

PRACTICE EXAM 7: NYSTCE GRADES 1-6 MATHEMATICS

(222) - 100 QUESTIONS

This independently written expanded practice exam contains 100 selected-response questions aligned to the official NYSTCE Field 222 Mathematics selected-response competencies. The actual Part Two: Mathematics test contains 40 selected-response items and 1 constructed-response item, provides 2 hours 15 minutes of testing time, uses a passing score of 520, and provides a standard 4-function on-screen calculator. Choose the single best answer for each item before consulting the answer key and explanations.

1. A digital scale reads 742.0635 grams. What value does the digit 6 represent?

- A. 0.06
- B. 0.006
- C. 0.6
- D. 6

2. A theater workshop begins with $12 \frac{5}{12}$ yards of fabric and uses $7 \frac{3}{8}$ yards. How much fabric remains?

- A. $4 \frac{23}{24}$ yards
- B. $5 \frac{5}{24}$ yards
- C. $5 \frac{1}{24}$ yards
- D. $6 \frac{1}{24}$ yards

3. A science class uses 0.42 of a 6.75-liter container. How many liters are used?

- A. 0.2835 liter
- B. 2.175 liters
- C. 28.35 liters
- D. 2.835 liters

4. A teacher has 84 pencils, 126 erasers, and 210 stickers and wants to make the greatest possible number of identical supply packs with nothing left over. How many packs can be made?

- A. 14 packs
- B. 42 packs
- C. 21 packs
- D. 420 packs

5. Four temperatures are $-\frac{5}{6}$ degree, -0.81 degree, -0.845 degree, and -0.79 degree. Which temperature is greatest?

- A. $-\frac{5}{6}$ degree
- B. -0.81 degree
- C. -0.79 degree
- D. -0.845 degree

6. A numerical scoring rule is written as $48 \div 6 + 2(5^2 - 21)$. Which value does the rule produce?

- A. 16
- B. 12
- C. 24
- D. 40

7. A school club's ticket total is modeled by $4x + 17 = 85$. What value of x makes the equation true?

- A. $x = 12$
- B. $x = 17$
- C. $x = 21$
- D. $x = 25.5$

8. A measuring device records a length of 0.375 inch. Which listed fraction names the same length in simplest terms?

- A. $\frac{3}{5}$
- B. $\frac{5}{8}$
- C. $\frac{37}{50}$
- D. $\frac{3}{8}$

9. A box of 15 notebooks costs \$28.20. What is the unit price of one notebook?

- A. \$1.68
- B. \$1.92
- C. \$2.13
- D. \$1.88

10. A 3-hour bus route covers 174 miles. Dividing the route distance evenly over the travel time gives what miles-per-hour rate?

- A. 48 miles per hour
- B. 57 miles per hour
- C. 58 miles per hour
- D. 522 miles per hour

11. The ratio of green tiles to white tiles in a mosaic is 7:9. If 42 green tiles are used, how many white tiles are needed?

- A. 48
- B. 54
- C. 56
- D. 63

12. A cartographer uses a scale in which every 5 centimeters corresponds to 32 kilometers. A 13.75-centimeter segment on the drawing represents how many kilometers?

- A. 88 kilometers
- B. 70.4 kilometers
- C. 80 kilometers
- D. 110 kilometers

13. A museum receives 850 student visitors in one week, and 18% attend a planetarium program. How many students attend the program?

- A. 153
- B. 136
- C. 170
- D. 680

14. A reading challenge goal of 72 books is increased by 25%. What is the new goal?

- A. 81 books
- B. 90 books
- C. 93 books
- D. 108 books

15. A store reduces the price of a \$240 tablet by 15%. What is the sale price before tax?

- A. \$36
- B. \$204.15
- C. \$204
- D. \$276

16. A 156-minute workshop divides its time between demonstrations and practice in the ratio 5:7. How many minutes are allotted to demonstrations?

- A. 60 minutes
- B. 72 minutes
- C. 91 minutes
- D. 65 minutes

17. A proportion is given by $x/18 = 14/21$. What is x ?

- A. 9
- B. 14
- C. 12
- D. 27

18. A recipe uses $2\frac{1}{4}$ cups of oats per batch. If a baker makes $1\frac{5}{9}$ batches, how many cups of oats are needed?

- A. $3\frac{1}{2}$ cups
- B. $2\frac{7}{9}$ cups
- C. $3\frac{1}{4}$ cups
- D. $4\frac{1}{2}$ cups

19. How many lengths of $2\frac{7}{9}$ meters fit into a rope measuring $5\frac{1}{6}$ meters?

- A. $1\frac{7}{50}$
- B. $2\frac{7}{50}$
- C. $2\frac{43}{50}$
- D. $1\frac{43}{50}$

20. Seventy-two hundredths is being written as a reduced fraction. Which option is the reduced form?

- A. $\frac{7}{20}$
- B. $\frac{18}{25}$
- C. $\frac{9}{20}$
- D. $\frac{72}{25}$

21. At sunrise the temperature is -7 degrees C. By noon it rises 13 degrees. What is the noon temperature?

- A. 6 degrees C
- B. -20 degrees C
- C. -6 degrees C
- D. 20 degrees C

22. An account balance is $-\$18$ after a fee. Another $\$9$ charge is then applied. What is the new balance?

- A. $-\$9$
- B. $-\$27$
- C. $\$9$
- D. $\$27$

23. The score change is the product of three factors: -6, -8, and 3. What is the product?

- A. -144
- B. 48
- C. 144
- D. 288

24. Starting at -14 on a number line and ending at 5 requires a movement of how many units?

- A. 9 units
- B. 14 units
- C. 21 units
- D. 19 units

25. Which value is least: -1.07, $-1 \frac{1}{20}$, -0.99, or -1.005?

- A. $-1 \frac{1}{20}$
- B. -0.99
- C. -1.005
- D. -1.07

26. A wildlife count is written as 3.27×10^5 . What is the number in standard notation?

- A. 327,000
- B. 32,700
- C. 3,270,000
- D. 0.000327

27. A measurement of 0.0000845 meter must be expressed using a coefficient between 1 and 10 times a power of ten. Which expression does that?

- A. 8.45×10^{-4}
- B. 8.45×10^{-5}
- C. 8.45×10^{-6}
- D. 8.45×10^{-3}

28. The side length of a square with area 150 square units is $\sqrt{150}$. To the nearest tenth, what is that length?

- A. 11.5
- B. 12.5
- C. 12.2
- D. 15.0

29. A power-of-two expression contains 2^5 multiplied by 2^3 and then divided by 2^4 . What is its value?

- A. 16
- B. 4
- C. 8
- D. 32

30. Three choices can be written as ratios of integers, but one cannot. Which choice is the nonrational value?

- A. $\sqrt{81}$
- B. 0.625
- C. $\pi/2$
- D. $-3/7$

31. The decimal 0.363636... repeats the block 36 forever. What fraction does it equal?

- A. $\frac{3}{11}$
- B. $\frac{4}{11}$
- C. $\frac{4}{9}$
- D. $\frac{36}{100}$

32. A bakery uses 6 cups of flour to make 15 rolls. At the same rate, how many rolls can be made with 14 cups of flour?

- A. 30 rolls
- B. 32 rolls
- C. 42 rolls
- D. 35 rolls

33. A walker covers 4.5 miles in 54 minutes. At the same pace, what is the speed in miles per hour?

- A. 5 miles per hour
- B. 4 miles per hour
- C. 4.5 miles per hour
- D. 6 miles per hour

34. A soup recipe uses 2.5 cups of broth for 8 servings. How much broth is needed for 20 servings at the same rate?

- A. 5 cups
- B. 6 cups
- C. 6.25 cups
- D. 8.5 cups

35. An art supply costs \$64 before tax. If the sales tax rate is 7.5%, what is the total price?

- A. \$64.75
- B. \$68.05
- C. \$71.50
- D. \$68.80

36. A jacket marked \$85 is discounted by 30%. What is the discounted price before tax?

- A. \$25.50
- B. \$59.50
- C. \$55.00
- D. \$70.00

37. After a 12% increase, a club's membership is 67.2 members in a mathematical model. What was the original modeled membership?

- A. 55
- B. 60
- C. 62
- D. 75

38. A rehearsal lasts 3.75 hours. How many minutes is that?

- A. 180 minutes
- B. 215 minutes
- C. 375 minutes
- D. 225 minutes

39. A board is 9 feet 8 inches long. What is its length in inches?

- A. 98 inches
- B. 108 inches
- C. 116 inches
- D. 128 inches

40. On a coordinate grid, points P(-7, 4) and Q(6, 4) lie on the same horizontal line. How far apart are they?

- A. 13 units
- B. 1 unit
- C. 11 units
- D. 17 units

41. In a club, the ratio of boys to girls is 4:5 and there are 63 students altogether. How many are girls?

- A. 35
- B. 28
- C. 32
- D. 40

42. A scale drawing is enlarged by a factor of 1.5. A side that is 8 centimeters long on the original drawing will be how long after enlargement?

- A. 5.33 centimeters
- B. 8.5 centimeters
- C. 16 centimeters
- D. 12 centimeters

43. A fruit drink is mixed in a ratio of 3 parts juice to 2 parts water. If 25 cups of drink are prepared, how many cups are juice?

- A. 10 cups
- B. 12 cups
- C. 15 cups
- D. 18 cups

44. Fifty-four is 72% of what number?

- A. 38.88
- B. 75
- C. 72
- D. 126

45. The temperature begins at -11 degrees, rises 18 degrees, and then falls 7 degrees. What is the final temperature?

- A. -36 degrees
- B. -4 degrees
- C. 0 degrees
- D. 14 degrees

46. Which value is greatest: $\frac{7}{12}$, 0.57, 0.605, or $\frac{3}{5}$?

- A. $\frac{7}{12}$
- B. 0.57
- C. $\frac{3}{5}$
- D. 0.605

47. Simplify the expression $7x + 4 - 3x + 9$.

- A. $4x + 5$
- B. $4x + 13$
- C. $10x + 13$
- D. $10x + 5$

48. For $a = -4$ and $b = 5$, what value is produced by the expression $3a^2 - 2b$?

- A. 38
- B. -58
- C. 28
- D. 58

49. A number is substituted for x in $5x - 8 < 27$. Which listed number makes the statement true?

- A. 7
- B. 8
- C. 6
- D. 9

50. The point $(-5, 8)$ lies in which quadrant of the coordinate plane?

- A. Quadrant I
- B. Quadrant II
- C. Quadrant III
- D. Quadrant IV

51. A rectangular bulletin board is 13.5 feet long and 8 feet high. What is its area?

- A. 43 square feet
- B. 86 square feet
- C. 216 square feet
- D. 108 square feet

52. A triangular pennant has a 17-inch base and a 9-inch perpendicular altitude. How many square inches of material does one pennant cover?

- A. 76.5 square inches
- B. 26 square inches
- C. 153 square inches
- D. 306 square inches

53. A slanted display panel has a 12-meter base and the perpendicular separation between its parallel sides is 7.5 meters. What area does it cover?

- A. 39 square meters
- B. 45 square meters
- C. 180 square meters
- D. 90 square meters

54. The parallel sides of a trapezoidal tabletop are 11 centimeters and 19 centimeters, separated by 8 centimeters. How many square centimeters are in the tabletop?

- A. 60 square centimeters
- B. 152 square centimeters
- C. 120 square centimeters
- D. 240 square centimeters

55. A shipping crate has interior dimensions 9 feet by 4 feet by 6 feet. How many cubic feet can the rectangular interior hold?

- A. 216 cubic feet
- B. 38 cubic feet
- C. 108 cubic feet
- D. 432 cubic feet

56. Each edge of a cube-shaped gift box is 5.5 centimeters. Find the combined area of all six outside faces.

- A. 30.25 square centimeters
- B. 181.5 square centimeters
- C. 90.75 square centimeters
- D. 166.375 square centimeters

57. A garden plot has side lengths 14.2 meters and 6.8 meters. How many meters of edging are needed to surround the entire plot once?

- A. 21 meters
- B. 42 meters
- C. 48.28 meters
- D. 96.56 meters

58. An angle and its adjacent angle make a 180-degree straight path. If one is 137 degrees, how large is the adjacent angle?

- A. 37 degrees
- B. 53 degrees
- C. 137 degrees
- D. 43 degrees

59. Two angles of a triangle measure 64 degrees and 51 degrees. What is the measure of the third angle?

- A. 55 degrees
- B. 75 degrees
- C. 65 degrees
- D. 115 degrees

60. Two lines intersect. One of the angles formed measures 118 degrees. What is the measure of the vertical angle opposite it?

- A. 118 degrees
- B. 62 degrees
- C. 72 degrees
- D. 242 degrees

61. A mirror transformation sends $R = (4, -7)$ to the opposite side of the vertical axis while keeping its height unchanged. Which coordinate is produced?

- A. (4, 7)
- B. (-4, 7)
- C. (-4, -7)
- D. (7, -4)

62. Beginning at $(-3, 5)$, move 8 coordinate units east and 2 units south. Which point is reached?

- A. (5, 3)
- B. (5, 7)
- C. (-11, 3)
- D. (-1, 13)

63. A lift moves from coordinate height $y = -9$ to $y = 6$ while x remains 2. How many coordinate units does it move vertically?

- A. 7 units
- B. 15 units
- C. 11 units
- D. 17 units

64. Five daily counts are 12, 15, 9, 14, and 10. If they are shared evenly, what value represents the arithmetic average?

- A. 10
- B. 13
- C. 60
- D. 12

65. Arrange the six observations 4, 11, 8, 15, 9, and 7 in order. What value lies halfway between the two central observations?

- A. 8
- B. 9
- C. 9.5
- D. 8.5

66. In the list 3, 5, 5, 7, 8, 5, 9, and 7, which number occurs more often than any other?

- A. 7
- B. 8
- C. 5
- D. 9

67. A data set has observations 18, 12, 23, 16, and 9. How many units separate its maximum and minimum values?

- A. 9
- B. 14
- C. 18
- D. 32

68. For the eight ordered measurements 3, 5, 7, 8, 10, 12, 13, and 18, subtract the median of the lower four values from the median of the upper four values. What is the result?

- A. 6.5
- B. 5.5
- C. 6
- D. 12.5

69. From the equally likely faces 1 through 6 of a standard number cube, two faces satisfy the condition 'greater than 4.' What probability does that represent?

- A. $\frac{1}{6}$
- B. $\frac{1}{2}$
- C. $\frac{1}{3}$
- D. $\frac{2}{3}$

70. A container holds 20 counters: 5 green, 7 yellow, and 8 blue. If one is drawn randomly, what is the chance its color is green or yellow?

- A. $\frac{3}{5}$
- B. $\frac{2}{5}$
- C. $\frac{7}{20}$
- D. $\frac{3}{4}$

71. In 60 trials of a spinner, a student records 18 successes. What is the experimental probability of success?

- A. 0.18
- B. 0.42
- C. 0.70
- D. 0.30

72. The outcome list for two coin tosses is HH, HT, TH, and TT. What fraction of these outcomes contains exactly one head?

- A. $\frac{1}{4}$
- B. $\frac{1}{2}$
- C. $\frac{1}{3}$
- D. $\frac{3}{4}$

73. Distribute 6 across the two terms inside $2x - 5$. Which resulting expression is equivalent to the original product?

- A. $12x - 5$
- B. $8x - 30$
- C. $12x + 30$
- D. $12x - 30$

74. A value is tripled and then increased by 11 to produce 50. What is the value?

- A. $x = 13$
- B. $x = 10$
- C. $x = 17$
- D. $x = 39$

75. Five times the quantity $x - 2$ equals 35. What number must x be?

- A. $x = 5$
- B. $x = 7$
- C. $x = 9$
- D. $x = 12$

76. Translate the phrase 'twice n , then decrease the result by nine' into an algebraic expression.

- A. $9 - 2n$
- B. $2n - 9$
- C. $2(n - 9)$
- D. $9n - 2$

77. An input-output rule multiplies x by 3 and subtracts 4. When the input is 7, what output is produced?

- A. 11
- B. 21
- C. 17
- D. 25

78. The sequence 4, 9, 14, 19, ... increases by a constant amount. What is the 12th term?

- A. 54
- B. 60
- C. 64
- D. 59

79. A container holds 3.5 gallons of water. How many quarts is that?

- A. 14 quarts
- B. 7 quarts
- C. 10.5 quarts
- D. 28 quarts

80. A package has a mass of 2.4 kilograms. What is the mass in grams?

- A. 24 grams
- B. 2,400 grams
- C. 240 grams
- D. 24,000 grams

81. A 1.75-liter pitcher is poured into milliliter-marked containers. What total milliliter volume is equivalent?

- A. 175 milliliters
- B. 1,075 milliliters
- C. 17,500 milliliters
- D. 1,750 milliliters

82. A rectangular floor is 12 meters by 9 meters, but a 4-meter by 3-meter rectangular opening is not part of the floor. What is the remaining floor area?

- A. 84 square meters
- B. 108 square meters
- C. 96 square meters
- D. 120 square meters

83. An aquarium's rectangular interior has dimensions 8 feet, 3 feet, and 2.5 feet. What capacity does this represent in cubic feet?

- A. 60 cubic feet
- B. 13.5 cubic feet
- C. 30 cubic feet
- D. 120 cubic feet

84. A room is drawn at a scale of 1 inch to 6 feet. The drawing measures 3.75 inches by 2.5 inches. What is the actual floor area?

- A. 56.25 square feet
- B. 337.5 square feet
- C. 135 square feet
- D. 405 square feet

85. A rectangle has width x meters and length $x + 3$ meters. Its perimeter is 34 meters. What is x ?

- A. 5
- B. 8.5
- C. 7
- D. 14

86. Five quiz scores have a mean of 86. Four of the scores are 78, 84, 91, and 87. What is the fifth score?

- A. 86
- B. 90
- C. 88
- D. 92

87. An extreme value of 44 is appended to the five-value set 6, 8, 9, 10, and 12. After recomputing the average across all six values, what is the mean to the nearest hundredth?

- A. 12.50
- B. 14.17
- C. 17.80
- D. 14.83

88. In a survey of 120 students, 35% choose option A. How many students is that?

- A. 42 students
- B. 35 students
- C. 40 students
- D. 78 students

89. A student subtracts $402 - 178$ by subtracting each digit independently and records 334. Which teacher response best addresses the underlying place-value misconception?

- A. Tell the student to memorize the standard algorithm and repeat it without discussing why regrouping is needed.
- B. Use base-ten blocks or an open number line to model regrouping one hundred and one ten before subtracting 178.
- C. Have the student subtract 178 from 400 and ignore the remaining 2 because it is too small to matter.
- D. Ask the student to reverse the numbers and subtract 402 from 178 so every top digit is larger.

90. A student claims $\frac{3}{8} + \frac{2}{5} = \frac{5}{13}$. Which instructional move would most directly develop the correct meaning of fraction addition?

- A. Have the student add numerators and denominators again with larger numbers until the rule becomes familiar.
- B. Tell the student that denominators should be ignored whenever two fractions have different bottom numbers.
- C. Ask the student to convert both fractions to unrelated mixed numbers before trying the same addition procedure.
- D. Use fraction strips or an area model to rename both fractions in fortieths before combining the equal-sized parts.

91. A learner writes $0.6 \times 0.4 = 2.4$ because $6 \times 4 = 24$. Which representation would best address the magnitude and place-value error?

- A. Tell the learner to move the decimal one place in every multiplication problem, regardless of the factors.
- B. Have the learner replace both decimals with whole numbers permanently so decimal place value does not affect the product.
- C. Use a hundred grid to shade six tenths in one direction and four tenths in the other, showing an overlap of 24 hundredths.
- D. Ask the learner to add 0.6 and 0.4 first, then use that sum as the product.

92. While solving $156 \div 12$, a student repeatedly subtracts 12 but loses track of how many groups have been removed. Which strategy would best connect the student's thinking to an efficient algorithm?

- A. Use partial quotients, subtracting convenient multiples of 12 and recording each number of groups before combining the quotients.
- B. Require the student to abandon grouping ideas and copy the long-division steps exactly from the board.
- C. Tell the student to multiply 156 by 12 first and use that larger number as the quotient.
- D. Ask the student to subtract 1 repeatedly instead of 12 so every subtraction can be counted individually.

93. A learner compares 0.35 and 0.7 by ignoring place value and says the 35 makes 0.35 larger. Which teacher response would most effectively rebuild the comparison concept?

- A. Place both numbers on a 0-to-1 number line or hundred grid and rewrite 0.7 as 0.70 for a place-value comparison.
- B. Agree that 35 is greater than 7 and therefore any decimal containing 35 must also be greater.
- C. Tell the student to compare only the number of digits after the decimal point and choose the longer decimal.
- D. Have the student remove both decimal points, compare the whole numbers, and then restore the decimals afterward.

94. A student converts 3.2 meters to centimeters by dividing by 100. Which teacher move would best develop unit-conversion reasoning?

- A. Give the rule 'always divide by 100' and ask the student to apply it more quickly on the next problem.
- B. Tell the student that meters and centimeters are interchangeable labels, so no numerical change is necessary.
- C. Use a meter stick partitioned into centimeters and ask how many 100-centimeter groups are contained in 3.2 meters.
- D. Have the student round 3.2 meters to 3 meters before converting because decimals should be removed first.

95. When plotting the point (2, -5), a student moves down 5 units first and then right 2 units. What teacher prompt best reinforces coordinate order?

- A. Tell the student that either coordinate may be used first because ordered pairs have no fixed order.
- B. Ask the student to read the ordered pair as x first, y second, moving horizontally to $x = 2$ before moving vertically to $y = -5$.
- C. Ask the student to change both coordinates to positive numbers before plotting any point below an axis.
- D. Have the student add the coordinates and plot a single point at -3 on the horizontal axis.

96. A student says a rectangular prism's surface area and volume are the same because both use length, width, and height. Which activity best distinguishes the two quantities?

- A. Have the student memorize two formulas without using units or models to distinguish what each formula measures.
- B. Ask the student to add all three dimensions and use that sum for both surface area and volume.
- C. Show only a flat rectangle and explain that three-dimensional measurements follow the same rule as perimeter.
- D. Build the prism with unit cubes to count volume, then cover its outside faces with unit squares to represent surface area.

97. A class wants to estimate the favorite after-school activity of all sixth graders, but surveys only members of the basketball team. What should the teacher emphasize?

- A. The basketball team is automatically representative because every student on the team is in sixth grade.
- B. A larger number of basketball players would remove all bias even if no other students were included.
- C. The class should report the team results as the preferences of all sixth graders without discussing how the sample was chosen.
- D. The sample may be biased, so students should select a more representative or randomly chosen group from the entire sixth grade.

98. A student is asked for the median of 6, 13, 8, 20, and 9 but immediately chooses 20 because it is the largest value. What is the most useful next step?

- A. Tell the student that the median is always the largest number whenever there are five data values.
- B. Have the student order the data from least to greatest and identify the value in the middle position.
- C. Ask the student to add all five values and use the total as the median without ordering the data.
- D. Remove the smallest value so the largest value becomes more central in the remaining list.

99. A learner completes $8 + 5 = 7 + \underline{\quad}$ by writing 13 in the blank. Which representation would best build a relational meaning of the equal sign?

- A. Explain that the blank after an equal sign always contains the answer to the calculation that appears before the sign.
- B. Replace the equal sign with an arrow so the learner can continue treating the statement as a one-way computation.
- C. Use a balance model showing 13 on the left and ask what amount combined with 7 keeps both sides balanced.
- D. Tell the learner to copy 13 into every blank that appears anywhere to the right of an equal sign.

100. A student says a rhombus cannot be a parallelogram because a rhombus has four equal sides. Which activity best supports hierarchical classification of quadrilaterals?

- A. Sort quadrilaterals by defining properties and identify that a rhombus has two pairs of parallel sides, so it satisfies the definition of a parallelogram.
- B. Sort shapes only by whether they look wide, tall, or tilted, without discussing parallel sides or angle properties.
- C. Teach each quadrilateral name as a completely separate category that can never overlap another category.
- D. Show one prototype of each shape and ask students to classify future figures only by visual resemblance to those prototypes.

Practice Exam 7: Answer Key and Explanations

1. A — The 6 is in the hundredths place because it is the second digit to the right of the decimal point. Six hundredths is $6/100$, which equals 0.06. The other choices move the digit into the thousandths, tenths, or ones place instead of preserving its actual place value. The original conditions confirm the result.

2. C — Convert the mixed numbers to improper fractions and use denominator 24. Twelve and five twelfths is $298/24$, while seven and three eighths is $177/24$. Their difference is $121/24$, or $5 \frac{1}{24}$. The nearby choices come from regrouping, denominator, or subtraction errors. The original conditions confirm the result. A final check supports this answer.

3. D — Multiplying 6.75 by 0.42 gives 2.835 liters. Because 0.42 is a little less than one half, the product should be a little less than half of 6.75, so a value near 2.8 is reasonable. The other choices reflect decimal placement or operation errors. The original conditions confirm the result. A final check supports this answer.

4. B — The number of identical packs must divide 84, 126, and 210 evenly, so the greatest common factor is needed. Factoring or repeated division shows that the greatest shared factor is 42. Each pack would then contain 2 pencils, 3 erasers, and 5 stickers with no leftovers. The original conditions confirm the result.

5. C — Convert $-5/6$ to about -0.833. Among the four negative values, the greatest number lies farthest to the right on the number line. Negative 0.79 is closer to zero than -0.81, -0.833, or -0.845, so it is the greatest temperature listed. Checking the result against the original quantities also helps rule out choices caused by a reversed operation or misplaced decimal.

6. A — Use the order of operations. First, 5 squared is 25, so the quantity in parentheses is 4. Then 2 times 4 is 8, and 48 divided by 6 is also 8. Adding those results gives 16. The distractors come from changing the required order of operations. The original conditions confirm the result.

7. B — Subtract 17 from both sides of $4x + 17 = 85$ to obtain $4x = 68$. Dividing both sides by 4 gives $x = 17$. Substitution verifies the solution because $4(17) + 17 = 68 + 17 = 85$. The alternatives result from incomplete inverse operations. The original conditions confirm the result.

8. D — Write 0.375 as $375/1000$. Dividing numerator and denominator by their greatest common factor, 125, gives $3/8$. Converting $3/8$ back to a decimal produces 0.375, confirming the equivalence. The other fractions equal different decimals and therefore do not represent the original number. The original conditions confirm the result. A final check supports this answer.

9. D — A unit price is found by dividing total cost by the number of items. Dividing \$28.20 by 15 gives \$1.88 per notebook. Multiplying \$1.88 by 15 returns \$28.20, which checks the calculation. The other choices are plausible results of rounding or division mistakes. The original conditions confirm the result. A final check supports this answer.

10. C — Average speed equals distance divided by time. Dividing 174 miles by 3 hours gives 58 miles per hour. Multiplying 58 by 3 reproduces the 174-mile distance. A rate near 60 miles per hour is also reasonable, while the largest distractor incorrectly multiplies distance and time. The original conditions confirm the result.

11. B — The ratio 7:9 means each group of 7 green tiles corresponds to 9 white tiles. Forty-two green tiles make 6 groups of 7, so the matching white count is 6 times 9, or 54. The ratio 42:54 simplifies to 7:9, confirming the proportional relationship. The original conditions confirm the result.

12. A — The scale factor from 5 centimeters to 13.75 centimeters is 2.75. Multiply the actual distance by that same factor: 32 times 2.75 equals 88 kilometers. A proportion, $5/32 = 13.75/x$, gives the same value and confirms that both quantities were scaled consistently. The original conditions confirm the result. A final check supports this answer.

13. A — Convert 18% to 0.18 and multiply by 850. The product is 153. A mental check can use 20% of 850, which is 170, and subtract 2% of 850, which is 17, giving 153. This verifies the percentage calculation and the selected response. The original conditions confirm the result. A final check supports this answer.

14. B — An increase of 25% means add one fourth of the original amount. One fourth of 72 is 18, and $72 + 18 = 90$. Equivalently, multiplying 72 by 1.25 gives 90. The distractors result from adding the percent as a whole number or using an incorrect scale factor. The original conditions confirm the result.

15. C — Fifteen percent of \$240 is \$36, found by multiplying 240 by 0.15. A discount subtracts that amount from the original price, so $\$240 - \$36 = \$204$. Multiplying by 0.85 gives the same result. The other choices confuse the discount amount with the final price or add instead. The original conditions confirm the result.

16. D — The ratio has 12 total parts because $5 + 7 = 12$. Dividing 156 minutes by 12 gives 13 minutes per part. Demonstrations use 5 parts, so 5 times 13 equals 65 minutes. The remaining 91 minutes correspond to the 7 practice parts and check the partition. The original conditions confirm the result.

17. C — Simplify $14/21$ to $2/3$. Because $x/18$ must equal $2/3$, multiply 18 by $2/3$ to get 12. Cross-multiplication gives $21x = 252$ and $x = 12$ as well. Substituting $12/18$ reduces to $2/3$, confirming the solution. Checking the result against the original quantities also helps rule out choices caused by a reversed operation or misplaced decimal.

18. A — Convert the mixed numbers to $9/4$ and $14/9$, then multiply. The 9s cancel, leaving $14/4$, which simplifies to $7/2$ or $3 \frac{1}{2}$ cups. Because the number of batches is greater than one, the answer should exceed $2 \frac{1}{4}$ cups, supporting the selected value. The original conditions confirm the result. A final check supports this answer.

19. D — Convert the mixed numbers to $31/6$ and $25/9$. Dividing by $25/9$ means multiplying by $9/25$, giving $279/150$. Reduce by 3 to obtain $93/50$, which is $1 \frac{43}{50}$. Since the rope is less than twice the piece length, an answer between one and two is reasonable. The original conditions confirm the result.

20. B — The decimal 0.72 represents 72 hundredths, or $72/100$. Dividing numerator and denominator by 4 gives $18/25$, which is in simplest form. Converting $18/25$ back to hundredths by multiplying by 4 gives $72/100$, confirming the equivalence. The other fractions represent different decimal values. The original conditions confirm the result. A final check supports this answer.

21. A — A rise of 13 degrees means add 13 to the starting temperature of -7 . Moving 13 units to the right on a number line passes zero after 7 units and continues 6 more units, ending at 6. The sign and magnitude match the described increase from below zero to above zero.

22. B — A charge decreases the balance, so subtract 9 from -18 . That gives -27 . On a number line, starting at -18 and moving 9 units left reaches -27 . The positive choices reverse the direction of the charge, while -9 would represent adding 9 rather than subtracting it. The original conditions confirm the result.

23. C — The product of two negative numbers is positive, so $(-6)(-8) = 48$. Multiplying 48 by 3 gives 144. There are two negative factors, an even number, so the final product must be positive. The negative distractor reflects a sign error, while the others reflect incomplete multiplication. The original conditions confirm the result.

24. D — Distance is the absolute difference between the coordinates. Compute $5 - (-14) = 19$, so the two points are 19 units apart. Another view is to move 14 units from -14 to 0 and then 5 more units to 5, totaling 19 units. The original conditions confirm the result. A final check supports this answer.

25. D — Convert $-1 \frac{1}{20}$ to -1.05. Comparing -1.07, -1.05, -0.99, and -1.005, the least value is the one farthest left on the number line. Negative 1.07 is more negative than the others, so it is the smallest value in the set. Checking the result against the original quantities also helps rule out choices caused by a reversed operation or misplaced decimal.

26. A — Multiplying by 10^5 moves the decimal point five places to the right. Starting with 3.27 gives 327,000. The exponent is positive, so the result must be much larger than 3.27. The distractors use the wrong number of places or move the decimal in the opposite direction. The original conditions confirm the result.

27. B — Scientific notation requires a coefficient at least 1 but less than 10. Moving the decimal in 0.0000845 five places right gives 8.45, so the exponent is -5. The negative exponent indicates a small number. Only 8.45×10^{-5} has both the correct coefficient and value. The original conditions confirm the result.

28. C — Because 12 squared is 144 and 13 squared is 169, $\sqrt{150}$ must be between 12 and 13 and closer to 12. Calculating gives approximately 12.247, which rounds to 12.2 to the nearest tenth. The other choices are farther from the actual square root. The original conditions confirm the result. A final check supports this answer.

29. A — When multiplying powers with the same base, add exponents; when dividing, subtract exponents. The exponent becomes $5 + 3 - 4 = 4$. Therefore the expression equals 2^4 , or 16. The distractors result from omitting one exponent operation or combining the exponents incorrectly. The original conditions confirm the result. A final check supports this answer.

30. C — An irrational number cannot be written as a ratio of integers. The number pi is irrational, and dividing it by the nonzero rational number 2 remains irrational. By contrast, $\sqrt{81}$ equals 9, 0.625 equals $\frac{5}{8}$, and $-\frac{3}{7}$ is already a ratio of integers. The original conditions confirm the result. A final check supports this answer.

31. B — Let the repeating decimal be represented as $\frac{36}{99}$ because a two-digit repeating block uses two 9s in the denominator. Reducing $\frac{36}{99}$ by 9 gives $\frac{4}{11}$. Dividing 4 by 11 produces 0.363636..., so the fraction exactly matches the repeating decimal rather than merely approximating it. The original conditions confirm the result.

32. D — The unit rate is 15 rolls for 6 cups, or 2.5 rolls per cup. Multiplying 14 cups by 2.5 gives 35 rolls. A proportion, $\frac{6}{15} = \frac{14}{x}$, gives the same result. The calculation keeps the multiplicative

relationship between flour and rolls constant. The original conditions confirm the result. A final check supports this answer.

33. A — Convert 54 minutes to 0.9 hour, then divide distance by time. The rate is $4.5 / 0.9 = 5$ miles per hour. At that rate, 0.9 hour times 5 miles per hour gives 4.5 miles, which confirms the conversion and the unit rate. The original conditions confirm the result. A final check supports this answer.

34. C — The serving scale factor is $20/8 = 2.5$. Multiply the original 2.5 cups of broth by 2.5 to get 6.25 cups. A proportion, $2.5/8 = x/20$, gives the same result. The answer must exceed 2.5 cups because the recipe makes more servings. The original conditions confirm the result. A final check supports this answer.

35. D — The tax is 7.5% of \$64, which is $0.075 \times 64 = \$4.80$. Add the tax to the original price: $\$64 + \$4.80 = \$68.80$. Multiplying \$64 by 1.075 gives the same total. The distractors miscalculate or misapply the tax amount. The original conditions confirm the result. A final check supports this answer.

36. B — Thirty percent of \$85 is \$25.50. Subtracting that discount from the original price gives \$59.50. Equivalently, paying 70% of the original price means multiplying 85 by 0.70, also giving \$59.50. The \$25.50 choice is only the discount, not the sale price. The original conditions confirm the result. A final check supports this answer.

37. B — A 12% increase means the new amount is 112% of the original, or 1.12 times the original. Divide 67.2 by 1.12 to get 60. Checking, 12% of 60 is 7.2, and $60 + 7.2 = 67.2$, so the original modeled amount is correct. The original conditions confirm the result. A final check supports this answer.

38. D — One hour contains 60 minutes, so multiply 3.75 by 60. The product is 225 minutes. Another approach is 3 hours = 180 minutes and 0.75 hour = 45 minutes, totaling 225. The distractors either ignore the fractional hour or treat the decimal digits as minutes. The original conditions confirm the result.

39. C — Each foot contains 12 inches, so 9 feet equals 108 inches. Adding the remaining 8 inches gives 116 inches. The 98-inch distractor treats each foot as 10 inches, while 108 ignores the extra 8 inches. The conversion requires combining both parts in the same unit. The original conditions confirm the result.

40. A — Because the points have the same y-coordinate, their distance is the absolute difference of the x-coordinates. Compute $6 - (-7) = 13$. Moving from -7 to 0 covers 7 units and from 0 to 6 covers 6 more, for a total of 13 units. The original conditions confirm the result.

41. A — The ratio contains 9 total parts because $4 + 5 = 9$. Dividing 63 students by 9 gives 7 students per part. Girls represent 5 parts, so 5 times 7 equals 35. The remaining 28 boys give 28:35, which reduces to the original 4:5 ratio. The original conditions confirm the result.

42. D — An enlargement factor of 1.5 means every length is multiplied by 1.5. Multiplying 8 centimeters by 1.5 gives 12 centimeters. Since the scale factor is greater than 1, the enlarged side must be longer than 8 centimeters. Dividing by 1.5 would instead model a reduction. The original conditions confirm the result.

43. C — The mixture has 5 total ratio parts. Dividing 25 cups by 5 gives 5 cups per part. Juice represents 3 parts, so 3 times 5 equals 15 cups. Water then uses 10 cups, and the ratio 15:10 simplifies to 3:2, confirming the partition. The original conditions confirm the result. A final check supports this answer.

44. B — Translate the statement into $0.72x = 54$. Dividing both sides by 0.72 gives $x = 75$. Checking, 72% of 75 is 0.72 times 75 = 54. The 38.88 distractor multiplies 54 by 0.72 instead of finding the whole from the known percentage. The original conditions confirm the result. A final check supports this answer.

45. C — Start at -11 and add the 18-degree rise to reach 7. Then subtract the 7-degree fall to reach 0. Tracking each change with its sign keeps the sequence clear. The final temperature is exactly zero, which also makes sense because the total rise and fall offset the initial deficit. The original conditions confirm the result.

46. D — Convert the fractions to decimals for a common comparison. Seven twelfths is about 0.5833, and $\frac{3}{5}$ is 0.6. Comparing 0.5833, 0.57, 0.605, and 0.6 shows that 0.605 is the greatest. Aligning place values prevents judging the numbers only by their written digits. The original conditions confirm the result. A final check supports this answer.

47. B — Combine like terms. The x -terms give $7x - 3x = 4x$, and the constants give $4 + 9 = 13$. Therefore the simplified expression is $4x + 13$. Terms with and without variables cannot be combined with each other, which is the source of several distractors. The original conditions confirm the result.

48. A — Substitute $a = -4$ and $b = 5$. Squaring -4 gives 16, so $3a^2 = 48$. Then $2b = 10$, and $48 - 10 = 38$. The exponent applies before multiplication, and the square makes the first term positive. Sign or order errors produce the distractors. The original conditions confirm the result.

49. C — Solving $5x - 8 < 27$ gives $5x < 35$ and therefore $x < 7$. Of the listed values, only 6 is less than 7. Substitution confirms it: $5(6) - 8 = 22$, which is less than 27, while 7 gives equality and the larger values fail. The original conditions confirm the result.

50. B — A point with a negative x -coordinate and a positive y -coordinate lies in Quadrant II. The point $(-5, 8)$ is left of the y -axis and above the x -axis, so Quadrant II is correct. The other quadrants correspond to different sign combinations for the two coordinates. The original conditions confirm the result.

51. D — Area of a rectangle is length times width. Multiplying 13.5 feet by 8 feet gives 108 square feet. The unit is square feet because area measures two-dimensional coverage. Adding the side lengths would relate to perimeter rather than area, and doubling the product would overcount the surface. The original conditions confirm the result.

52. A — Use the triangle area formula, one half times base times height. One half of 17 times 9 equals 76.5 square inches. The height must be perpendicular to the base. The 153-square-inch choice omits the one-half factor, while the other distractors use incorrect operations. The original conditions confirm the result. A final check supports this answer.

53. D — The area of a parallelogram is base times perpendicular height. Multiplying 12 by 7.5 gives 90 square meters. The slanted side length is not needed because area depends on the perpendicular distance between the parallel bases. Halving the product would incorrectly use the triangle formula. The original conditions confirm the result.

54. C — For a trapezoid, add the parallel bases, multiply by the height, and divide by 2. The base sum is 30, and 30 times 8 divided by 2 equals 120 square centimeters. The 240 choice omits the one-half factor, while 60 halves the result twice. The original conditions confirm the result.

55. A — Volume of a rectangular prism is length times width times height. Multiplying 9 by 4 by 6 gives 216 cubic feet. Cubic units are appropriate because three dimensions are multiplied. Adding dimensions gives a linear measure, and halving the product would not match the volume formula. The original conditions confirm the result.

56. B — A cube has six congruent square faces. One face has area 5.5 squared, or 30.25 square centimeters. Multiplying by 6 gives 181.5 square centimeters for the total surface area. The 30.25 choice counts only one face, while 166.375 is the cube's volume instead. The original conditions confirm the result. A final check supports this answer.

57. B — Perimeter is the distance around the rectangle, so add length and width and double the sum. Fourteen point two plus 6.8 equals 21, and twice 21 equals 42 meters. The 96.56 choice is the area, showing why the requested attribute and units must be identified first. The original conditions confirm the result.

58. D — Angles forming a straight line are supplementary, so their measures total 180 degrees. Subtract 137 from 180 to get 43 degrees. Adding 137 and 43 returns 180, confirming the result. Equal or complementary-angle reasoning would not match the straight-line relationship described in the problem. The original conditions confirm the result.

59. C — The interior angles of a triangle sum to 180 degrees. The two known angles total 115 degrees, so the third angle is $180 - 115 = 65$ degrees. Adding 64, 51, and 65 gives 180, which checks the result. The distractors come from incomplete subtraction. The original conditions confirm the result.

60. A — Vertical angles are opposite angles formed by two intersecting lines, and they are congruent. Therefore the angle opposite the 118-degree angle also measures 118 degrees. The adjacent angles would measure 62 degrees because they are supplementary, so 62 is a plausible but incorrect distractor. The original conditions confirm the result.

61. C — Reflecting across the y-axis changes the sign of the x-coordinate while leaving the y-coordinate unchanged. Starting from (4, -7) produces (-4, -7). The other choices change the wrong coordinate, change both signs, or exchange coordinate positions rather than applying the stated reflection. The original conditions confirm the result. A final check supports this answer.

62. A — Moving 8 units right adds 8 to the x-coordinate: $-3 + 8 = 5$. Moving 2 units down subtracts 2 from the y-coordinate: $5 - 2 = 3$. Therefore the image is (5, 3). The distractors reverse one direction or change the wrong coordinate. The original conditions confirm the result.

63. B — Because the x-coordinates are equal, only the vertical change matters. The distance is the absolute difference of the y-coordinates: $6 - (-9) = 15$. Moving from -9 to 0 covers 9 units and from 0 to 6 covers 6 more, totaling 15 units. The original conditions confirm the result. A final check supports this answer.

64. D — Add the five values to get 60, then divide by the number of values, 5. The mean is 12. The value 60 is the total rather than the average, and the other distractors come from dividing incorrectly or confusing the mean with another measure of center. The original conditions confirm the result.

65. D — Order the data: 4, 7, 8, 9, 11, 15. With six values, the median is the average of the two middle values, 8 and 9. Their average is 8.5. Choosing only one middle value would ignore that an even-sized data set has two central positions. The original conditions confirm the result.

66. C — The mode is the value that occurs most often. In the list, 5 appears three times, 7 appears twice, and the other values appear once. Therefore 5 is the mode. Frequency, not numerical size or position in the ordered list, determines the mode of a data set. The original conditions confirm the result.

67. B — The range is the greatest value minus the least value. Here the maximum is 23 and the minimum is 9, so the range is $23 - 9 = 14$. The range describes the overall spread between the extremes, not the largest value or the sum of the extremes. The original conditions confirm the result.

68. A — The lower half is 3, 5, 7, 8, so Q1 is the average of 5 and 7, which is 6. The upper half is 10, 12, 13, 18, so Q3 is 12.5. The interquartile range is $Q3 - Q1 = 12.5 - 6 = 6.5$. The original conditions confirm the result.

69. C — Numbers greater than 4 on a six-sided number cube are 5 and 6, so there are 2 favorable outcomes out of 6 equally likely outcomes. The probability is $2/6$, which simplifies to $1/3$. Counting both favorable and total outcomes correctly prevents the common denominator and complement errors. The original conditions confirm the result.

70. A — There are 20 counters altogether. A counter that is not blue must be green or yellow, giving $5 + 7 = 12$ favorable outcomes. The probability is $12/20$, which simplifies to $3/5$. The complement also checks: blue has probability $8/20 = 2/5$, so not blue is $3/5$. The original conditions confirm the result.

71. D — Experimental probability is successes divided by total trials. Dividing 18 by 60 gives 0.30, or 30%. The ratio $18/60$ also simplifies to $3/10$. The other choices confuse the number of successes with a decimal or use the failures instead of the recorded success rate. The original conditions confirm the result.

72. B — The equally likely outcomes are HH, HT, TH, and TT. Exactly one head occurs in HT and TH, so 2 of the 4 outcomes are favorable. The probability is $2/4 = 1/2$. Counting ordered outcomes prevents overlooking that head-tail and tail-head are distinct results. The original conditions confirm the result.

73. D — Apply the distributive property by multiplying 6 by each term inside the parentheses. Six times $2x$ is $12x$, and 6 times -5 is -30 , giving $12x - 30$. The distractors distribute to only one term, combine unlike quantities, or lose the negative sign. The original conditions confirm the result. A final check supports this answer.

74. A — Subtract 11 from both sides to obtain $3x = 39$. Dividing by 3 gives $x = 13$. Substituting 13 into the original equation gives $3(13) + 11 = 39 + 11 = 50$, confirming the solution. The distractors result from skipping or reversing an inverse operation. The original conditions confirm the result.

75. C — Divide both sides by 5 to get $x - 2 = 7$. Then add 2 to both sides, giving $x = 9$. Substitution checks the result because $5(9 - 2) = 5 \text{ times } 7 = 35$. The other choices stop after one step or reverse an operation. The original conditions confirm the result.

76. B — Twice a number n is $2n$. The phrase 'nine less than' that quantity means subtract 9 from $2n$, producing $2n - 9$. Reversing the subtraction changes the meaning, while $2(n - 9)$ subtracts 18 after distribution rather than 9. Checking the result against the original quantities also helps rule out choices caused by a reversed operation or misplaced decimal.

77. C — Substitute $x = 7$ into $y = 3x - 4$. Three times 7 is 21, and $21 - 4 = 17$. The ordered relationship between input and output is preserved by following the rule exactly. The distractors omit the subtraction, subtract first, or use an incorrect product. The original conditions confirm the result.

78. D — The sequence increases by 5 each time. From the first term to the twelfth term there are 11 equal increases, so compute $4 + 11 \text{ times } 5 = 59$. Using 12 increases instead of 11 would move one term too far, which explains a common distractor. The original conditions confirm the result.

79. A — One gallon equals 4 quarts. Multiply 3.5 gallons by 4 quarts per gallon to get 14 quarts. The units gallons cancel conceptually, leaving quarts. Since each gallon contains more than one quart, the numerical value should increase rather than decrease during the conversion. The original conditions confirm the result. A final check supports this answer.

80. B — One kilogram equals 1,000 grams, so multiply 2.4 by 1,000. Moving the decimal three places to the right gives 2,400 grams. The factor is determined by the metric relationship between kilograms and grams; using 10 or 100 would convert by the wrong magnitude. The original conditions confirm the result. A final check supports this answer.

81. D — One liter equals 1,000 milliliters. Multiplying 1.75 by 1,000 gives 1,750 milliliters. The metric prefix relationship makes the conversion exact. The smaller distractor moves the decimal only two places, while the larger distractor moves it four places instead of three. Checking the result against the original quantities also helps rule out choices caused by a reversed operation or misplaced decimal.

82. C — Find the area of the full rectangle first: $12 \text{ times } 9 = 108$ square meters. The opening has area $4 \text{ times } 3 = 12$ square meters. Subtracting the missing area gives $108 - 12 = 96$ square meters. Adding the opening instead would count space that is not part of the floor.

83. A — Volume of a rectangular prism is the product of its three dimensions. Multiply 8 by 3 by 2.5 to get 60 cubic feet. Because length, width, and height are all measured in feet, the resulting unit is cubic feet. The distractors omit or double one dimension. The original conditions confirm the result.

84. B — Convert each drawing dimension using the scale before finding area. Three point seven five inches represents 22.5 feet, and 2.5 inches represents 15 feet. Multiplying 22.5 by 15 gives 337.5 square

feet. Scaling area directly by 6 instead of scaling both dimensions would produce an incorrect result. The original conditions confirm the result.

85. C — Perimeter equals twice the sum of length and width. Set $2[x + (x + 3)] = 34$. Dividing by 2 gives $2x + 3 = 17$, then $2x = 14$ and $x = 7$. The dimensions are therefore 7 and 10, whose perimeter is 34. The original conditions confirm the result.

86. B — A mean of 86 for five scores requires a total of $86 \times 5 = 430$ points. The four known scores total 340. Subtracting gives $430 - 340 = 90$ for the missing score. Adding 90 to the known scores returns the required total and therefore the stated mean. The original conditions confirm the result.

87. D — The original five values total 45. Adding 44 gives a new total of 89 across six values. Dividing 89 by 6 gives approximately 14.8333, which rounds to 14.83. The large added value raises the mean noticeably, illustrating how an extreme observation can affect this measure of center. The original conditions confirm the result.

88. A — Convert 35% to 0.35 and multiply by 120. The product is 42 students. Another method is to find 30% of 120, which is 36, and 5% of 120, which is 6; together they total 42. The count must be a whole number in this context. The original conditions confirm the result.

89. B — The error shows that the student is treating digits independently instead of recognizing hundreds, tens, and ones that can be regrouped. A concrete or visual model makes the exchange across place values visible and connects the standard algorithm to quantity. Memorization alone may reproduce steps without repairing the underlying place-value understanding.

90. D — Fractions can be added only after the parts refer to the same-sized unit. Renaming $\frac{3}{8}$ as $\frac{15}{40}$ and $\frac{2}{5}$ as $\frac{16}{40}$ makes the common unit visible, so the sum is $\frac{31}{40}$. A visual model explains why denominators are not simply added and builds conceptual understanding of equivalence. The original conditions confirm the result.

91. C — A hundred grid represents 0.6 as six tenths and 0.4 as four tenths. Their overlap covers 24 hundredths, or 0.24, making both multiplication and place value visible. The model also shows the product should be smaller than either factor because both factors are positive numbers less than one. The original conditions confirm the result.

92. A — Repeated subtraction already reflects the meaning of division as finding equal groups, but it becomes inefficient when each group is recorded separately. Partial quotients preserve that reasoning while using larger chunks such as 10 groups at once. Recording the chunks prevents counting errors and provides a conceptual bridge to the standard division algorithm.

93. A — Writing 0.7 as 0.70 shows that 0.35 is 35 hundredths while 0.70 is 70 hundredths. A number line or hundred grid makes the magnitude difference visible and prevents whole-number reasoning from being applied directly to decimals. The representation connects notation, place value, and relative size. The original conditions confirm the result.

94. C — A meter contains 100 centimeters, so a length expressed in the smaller unit has a larger numerical value. A partitioned meter stick makes that relationship concrete: 3.2 meters corresponds to

3.2 groups of 100 centimeters, or 320 centimeters. The model builds reasoning from unit size rather than a memorized direction rule.

95. B — An ordered pair records horizontal position first and vertical position second. Moving to $x = 2$ before moving to $y = -5$ connects the notation directly to the axes and helps prevent coordinate reversal. The prompt focuses on meaning rather than simply telling the student that the plotted point is wrong.

96. D — Volume measures the space inside a three-dimensional object and is represented with unit cubes. Surface area measures the total area of the exterior faces and is represented with unit squares. Using both models on the same prism makes the different attributes and units visible before students rely on formulas. The original conditions confirm the result.

97. D — A sample should reflect the population being studied. Basketball-team members may share interests that differ from those of the entire sixth grade, so the sampling method can bias the estimate. Selecting students across the full grade, ideally through a random or otherwise representative process, supports a more defensible generalization. The original conditions confirm the result.

98. B — The median is based on position in an ordered data set, not on which value is greatest. Ordering the numbers as 6, 8, 9, 13, 20 makes the middle value 9 visible. This step directly addresses the misconception and distinguishes median from maximum, mean, and other numerical summaries. The original conditions confirm the result.

99. C — The equal sign means both sides have the same value. The left side totals 13, so the right side must also total 13; therefore 7 needs 6 more. A balance representation makes equivalence visible and challenges the misconception that an equal sign simply announces where an answer should be written.

100. A — Quadrilateral categories can overlap because one shape may satisfy the defining properties of a broader category. A rhombus has two pairs of parallel opposite sides, so it is a parallelogram, with the additional property of four equal sides. Sorting by properties develops hierarchical reasoning rather than dependence on visual prototypes.