15. Why are class marks used when finding the mean of grouped data?

(A) The lower limit of a class is always wrong
(B) Class marks are the frequencies
(C) Class marks are always whole numbers
(D) The exact values inside a class are unknown, so the mid-value stands for the class

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16. The values 2, 4 and 6 have frequencies 3, 5 and 2. Find the mean.

(A) 4
(B) 3.8
(C) 10
(D) 12.7

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17. The weighted arithmetic mean is:

(A) $\Sigma wx \times \Sigma w$
(B) $\Sigma x / n$
(C) $\Sigma w / \Sigma x$
(D) $\Sigma wx / \Sigma w$

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18. Most houses in a town cost about Rs 5 million, but one palace costs Rs 500 million. Which average describes a typical house better?

(A) The median, because it is not pulled up by the extreme value
(B) The mean, because it includes every value
(C) The median, because it is always larger than the mean
(D) The mean, because extreme values are removed from it

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19. Every value in a data set is increased by 5. What happens to the mean and the median?

(A) Only the mean increases by 5
(B) Only the median increases by 5
(C) Both increase by 5
(D) Neither changes

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20. A coin lands heads 7 times in the first 10 tosses. Ali says the next tosses must give more tails to balance this. Why is he wrong?

(A) P(head) is now 7/10 for every toss
(B) Each toss is independent, so P(tail) is still 1/2 on every toss
(C) Tails cannot occur after heads
(D) The coin has become unfair

Answer key

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

Explanations

1. C. n × p
Expected frequency = number of trials × probability of the event.

2. A. $l + (f_m - f_1)h / (2f_m - f_1 - f_2)$
Here f_m is the modal class frequency, f_1 the frequency before it and f_2 the frequency after it.

3. B. About 20 sixes are expected, but the actual number may differ
Expected frequency is a prediction based on probability, not a guaranteed result.

4. D. $l + (h/f)(n/2 - c)$
Here l is the lower boundary of the median class, h its size, f its frequency, n = Σf and c the cumulative frequency before it.

5. A. class marks against frequencies
A frequency polygon plots class marks on the x-axis and frequencies on the y-axis.

6. D. Their sum would be 1.2, but it must be 1
P(E) + P(E′) = 1, so if P(E) = 0.6 then P(E′) = 0.4.

7. C. 38
The total is 8 × 25 = 200. The seven values add to 162, so the eighth is 200 − 162 = 38.

8. C. Σfx / Σf
Mean = Σfx ÷ Σf, where x is the class mark of each class.

9. A. The sum is mean × n = 355
Since mean = sum ÷ n, the sum = 35.5 × 10 = 355.

10. B. The two scores are not equally important, so weights are needed
Values that are not equally important need a weighted mean, with weights 70 and 30.

11. D. 76
Σwx = 100 + 210 + 450 = 760 and Σw = 10, so the weighted mean = 76.

12. C. 100
Expected frequency = 5000 × 0.02 = 100.

13. B. The mode, because it shows the size sold most often
The most frequently sold size is the mode, and that tells the shop what to stock.

14. A. The 5000-roll value, because more trials bring relative frequency closer to the theoretical probability
The more experiments done, the closer the relative frequency becomes to the theoretical probability.

15. D. The exact values inside a class are unknown, so the mid-value stands for the class
Grouped data hides the individual values, so each class is represented by its mid-value.

16. **B. 3.8**

Σfx = 6 + 20 + 12 = 38 and Σf = 10, so mean = 3.8.

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17. **D. Σwx / Σw**

Each value x is multiplied by its weight w. The sum is divided by the total of the weights.

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18. **A. The median, because it is not pulled up by the extreme value**

One extreme value drags the mean upwards, while the median stays near the typical value.

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19. **C. Both increase by 5**

Shifting every value by the same amount shifts the mean and the median by that amount.

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20. **B. Each toss is independent, so P(tail) is still 1/2 on every toss**

Earlier results do not change the probability of the next toss. Relative frequency settles near 1/2 only over a large number of trials.

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