Grade 9 Mathematics

Unit 9: Statistics and Probability

End of Unit Review Questions — Multiple Choice Quiz (30 Questions)

Source: FDRE Ministry of Education — Mathematics Grade 9 Textbook, Pages 360–362

Question 1:

The amounts of money in birr that 20 people have in their pockets are: 4, 9, 2, 3, 9, 1, 2, 4, 2, 4, 6, 6, 7, 2, 5, 9, 3, 5, 8, 9. What percent of the people have less than Birr 4?

A. 25%
B. 30%
C. 35%
D. 40%

Answer:

C. 35%

Explanation:

Values less than 4 are: 1, 2, 2, 2, 2, 3, 3 = 7 people. Percentage = 7/20 × 100% = 35%.

Textbook basis:

Grade 9 Mathematics, Unit 9: Statistical Data (Pages 360)

Question 2:

A bag contains 9 balls: 4 blue and 5 red. You draw one ball. How many outcomes are in the sample space?

A. 4
B. 5
C. 2
D. 9

Answer:

D. 9

Explanation:

Each of the 9 balls is a distinct outcome (distinguishable only by colour, but there are 9 individual balls). The sample space has 9 elements.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 360)

Question 3:

A bag contains 9 balls: 4 blue and 5 red. If you draw one ball at random, what is the probability that it is red?

A. 4/9

B. 5/9

C. 1/2

D. 5/4

Answer:

B. 5/9

Explanation:

There are 5 red balls out of 9 total. P(red) = 5/9.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 360)

Question 4:

A fair coin is tossed and a fair die is thrown. How many outcomes are in the combined sample space?

A. 6

B. 8

C. 12

D. 36

Answer:

C. 12

Explanation:

The coin has 2 outcomes and the die has 6 outcomes. Combined: 2 × 6 = 12.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 360)

Question 5:

A fair coin is tossed and a fair die is thrown. Let A be the event that a head is tossed, and B be the event that an odd number is thrown. What is P(A and B)?

A. 1/4

B. 1/2

C. 3/4

D. 1/6

Answer:

A. 1/4

Explanation:

The combined sample space has 12 outcomes. Outcomes where head AND odd number: (H,1), (H,3), (H,5) = 3 outcomes. P(A and B) = 3/12 = 1/4.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 360)

Question 6:

A fair coin is tossed and a fair die is thrown. Let A be the event that a head is tossed, and B be the event that an odd number is thrown. What is P(A or B)?

A. 1/4

B. 1/2

C. 3/4

D. 2/3

Answer:

C. 3/4

Explanation:

P(A) = 6/12, P(B) = 6/12, P(A and B) = 3/12. By the addition rule: P(A or B) = 6/12 + 6/12 − 3/12 = 9/12 = 3/4.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 360)

Question 7:

The mean temperatures recorded over a five-day period last winter are: 18, 22, 19, 25, 12. What is the mean?

A. 19

B. 19.2

C. 20

D. 18.5

Answer:

B. 19.2

Explanation:

Mean = (18 + 22 + 19 + 25 + 12)/5 = 96/5 = 19.2.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 360)

Question 8:

The mean temperatures recorded over a five-day period last winter are: 18, 22, 19, 25, 12. What is the median?

A. 18

B. 19

C. 19.2

D. 22

Answer:

B. 19

Explanation:

Arranged in order: 12, 18, 19, 22, 25. The middle value (3rd out of 5) is 19.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 360)

Question 9:

The mean temperatures recorded over a five-day period last winter are: 18, 22, 19, 25, 12. What is the mode?

A. 19

B. 12

C. No mode

D. 18

Answer:

C. No mode

Explanation:

No value repeats in the data set, so there is no mode.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 360)

Question 10:

The mean temperatures recorded over a five-day period last winter are: 18, 22, 19, 25, 12. What is the range?

A. 10

B. 7

C. 13

D. 14

Answer:

C. 13

Explanation:

Range = largest − smallest = 25 − 12 = 13.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Dispersion (Page 360)

Question 11:

The temperatures recorded over five days are: 18, 22, 19, 25, 12 (mean = 19.2). What is the population variance?

A. 18.96

B. 23.7

C. 4.35

D. 94.8

Answer:

A. 18.96

Explanation:

Squared deviations: $(18-19.2)^2=1.44$, $(22-19.2)^2=7.84$, $(19-19.2)^2=0.04$, $(25-19.2)^2=33.64$, $(12-19.2)^2=51.84$. Sum=94.8. Variance = 94.8/5 = 18.96.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Dispersion (Page 360)

Question 12:

The temperatures recorded over five days are: 18, 22, 19, 25, 12 (population variance = 18.96). What is the standard deviation, correct to 2 decimal places?

A. 3.56

B. 18.96

C. 4.35

D. 9.48

Answer:

C. 4.35

Explanation:

Standard deviation = $\sqrt{(\text{variance})} = \sqrt{18.96} \approx 4.35$.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Dispersion (Page 360)

Question 13:

The scores of an exam are given in the frequency distribution table below: What is the mean score?

v	11	12	13	14	15	16
f	6	7	5	7	3	2

A. 12
B. 13
C. 13.5
D. 14

Answer:

B. 13

Explanation:

Σfv = 11×6 + 12×7 + 13×5 + 14×7 + 15×3 + 16×2 = 66+84+65+98+45+32 = 390. Σf = 30. Mean = 390/30 = 13.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 361)

Question 14:

(**Use Question 13 Table**) What is the median?

A. 12
B. 13
C. 13.5
D. 14

Answer:

B. 13

Explanation:

Total observations = 30. Median = average of 15th and 16th values. Cumulative frequencies: 6, 13, 18, 25, 28, 30. Both the 15th and 16th values fall in the score 13 group. Median = 13.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 361)

Question 15:

(**Use Question 13 Table**). What is the mode?

A. 13
B. 11
C. 12 and 14
D. 12

Answer:

C. 12 and 14

Explanation:

Both score 12 and score 14 have the highest frequency of 7. The data is bimodal: mode = 12 and 14.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 361)

Question 16:

(**Use Question 13 Table**). What is the range?

A. 3
B. 4
C. 5
D. 6

Answer:

C. 5

Explanation:

Range = largest − smallest = 16 − 11 = 5.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Dispersion (Page 361)

Question 17:

(**Use Question 13 Table**). If the mean is 13, what is the population variance (correct to 2 decimal places)?

A. 1.51
B. 2.27
C. 5.00
D. 68

Answer:

B. 2.27

Explanation:

$\Sigma f(v-\text{mean})^2 = 6(11-13)^2 + 7(12-13)^2 + 5(13-13)^2 + 7(14-13)^2 + 3(15-13)^2 + 2(16-13)^2 = 24+7+0+7+12+18 = 68$. Variance = 68/30 = 2.27.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Dispersion (Page 361)

Question 18:

(**Use Question 13 Table**). What is the standard deviation, correct to 2 decimal places?

A. 1.13
B. 1.51
C. 2.27
D. 0.68

Answer:

B. 1.51

Explanation:

SD = $\sqrt{}$(variance) = $\sqrt{2.27} \approx 1.51$.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Dispersion (Page 361)

Question 19:

Which one of the following statements is true?

A. The mean, mode and median of a data set cannot be equal
B. The range of a data set cannot be a non-positive number
C. The sum of the deviations of each value from the mean is always zero
D. The standard deviation is always greater than the variance

Answer:

C. The sum of the deviations of each value from the mean is always zero

Explanation:

By the property of the arithmetic mean, the sum of all deviations from the mean always equals zero. The other statements are false: mean, mode and median can be equal; the range can be zero (when all values are equal); and standard deviation is not always greater than variance.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 361)

Question 20:

A fair die is rolled. What is the probability that 1, 4, 5, or 6 will be on the upper face?

A. 1/3
B. 1/2
C. 2/3
D. 5/6

Answer:

C. 2/3

Explanation:

Favourable outcomes: {1, 4, 5, 6} = 4 outcomes. Total outcomes = 6. P = 4/6 = 2/3.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 21:

A spinner is divided into 3 equal parts labeled 8, 9 and 10. Given that the arrow landed on an even number, what is the probability that it shows 8?

A. 1/3
B. 1/2
C. 2/3
D. 1

Answer:

B. 1/2

Explanation:

Even numbers on the spinner: {8, 10}. Given the result is even, P(8 | even) = 1/2.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 22:

A spinner is divided into 3 equal parts labeled 8, 9 and 10. Given that the arrow landed on an odd number, what is the probability that it shows 9?

A. 1/3
B. 1/2
C. 2/3
D. 1

Answer:

D. 1

Explanation:

The only odd number on the spinner is 9. Given the result is odd, P(9 | odd) = 1/1 = 1.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 23:

A pair of dice is rolled. What is the probability that the product of the two numbers is 1?

A. 1/36

B. 1/18

C. 1/6

D. 2/36

Answer:

A. 1/36

Explanation:

The only way the product equals 1 is if both dice show 1: (1,1). P = 1/36.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 24:

A pair of dice is rolled. What is the probability that the product of the two numbers is less than 6?

A. 10/36

B. 8/36

C. 12/36

D. 9/36

Answer:

A. 10/36

Explanation:

Products less than 6 (i.e., 1,2,3,4,5): (1,1)=1, (1,2)=2, (2,1)=2, (1,3)=3, (3,1)=3, (1,4)=4, (2,2)=4, (4,1)=4, (1,5)=5, (5,1)=5. That is 10 outcomes. P = 10/36.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 25:

A pair of dice is rolled. What is the probability that the product of the two numbers is odd?

A. 1/2

B. 1/4

C. 1/3

D. 1/6

Answer:

B. 1/4

Explanation:

The product is odd only when both dice show odd numbers. Odd faces: {1,3,5}. Outcomes: 3 × 3 = 9 out of 36. P = 9/36 = 1/4.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 26:

A pair of dice is rolled. What is the probability that the product of the two numbers is greater than or equal to 15?

A. 11/36

B. 13/36

C. 15/36

D. 10/36

Answer:

B. 13/36

Explanation:

Products ≥ 15: (3,5),(5,3)=15; (3,6),(6,3)=18; (4,4)=16; (4,5),(5,4)=20; (4,6),(6,4)=24; (5,5)=25; (5,6),(6,5)=30; (6,6)=36. Total = 13 outcomes. P = 13/36.

Textbook basis:

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Question 27:

A pair of dice is rolled. What is the probability that the product of the two numbers is less than 2?

A. 1/36

B. 2/36

C. 1/6

D. 0

Answer:

A. 1/36

Explanation:

The product is less than 2 only when both dice show 1 (product = 1). P = 1/36.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 28:

A card is drawn from a well-shuffled pack of 52 cards. What is the probability of getting the queen of clubs or the king of hearts?

A. 1/52

B. 1/26

C. 1/13

D. 2/13

Answer:

B. 1/26

Explanation:

There is exactly 1 queen of clubs and 1 king of hearts (they are different cards, no overlap). P = 2/52 = 1/26.

Textbook basis:

Grade 9 Mathematics, Unit 9: Probability (Page 361)

Question 29:

A football club received points 1, 3, 1, 3, 3, 1, 3 from its first 7 games. What must be the point in the 8th game to have a mean of 2 points?

A. 0

B. 1

C. 3

D. No answer

Answer:

B. 1

Explanation:

Sum of 7 games = 1+3+1+3+3+1+3 = 15. For mean = 2 over 8 games, total must be 16. So the 8th game = 16 − 15 = 1.

Textbook basis:

Grade 9 Mathematics, Unit 9: Measures of Central Tendency (Page 361)

Question 30:

Based on the frequency distribution table below, which one of the following is true?

v	9	6	5	4	3	2
f	6	7	5	7	3	2

A. The mean is 5.4
B. The mode is 9
C. The median is 5.5
D. No answer

Answer:

A. The mean is 5.4

Explanation:

Σfv = 9×6+6×7+5×5+4×7+3×3+2×2 = 54+42+25+28+9+4 = 162. Σf = 30. Mean = 162/30 = 5.4. The mode is 6 and 4 (both have frequency 7), not 9. Median: ordered cumulative 2(2),5(3+2=5),12(5+7=12),17(12+5=17),24(17+7=24),30 → 15th and 16th values both fall in value 5, so median = 5, not 5.5.

Textbook basis:

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