MATHEMATICS MCQ BOOKLET

# Grade 10 · Chapter 12 · Basic Statistics

FBISE / National Book Foundation Model Textbook companion

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*Independent MCQs on cumulative frequency, ogives, quartiles, box plots, scatter correlation, grouped mean/SD/variance, and probability laws. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a short explanation of why it is correct.*

## A. Important / Main Topics

**1. Cumulative frequency of a class is the number of values:**

(A) less than the upper class boundary (running total)
(B) only in that class
(C) equal to the class mark
(D) above the maximum

**Correct Answer: A**

*Explanation: Cumulative frequency counts all observations up to that upper boundary.*

**2. An ogive is another name for:**

(A) frequency polygon of class marks
(B) cumulative frequency polygon or curve
(C) scatter diagram
(D) box plot only

**Correct Answer: B**

*Explanation: An ogive is another name for cumulative frequency polygon or curve.*

**3. To draw a cumulative frequency polygon, the x-axis usually uses:**

(A) lower class limits only
(B) frequencies only
(C) upper class boundaries
(D) probabilities only

**Correct Answer: C**

*Explanation: To draw a cumulative frequency polygon, the x-axis usually uses upper class boundaries.*

**4. On an ogive, Q□ is read by marking on the y-axis:**

(A) n/2
(B) 3n/4
(C) n
(D) n/4

**Correct Answer: D**

*Explanation: First quartile position is n/4 on the cumulative frequency scale.*

**5. On an ogive, the median Q□ is read at cumulative frequency:**

(A) n/2
(B) n/4
(C) 3n/4
(D) n only

**Correct Answer: A**

*Explanation: Median is the middle order position n/2 on the ogive.*

**6. On an ogive, Q□ is read at cumulative frequency:**

(A) n/4
(B) 3n/4
(C) n/2

(D) n

**Correct Answer: B**

*Explanation: On an ogive, Q□ is read at cumulative frequency 3n/4.*

**7. Interquartile range IQR equals:**

(A) Q□ + Q□
(B) Q□ − Q□
(C) Q□ − Q□
(D) max − min only

**Correct Answer: C**

*Explanation: IQR is the spread of the middle 50%: upper quartile minus lower quartile.*

**8. If Q□ = 40, Q□ = 70, Q□ = 90, the percentage scoring above 90 is about:**

(A) 10%
(B) 50%
(C) 75%
(D) 25%

**Correct Answer: D**

*Explanation: If Q□ = 40, Q□ = 70, Q□ = 90, the percentage scoring above 90 is about 25%.*

**9. A decile D□ marks the value below which lie:**

(A) 10% of data
(B) 1% of data
(C) 25% of data
(D) 50% of data

**Correct Answer: A**

*Explanation: First decile cuts off the lowest 10%, so the correct choice is 10% of data.*

**10. D□ as a decile corresponds to:**

(A) first quartile
(B) median (second quartile)
(C) third quartile
(D) maximum

**Correct Answer: B**

*Explanation: Fifth decile (50th percentile) is the median.*

**11. Percentile P□□ means:**

(A) 30% scored below
(B) 70th student only
(C) 70% scored below this value
(D) top 70%

**Correct Answer: C**

*Explanation: Percentile P□□ means 70% scored below this value.*

**12. A box-and-whisker plot shows:**

(A) only mean and mode
(B) only cumulative frequency
(C) only correlation r
(D) five-number summary: min, Q□, median, Q□, max

**Correct Answer: D**

*Explanation: Box plots display min, quartiles, median, and max with whiskers.*

**13. In a box plot, the box spans from:**

(A) Q□ to Q□
(B) min to max
(C) Q□ to Q□

(D) 0 to n

**Correct Answer: A**

*Explanation: In a box plot, the box spans from Q□ to Q□.*

**14. The line inside the box of a box plot is:**

(A) Q□
(B) median Q□
(C) Q□
(D) mean always

**Correct Answer: B**

*Explanation: The median is drawn as a line inside the IQR box.*

**15. Whiskers on a box plot extend toward:**

(A) only Q□ and Q□
(B) mean only
(C) minimum and maximum (non-outlier extremes)
(D) class marks

**Correct Answer: C**

*Explanation: Whiskers on a box plot extend toward minimum and maximum (non-outlier extremes).*

**16. If box plot shows min = 50, Q□ = 160, median = 300, Q□ = 800, max = 1000, IQR equals:**

(A) 150
(B) 750
(C) 950
(D) 640

**Correct Answer: D**

*Explanation: IQR = 800 − 160 = 640, so the correct choice is 640.*

**17. Positive correlation in box-plot comparison means:**

(A) one variable up, the other tends up
(B) one up, the other tends down
(C) no relationship
(D) IQR is zero

**Correct Answer: A**

*Explanation: Positive correlation in box-plot comparison means one variable up, the other tends up.*

**18. Negative correlation means:**

(A) both increase together
(B) one tends to increase when the other decreases
(C) IQR equals range
(D) median equals mean

**Correct Answer: B**

*Explanation: Negative correlation is an inverse tendency between variables.*

**19. A scatter diagram plots:**

(A) cumulative frequency only
(B) class marks only
(C) pairs (x, y) as points
(D) tree branches only

**Correct Answer: C**

*Explanation: Each observation is one point with horizontal x and vertical y.*

**20. A line of best fit on a scatter plot is drawn to:**

(A) pass through every point exactly
(B) show IQR
(C) replace the ogive

(D) approximate the linear trend of the data

**Correct Answer: D**

*Explanation: A line of best fit on a scatter plot is drawn to approximate the linear trend of the data.*

**21. Strong negative linear correlation has r close to:**

(A) −1
(B) +1
(C) 0
(D) n/2

**Correct Answer: A**

*Explanation: Strong negative linear correlation has r close to −1.*

**22. Pearson r is calculated as $\Sigma(x_i-\bar{x})(y_i-\bar{y})$ divided by:**

(A) n only
(B) $\sqrt{[\Sigma(x_i-\bar{x})^2 \times \Sigma(y_i-\bar{y})^2]}$
(C) range of x
(D) IQR

**Correct Answer: B**

*Explanation: Standard Pearson formula uses product of deviation sums in the denominator square root.*

**23. If r ≈ −0.88, as x increases y tends to:**

(A) increase
(B) stay constant
(C) decrease
(D) equal x

**Correct Answer: C**

*Explanation: Strong negative r means y decreases as x increases.*

**24. Range of a data set is:**

(A) $Q_3 - Q_1$
(B) mean − median
(C) variance
(D) largest value − smallest value

**Correct Answer: D**

*Explanation: Range is max minus min, so the correct choice is largest value − smallest value.*

**25. Variance measures:**

(A) spread around the mean (average squared deviation)
(B) central location only
(C) only quartiles
(D) only probability

**Correct Answer: A**

*Explanation: Variance quantifies how far values typically lie from the mean.*

**26. Standard deviation SD is:**

(A) square of variance
(B) positive square root of variance
(C) equal to range always
(D) IQR

**Correct Answer: B**

*Explanation: SD = √variance, in the same units as the data.*

**27. For grouped data, mean $\bar{x}$ uses:**

(A) Σx only
(B) class width only
(C) Σfx / Σf

(D) n/2

**Correct Answer: C**

*Explanation: For grouped data, mean $\bar{x}$ uses $\Sigma fx / \Sigma f$.*

**28. Grouped variance often uses formula with $\Sigma f(x_i - \bar{x})^2$ divided by:**

(A) class width only
(B) range
(C) IQR
(D) Σf (or n)

**Correct Answer: D**

*Explanation: Grouped variance often uses formula with $\Sigma f(x_i - \bar{x})^2$ divided by Σf (or n).*

**29. Coefficient of variation CV equals:**

(A) (SD/mean) × 100%
(B) SD × mean
(C) variance/mean
(D) IQR/median

**Correct Answer: A**

*Explanation: CV compares relative spread: SD as percentage of mean.*

**30. If mean = 68, SD = 14.6, CV equals approximately:**

(A) 14.6%
(B) 21.5%
(C) 68%
(D) 4.7%

**Correct Answer: B**

*Explanation: CV = (14.6/68)×100 ≈ 21.5%, so the correct choice is 21.5%.*

**31. Lower SD with similar mean suggests data are:**

(A) more spread out
(B) always skewed right
(C) more consistent (less spread)
(D) without median

**Correct Answer: C**

*Explanation: Smaller SD means observations cluster closer to the mean.*

**32. Comparing two classes: higher mean but higher SD suggests:**

(A) lower average and more consistent
(B) identical spread
(C) zero range
(D) higher average but more variable performance

**Correct Answer: D**

*Explanation: Better average with larger SD means less consistent results.*

**33. Dispersion refers to:**

(A) how spread out data values are
(B) central tendency only
(C) only probability
(D) only ogive shape

**Correct Answer: A**

*Explanation: Dispersion refers to how spread out data values are.*

**34. Three common measures of dispersion include:**

(A) mean, median, mode
(B) range, variance, standard deviation
(C) Q□, Q□, Q□ only

(D) only deciles

**Correct Answer: B**

*Explanation: Range, variance, and SD are standard dispersion measures.*

**35. Frequency polygon uses class marks on x-axis and:**

(A) cumulative frequency
(B) probability only
(C) class frequency on y-axis
(D) SD on y-axis

**Correct Answer: C**

*Explanation: Frequency polygon uses class marks on x-axis and class frequency on y-axis.*

**36. To close a frequency polygon, extra classes with zero frequency are added:**

(A) only at the top
(B) never
(C) only at median
(D) at both ends of the distribution

**Correct Answer: D**

*Explanation: To close a frequency polygon, extra classes with zero frequency are added at both ends of the distribution.*

**37. Sample space for two fair coins flipped is:**

(A) {HH, HT, TH, TT}
(B) {H, T}
(C) {H, T, HH}
(D) {0, 1}

**Correct Answer: A**

*Explanation: Sample space for two fair coins flipped is {HH, HT, TH, TT}.*

**38. P(both tails) for two fair coins equals:**

(A) 1/2
(B) 1/4
(C) 1/3
(D) 1/8

**Correct Answer: B**

*Explanation: One of four outcomes is TT, so P = 1/4, so the correct choice is 1/4.*

**39. P(Maria H and Haleema T) for two coins in order is:**

(A) 1/2
(B) 1/3
(C) 1/4
(D) 1/8

**Correct Answer: C**

*Explanation: P(Maria H and Haleema T) for two coins in order is 1/4.*

**40. Tree diagram for combined events shows:**

(A) only one branch
(B) only ogive
(C) box plot
(D) branches for successive choices and their probabilities

**Correct Answer: D**

*Explanation: Tree diagram for combined events shows branches for successive choices and their probabilities.*

**41. For independent events A and B, P(A and B) equals:**

(A) P(A) × P(B)
(B) P(A) + P(B)

(C) P(A) − P(B)
(D) 1 − P(A)

**Correct Answer: A**

*Explanation: Multiplication law: independent joint probability is the product.*

**42. For mutually exclusive events A and B, P(A or B) equals:**

(A) P(A) × P(B)
(B) P(A) + P(B)
(C) P(A) − P(B)
(D) 1

**Correct Answer: B**

*Explanation: For mutually exclusive events A and B, P(A or B) equals P(A) + P(B).*

**43. If P(A) = 0.3 and P(B) = 0.4 for independent tests, P(A or B) if not mutually exclusive needs:**

(A) only addition
(B) multiplication only
(C) inclusion–exclusion if overlap exists; if disjoint, 0.7
(D) zero

**Correct Answer: C**

*Explanation: If events can overlap, subtract P(A and B); if disjoint, P = 0.3 + 0.4 = 0.7.*

**44. If tests are independent with P(A+) = 0.3, P(B+) = 0.4, P(both positive) =**

(A) 0.7
(B) 0.1
(C) 1.0
(D) 0.12

**Correct Answer: D**

*Explanation: 0.3 × 0.4 = 0.12 for independent both positive.*

**45. If P(Job A) = 0.5, P(Job B) = 0.4 independent, P(either job) if mutually exclusive offers:**

(A) 0.9
(B) 0.2
(C) 0.1
(D) 0.5

**Correct Answer: A**

*Explanation: Disjoint: 0.5 + 0.4 = 0.9, so the correct choice is 0.9.*

**46. P(Volvo) = 1/2, P(Bedford) = 1/3 independent choice, P(either) if exclusive:**

(A) 1/6
(B) 5/6
(C) 2/3
(D) 1/2

**Correct Answer: B**

*Explanation: 1/2 + 1/3 = 5/6 when only one bus is taken.*

**47. P(Team S) = 12/27, P(Team H) = 13/27 independent wins, P(either) if exclusive:**

(A) 12/13
(B) 1/27
(C) 25/27
(D) 1

**Correct Answer: C**

*Explanation: 12/27 + 13/27 = 25/27, so the correct choice is 25/27.*

**48. P(colour damage) = 0.1, P(bad stitch) = 0.2 same item, P(either) if mutually exclusive:**

(A) 0.02
(B) 0.1

(C) 0.2
(D) 0.3

**Correct Answer: D**

*Explanation: 0.1 + 0.2 = 0.3 for disjoint defects, so the correct choice is 0.3.*

**49. P(A+) = 0.9, P(B+) = 0.7 independent, P(both positive) =**

(A) 0.63
(B) 1.6
(C) 0.2
(D) 0.9

**Correct Answer: A**

*Explanation: 0.9 × 0.7 = 0.63, so the correct choice is 0.63.*

**50. P(pass A) = 0.9, P(pass B) = 0.8 independent, P(pass both) =**

(A) 1.7
(B) 0.72
(C) 0.1
(D) 0.9

**Correct Answer: B**

*Explanation: 0.9 × 0.8 = 0.72, so the correct choice is 0.72.*

**51. Venn diagram with 40 like pizza, 45 like burgers, none both: total 100, P(either) =**

(A) 5/100
(B) 40/100
(C) 85/100
(D) 1

**Correct Answer: C**

*Explanation: Disjoint: (40 + 45)/100 = 85/100, so the correct choice is 85/100.*

**52. Conditional probability P(A|B) equals:**

(A) P(A) × P(B)
(B) P(B) / P(A)
(C) 1 − P(B)
(D) P(A and B) / P(B)

**Correct Answer: D**

*Explanation: Conditional probability P(A|B) equals P(A and B) / P(B).*

**53. Drawing two kings with replacement: P = (1/13)² =**

(A) 1/169
(B) 1/26
(C) 2/13
(D) 4/52

**Correct Answer: A**

*Explanation: "1/169" is correct: it matches the idea asked in the question ("Drawing two kings with replacement: P = (1/13)² ="), while the other choices do not.*

**54. Two kings without replacement: P = (4/52) × (3/51) =**

(A) 1/169
(B) 3/663
(C) 1/221
(D) 12/51

**Correct Answer: B**

*Explanation: "3/663" is correct: it matches the idea asked in the question ("Two kings without replacement: P = (4/52) × (3/51) ="), while the other choices do not.*

**55. Two sixes on two dice: P = (1/6)² =**

(A) 1/12
(B) 1/6
(C) 1/36
(D) 2/36

**Correct Answer: C**

*Explanation: "1/36" is correct: it matches the idea asked in the question ("Two sixes on two dice: P = (1/6)² ="), while the other choices do not.*

**56. 10 contestants equally likely for 1st place: P(one specific winner) =**

(A) 1/5
(B) 9/10
(C) 10
(D) 1/10

**Correct Answer: D**

*Explanation: Equal chance among 10 gives 1/10 each, so the correct choice is 1/10.*

**57. After 1st decided, 9 remain for 2nd; P(specific person 2nd | not 1st) context uses:**

(A) 1/9 among remaining
(B) 1/10 still
(C) 1/100
(D) zero

**Correct Answer: A**

*Explanation: Conditional: one of nine remaining equally likely for second.*

**58. Library Venn: 3 grade-7 only, 2 both, 5 grade-8 only, 40 neither; total books:**

(A) 10
(B) 50
(C) 40
(D) 8

**Correct Answer: B**

*Explanation: 3 + 2 + 5 + 40 = 50 books, so the correct choice is 50.*

**59. P(grade 7 book) with above counts =**

(A) 3/50
(B) 2/50
(C) 5/50
(D) 40/50

**Correct Answer: C**

*Explanation: Grade 7 total = 3 + 2 = 5, so 5/50 = 1/10.*

**60. P(English | grade 7) with 2 English in grade 7 region =**

(A) 2/50
(B) 2/3
(C) 5/50
(D) 2/5

**Correct Answer: D**

*Explanation: Among 5 grade-7 books, 2 are English: 2/5.*

**61. P(grade 7 and English) = (5/50) × (2/5) =**

(A) 1/25
(B) 2/50
(C) 10/50
(D) 2/5

**Correct Answer: A**

*Explanation: Joint: 2/50 = 1/25, so the correct choice is 1/25.*

**62. Mass vs fuel efficiency table: as mass increases, efficiency decreases suggests:**

(A) positive correlation
(B) negative correlation
(C) zero correlation
(D) IQR zero

**Correct Answer: B**

*Explanation: Mass vs fuel efficiency table: as mass increases, efficiency decreases suggests negative correlation.*

**63. Mass IQR = 1700 − 1200 = 500 kg; fuel IQR = 20 − 12 = 8 km/l used to:**

(A) find mean
(B) find probability
(C) compare spread of each variable
(D) draw tree

**Correct Answer: C**

*Explanation: IQR measures middle spread for each variable separately.*

**64. Grouped marks 0–10, 11–20, … cumulative last entry 35 means:**

(A) 35 classes
(B) mean is 35
(C) Q□ is 35 always
(D) 35 students total

**Correct Answer: D**

*Explanation: Grouped marks 0–10, 11–20, … cumulative last entry 35 means 35 students total.*

**65. Upper boundary for class 11–20 with 0.5 adjustment is:**

(A) 20.5
(B) 20
(C) 19.5
(D) 21

**Correct Answer: A**

*Explanation: Upper boundary for class 11–20 with 0.5 adjustment is 20.5.*

**66. Cumulative frequency at 10.5 boundary with f = 2 in class 1–10 gives c.f. =**

(A) 0
(B) 2
(C) 4
(D) 6

**Correct Answer: B**

*Explanation: Running total includes that class: c.f. = 2.*

**67. Ogive used to find median is more helpful than raw table when:**

(A) data are ungrouped only
(B) no frequencies exist
(C) quartiles must be estimated from grouped data
(D) probability is 1

**Correct Answer: C**

*Explanation: Ogive graphically locates quartiles for grouped distributions.*

**68. Scatter correlation r = 0 suggests:**

(A) perfect line
(B) negative relation
(C) IQR = 0
(D) no linear correlation

**Correct Answer: D**

*Explanation: r near 0 means little or no linear association.*

**69. SD of grouped data uses class marks as:**

(A) representative x values in deviation formulas
(B) frequencies
(C) probabilities
(D) boundaries only

**Correct Answer: A**

*Explanation: Each class midpoint stands for its interval in $\Sigma f(x-\bar{x})^2$.*

**70. Variance in same units as data squared means SD is preferred because:**

(A) SD is always larger
(B) SD has same units as original measurements
(C) variance is always 0
(D) SD equals mean

**Correct Answer: B**

*Explanation: Variance in same units as data squared means SD is preferred because SD has same units as original measurements.*

**71. Mutually exclusive events cannot:**

(A) have probabilities
(B) be shown on tree
(C) occur together in one trial
(D) appear in Venn diagram

**Correct Answer: C**

*Explanation: Mutually exclusive events cannot occur together in one trial.*

**72. Independent events: occurrence of one:**

(A) changes probability of other
(B) makes P = 0
(C) forces addition law only
(D) does not change probability of other

**Correct Answer: D**

*Explanation: Independence means P(B|A) = P(B), so the correct choice is does not change probability of other.*

**73. Addition law P(A□B) = P(A) + P(B) − P(A∩B) reduces to P(A)+P(B) when:**

(A) A and B are mutually exclusive
(B) always
(C) events independent
(D) P = 1

**Correct Answer: A**

*Explanation: Addition law P(A□B) = P(A) + P(B) − P(A∩B) reduces to P(A)+P(B) when A and B are mutually exclusive.*

**74. Tree diagram for 3 coin tosses: total outcomes =**

(A) 3
(B) 8
(C) 6
(D) 9

**Correct Answer: B**

*Explanation: $2^3 = 8$ equally likely paths, so the correct choice is 8.*

**75. P(three tails in 3 fair tosses) =**

(A) 1/3
(B) 1/6
(C) 1/8
(D) 3/8

**Correct Answer: C**

*Explanation: One path TTT out of 8: 1/8, so the correct choice is 1/8.*

**76. Sample space diagram for two coins is a:**

(A) 1×2 table of outcomes
(B) ogive
(C) box only
(D) 2×2 table listing combined results

**Correct Answer: D**

*Explanation: Sample space diagram for two coins is a 2×2 table listing combined results.*

**77. Real-life uses of SD include:**

(A) quality control, finance, education comparing spread
(B) only coin tossing
(C) only Venn diagrams
(D) only class boundaries

**Correct Answer: A**

*Explanation: Real-life uses of SD include quality control, finance, education comparing spread.*

**78. P(A|B) for drawing English book given grade 7 uses region:**

(A) whole library
(B) only grade 7 portion of Venn diagram
(C) only neither region
(D) only grade 8

**Correct Answer: B**

*Explanation: Conditioning restricts sample space to the given event B.*

**79. Predicting outside data range (extrapolation) on scatter line is:**

(A) always exact
(B) same as IQR
(C) unreliable compared to interpolation
(D) required for ogive

**Correct Answer: C**

*Explanation: Predicting outside data range (extrapolation) on scatter line is unreliable compared to interpolation.*

**80. Probability of combined events may be found using:**

(A) only mean formula
(B) only ogive
(C) only histogram
(D) sample space, tree, or Venn diagrams as appropriate

**Correct Answer: D**

*Explanation: Chapter 12 lists multiple diagrams for compound probability.*

## B. Less Important / Secondary Topics

**81. Raw (ungrouped) data in statistics means:**

(A) original values before grouping
(B) already in classes
(C) only cumulative totals
(D) only probabilities

**Correct Answer: A**

*Explanation: Raw data is the list before frequency.*

**82. Grouped data organizes values into:**

(A) only quartiles
(B) class intervals with frequencies

(C) only tree branches
(D) only Venn circles

**Correct Answer: B**

*Explanation: Grouped data organizes values into class intervals with frequencies.*

**83. Class mark is the:**

(A) frequency
(B) cumulative total
(C) midpoint of a class interval
(D) probability

**Correct Answer: C**

*Explanation: Class mark is the midpoint of a class interval.*

**84. Haani and Haider Qiraat example with 10 contestants illustrates:**

(A) ogive construction
(B) box plot whiskers
(C) variance formula derivation
(D) equally likely outcomes for ranking

**Correct Answer: D**

*Explanation: Each of 10 has chance 1/10 for first place when equally competent.*

**85. After first place fixed, remaining spots illustrate:**

(A) dependent sequential choices
(B) independent identical trials always
(C) mutually exclusive means
(D) IQR

**Correct Answer: A**

*Explanation: After first place fixed, remaining spots illustrate dependent sequential choices.*

**86. Cumulative frequency curve is also called:**

(A) histogram
(B) ogive
(C) scatter plot
(D) tally chart

**Correct Answer: B**

*Explanation: Ogive is the standard name for the cumulative frequency graph.*

**87. Quartile Q□ divides data so about:**

(A) 50% lie below
(B) 75% lie below
(C) 25% lie below
(D) 100% lie below

**Correct Answer: C**

*Explanation: Quartile Q□ divides data so about 25% lie below.*

**88. Percentile P□□ is the same idea as:**

(A) D□
(B) Q□
(C) median only
(D) D□

**Correct Answer: D**

*Explanation: 90th percentile aligns with ninth decile D□.*

**89. Outliers on box plot may be shown as:**

(A) individual points beyond whiskers
(B) hidden

(C) only median
(D) class marks

**Correct Answer: A**

*Explanation: Points beyond 1.5×IQR are often plotted separately.*

**90. Line of best fit by eye should balance points:**

(A) all above line
(B) above and below the line
(C) only at origin
(D) only at max

**Correct Answer: B**

*Explanation: Line of best fit by eye should balance points above and below the line.*

**91. r between +0.9 and +1 suggests:**

(A) weak positive
(B) negative relation
(C) strong positive linear correlation
(D) no correlation

**Correct Answer: C**

*Explanation: r between +0.9 and +1 suggests strong positive linear correlation.*

**92. Variance units for marks-squared means SD is reported in:**

(A) marks squared
(B) percent only
(C) no units
(D) marks

**Correct Answer: D**

*Explanation: Variance units for marks-squared means SD is reported in marks.*

**93. Σf for grouped data equals:**

(A) total number of observations n
(B) number of classes
(C) mean
(D) SD

**Correct Answer: A**

*Explanation: Sum of frequencies is total sample size.*

**94. Possibility diagram is another name for:**

(A) ogive
(B) sample space table of outcomes
(C) box plot
(D) histogram

**Correct Answer: B**

*Explanation: Possibility diagram is another name for sample space table of outcomes.*

**95. Drawing king then queen without replacement differs from with replacement because:**

(A) probabilities multiply the same
(B) events become certain
(C) second draw probability changes
(D) sample space shrinks to one

**Correct Answer: C**

*Explanation: Removing first card changes counts for the second draw.*

**96. P(at least one head) in two tosses = 1 − P(both tails) =**

(A) 1/4
(B) 1/2

(C) 1
(D) 3/4

**Correct Answer: D**

*Explanation: 1 − 1/4 = 3/4, so the correct choice is 3/4.*

**97. Mutually exclusive pizza and burger lovers in Venn diagram have:**

(A) no overlap in the neither-both case
(B) overlapping region
(C) equal circles always
(D) probability 1

**Correct Answer: A**

*Explanation: Disjoint sets: no student in both when none like both.*

**98. STEAM context for statistics includes interpreting:**

(A) only circle tangents
(B) data displays and probability in real decisions
(C) only compass constructions
(D) only cyclic quadrilaterals

**Correct Answer: B**

*Explanation: STEAM context for statistics includes interpreting data displays and probability in real decisions.*

**99. Histogram differs from bar chart for grouped data because:**

(A) bars always separated
(B) histogram has no area
(C) histogram bars touch (continuous classes)
(D) bar chart uses only ogive

**Correct Answer: C**

*Explanation: Histogram bars adjoin because classes are continuous intervals.*

**100. Median is preferred to mean when:**

(A) no skew
(B) only two values
(C) probability is 1/2
(D) extreme outliers pull the mean

**Correct Answer: D**

*Explanation: Median is preferred to mean when extreme outliers pull the mean.*

**101. D represents lowest:**

(A) 20%
(B) 10%
(C) 50%
(D) 90%

**Correct Answer: A**

*Explanation: D represents lowest 20%.*

**102. P(A and B) for dependent events uses:**

(A) P(A)+P(B) always
(B) P(A) × P(B|A)
(C) 1 − P(A)
(D) only Venn without numbers

**Correct Answer: B**

*Explanation: General multiplication: P(A) × P(B given A).*

**103. Three coin toss tree has branch count at each level:**

(A) 3
(B) 8

(C) 2
(D) 6

**Correct Answer: C**

*Explanation: Three coin toss tree has branch count at each level 2.*

**104. Box-and-whisker correlation compares:**

(A) only means
(B) only class width
(C) only tangent lengths
(D) shapes and positions of two distributions

**Correct Answer: D**

*Explanation: Box-and-whisker correlation compares shapes and positions of two distributions.*

**105. Cumulative frequency at lowest boundary is often:**

(A) 0
(B) n
(C) Q□
(D) mean

**Correct Answer: A**

*Explanation: Before first class no values are included, so c.f. starts at 0.*

**106. Chapter 12 links statistics with probability by:**

(A) ignoring data
(B) using diagrams to count favourable combined outcomes
(C) only geometry
(D) only tangents

**Correct Answer: B**

*Explanation: Chapter 12 links statistics with probability by using diagrams to count favourable combined outcomes.*

**107. Interpreting ogive Q□ = 90 means 75% of students scored:**

(A) above 90
(B) exactly 90
(C) at or below 90
(D) below Q□ only

**Correct Answer: C**

*Explanation: Q□ is the 75th percentile: 75% lie at or below it.*

**108. Fair die P(single 6) = 1/6 because:**

(A) six is largest
(B) dice are dependent
(C) addition law
(D) six outcomes equally likely

**Correct Answer: D**

*Explanation: Fair die P(single 6) = 1/6 because six outcomes equally likely.*