

NYSTCE Grades 1-6 Mathematics (222)

Practice Exam 6

100 selected-response practice questions
Answer key + detailed explanations

Independently written study material aligned to the NYSTCE Field 222 mathematics competencies. This is not an official NYSTCE publication.

Practice first. Check the key only after completing the full set.

Directions and Test Context

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.

Expanded practice format	100 selected-response questions
Official Field 222 Part Two format	40 selected-response items + 1 constructed-response item
Official testing time	2 hours 15 minutes
Official passing score	520
Calculator	Standard 4-function calculator provided on-screen

Official test-format details were checked against the NYSTCE website on August 17, 2026. Practice Exam 6 expands the selected-response portion to 100 items for additional repetition and coverage.

Practice Exam 6 - Questions

Competency 0001: Number and Operations

1. A laboratory balance displays 318.0476 grams. What value is contributed by the digit 4?

- A. 0.004
- B. 0.04
- C. 0.4
- D. 4

2. A community garden has $10 \frac{3}{8}$ bags of soil. Volunteers use $4 \frac{5}{6}$ bags. How many bags remain?

- A. $5 \frac{13}{24}$ bags
- B. $5 \frac{11}{24}$ bags
- C. $6 \frac{13}{24}$ bags
- D. $5 \frac{1}{2}$ bags

3. A robotics team uses 65% of a 5.28-meter cable for one assembly. What cable length, in meters, goes into that assembly?

- A. 3.432 meters
- B. 0.3432 meter
- C. 3.93 meters
- D. 34.32 meters

4. Three classroom timers sound every 18 minutes, 24 minutes, and 30 minutes. If they sound together now, after how many minutes will they next sound together?

- A. 72 minutes
- B. 120 minutes
- C. 360 minutes
- D. 2160 minutes

5. Four temperature changes are represented by -0.84, -0.86, -0.805, and $-\frac{7}{8}$. Which change would appear farthest left on a number line?

- A. $-\frac{7}{8}$
- B. -0.84
- C. -0.86
- D. -0.805

6. A score is computed by the expression $30 - [3(7 - 3)^2 \div 6]$. What score results?

- A. 8
- B. 27
- C. 54
- D. 22

7. After subtracting \$13 from six equal donations, a fundraiser records \$59. If each donation is x dollars, what is one donation?

- A. $x = 7.67$
- B. $x = 12$
- C. $x = 10$
- D. $x = 46$

8. A class completed 45% of a project. Which reduced fraction names the same portion of the whole project?
- A. $\frac{9}{20}$
 - B. $\frac{4}{5}$
 - C. $\frac{5}{9}$
 - D. $\frac{45}{10}$

Competency 0002: Ratios, Proportional Relationships, and Number Systems

9. A package of 18 folders costs \$24.30. What is the cost per folder?
- A. \$1.35
 - B. \$0.74
 - C. \$1.25
 - D. \$1.45
10. During a 2.8-hour training ride, a cyclist covers 126 kilometers without changing pace. How many kilometers are covered per hour?
- A. 35 kilometers per hour
 - B. 45 kilometers per hour
 - C. 50.4 kilometers per hour
 - D. 352.8 kilometers per hour
11. The ratio of brass buttons to silver buttons is 5:8. If a costume uses 45 brass buttons, how many silver buttons are needed?
- A. 50
 - B. 64
 - C. 72
 - D. 80
12. A map scale shows 3 centimeters for 22 kilometers. Two landmarks are 10.5 centimeters apart on the map. What is the actual distance?
- A. 66 kilometers
 - B. 70 kilometers
 - C. 77 kilometers
 - D. 231 kilometers
13. A school library has 640 new books, and 27.5% are nonfiction. How many of the new books are nonfiction?
- A. 160
 - B. 176
 - C. 1760
 - D. 232
14. A tablet originally costs \$320 and is marked down 18%. What is the sale price before tax?
- A. \$57.60
 - B. \$264.00
 - C. \$262.40
 - D. \$377.60

15. Attendance at a museum workshop rises from 350 participants to 434 participants. What is the percent increase?
- A. 19.4%
 - B. 20%
 - C. 24%
 - D. 84%
16. Nine batches of clay require 3.15 kilograms of material. At the same rate, how many kilograms are needed for 20 batches?
- A. 5.4 kilograms
 - B. 7 kilograms
 - C. 6.3 kilograms
 - D. 8.15 kilograms
17. A proportional relationship has constant of proportionality 1.6 and passes through the origin. Which equation represents the relationship?
- A. $y = x + 1.6$
 - B. $y = 1.6x + 1$
 - C. $y = 1.6x$
 - D. $x = 1.6y$
18. For one constant-ratio rule, the output-input pairs are (6, 25.2), (9, 37.8), and (14, 58.8). By what factor is each input multiplied to obtain its output?
- A. 3.6
 - B. 4.8
 - C. 6.2
 - D. 4.2
19. A pump's output varies directly with operating time. It moves 42 liters in 12 minutes. At the same rate, how many liters does it move in 35 minutes?
- A. 105 liters
 - B. 119 liters
 - C. 122.5 liters
 - D. 147 liters
20. A family leaves an 18% tip on a \$52.50 restaurant bill. How much is the tip?
- A. \$9.45
 - B. \$8.40
 - C. \$9.00
 - D. \$61.95
21. An investment of \$3,200 earns simple interest at 4.5% annually for 2.5 years. How many dollars of interest accumulate, excluding the principal?
- A. \$144
 - B. \$288
 - C. \$360
 - D. \$3,560

22. A reference length is 150 centimeters, but a student records 156 centimeters. What is the percent error relative to the reference length?

- A. 3.85%
- B. 4%
- C. 6%
- D. 104%

23. On an architect's drawing, every 2 inches corresponds to 15 actual feet. A drawn wall spans 7.2 inches. How long is the real wall?

- A. 46 feet
- B. 52.5 feet
- C. 108 feet
- D. 54 feet

24. A model is enlarged with scale factor 1.35. What length results from enlarging a 24-centimeter side?

- A. 25.35 centimeters
- B. 30 centimeters
- C. 35.4 centimeters
- D. 32.4 centimeters

25. A trail mix uses raisins and nuts in a ratio of 4:7. If the finished mix contains 55 cups altogether, how many cups are raisins?

- A. 20 cups
- B. 16 cups
- C. 28 cups
- D. 35 cups

26. A store prices a 15-pound bag of birdseed at \$18.75. If the cost is distributed evenly across the pounds, what does one pound cost?

- A. \$0.80
- B. \$1.15
- C. \$2.25
- D. \$1.25

27. A club's membership decreases from 960 members to 816 members. What percent decrease occurred?

- A. 12%
- B. 17.6%
- C. 85%
- D. 15%

28. A \$64 purchase is subject to 8.25% sales tax. What is the tax amount?

- A. \$4.80
- B. \$5.28
- C. \$5.12
- D. \$69.28

29. The temperature changes from -8.5°C before sunrise to 6.25°C in the afternoon. By how many degrees did it increase?
- A. 2.25°C
 - B. 14.75°C
 - C. 14.25°C
 - D. -14.75°C
30. A game begins with a score of -17 , applies an 8-point penalty, and then applies another 5-point penalty. What is the resulting score?
- A. -14
 - B. -20
 - C. 30
 - D. -30
31. Two points on a number line have coordinates -4.75 and 3.6 . What is the distance between them?
- A. 1.15 units
 - B. 8.35 units
 - C. 7.35 units
 - D. 8.15 units
32. A coordinate has negative horizontal position and positive vertical position. Which listed ordered pair matches that location?
- A. $(7, 4)$
 - B. $(-7, -4)$
 - C. $(7, -4)$
 - D. $(-7, 4)$
33. Four account changes are -0.84 , -0.86 , $-5/6$, and $-13/15$. Which represents the greatest loss, meaning the lowest numerical value?
- A. -0.84
 - B. -0.86
 - C. $-13/15$
 - D. $-5/6$
34. A $7\frac{1}{2}$ -foot rope is cut into equal pieces that are each $1\frac{1}{4}$ feet long. How many full pieces are made?
- A. 5
 - B. 6
 - C. 7
 - D. $9\frac{3}{8}$
35. A bowl receives $\frac{7}{12}$ cup of oats and $\frac{5}{18}$ cup of seeds. How much dry mixture is in the bowl after both amounts are added?
- A. $\frac{12}{30}$ cup
 - B. $1\frac{1}{36}$ cups
 - C. $\frac{35}{216}$ cup
 - D. $\frac{31}{36}$ cup

36. A bank balance changes by $-\$5.72$ and then by $+\$9.08$. What is the net change?
- A. -14.80
 - B. -3.36
 - C. 4.36
 - D. 3.36
37. A microscope measurement is 0.00000631 meter. Which expression is proper scientific notation for the measurement?
- A. 6.31×10^{-5}
 - B. 6.31×10^{-6}
 - C. 0.631×10^{-6}
 - D. 63.1×10^{-6}
38. A data value is formed by multiplying 8×10^5 by 3×10^{-3} . Which scientific-notation form represents the product?
- A. 2.4×10^2
 - B. 24×10^3
 - C. 2.4×10^3
 - D. 2.4×10^8
39. A square courtyard covers 310 square meters. If its side measurement is reported to one decimal place, what length should be recorded?
- A. 15.5 meters
 - B. 17.6 meters
 - C. 17.5 meters
 - D. 18.6 meters
40. Exactly $2,744$ unit cubes fill a larger cube with equal edge lengths. How many unit cubes run along one edge?
- A. 12 units
 - B. 13 units
 - C. 14 units
 - D. 16 units
41. Combine the powers of 5 in $(5^7 \div 5^3) \times 5^{-2}$. Which single power of 5 is equivalent?
- A. 5^2
 - B. 5^{-12}
 - C. 5^6
 - D. 5^8
42. A game awards $(-3)^4$ points and then removes 2^5 points. What final point total results?
- A. -113
 - B. 17
 - C. 113
 - D. 49

43. An open interval runs from $\frac{5}{8}$ up to 0.64. Which choice is inside the interval, excluding both endpoints?

- A. 0.63
- B. 0.62
- C. 0.625
- D. $\frac{13}{20}$

44. Which number would cancel -18.35 when the two values are added together?

- A. -18.35
- B. $\frac{1}{18.35}$
- C. $-\frac{1}{18.35}$
- D. 18.35

45. On a coordinate diagram, M(-9, 2) and N(4, 2) share the same height. What horizontal distance separates them?

- A. 5 units
- B. 11 units
- C. 15 units
- D. 13 units

46. Thirty-six of 120 survey respondents chose option A. What percent of respondents chose option A?

- A. 30%
- B. 24%
- C. 36%
- D. 70%

Competency 0003: Algebra, Measurement, Geometry, and Data

47. Five identical bundles each contain $2x - 7$ items, and $3x$ additional items are added. Which expression gives the total number of items?

- A. $13x - 35$
- B. $10x - 32$
- C. $13x - 7$
- D. $25x - 35$

48. A calculator uses $T = 4p^2 - 3q$. Entering $p = -2$ and $q = 5$ should produce which output?

- A. -31
- B. 1
- C. 11
- D. 31

49. A score qualifies when $4x + 3 > 27$. Which listed value qualifies?

- A. $x = 4$
- B. $x = 5$
- C. $x = 6$
- D. $x = 7$

50. Four times the quantity $2x - 1$ equals $6x + 10$. Which value makes this statement true?

- A. $x = 7$
- B. $x = 3$
- C. $x = 5$
- D. $x = 9$

51. Starting at 14, a pattern increases by 6 each step: 14, 20, 26, 32, What value appears in position 18?

- A. 110
- B. 120
- C. 116
- D. 122

52. A machine squares an input, doubles that result, adds five times the original input, and subtracts 1. What output is produced when the input is -3?

- A. 2
- B. -34
- C. 8
- D. 32

53. Moving from $(-1, 7)$ to $(5, -2)$ changes y by -9 while x changes by 6. What rate of vertical change per horizontal unit does this line have?

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

54. For the line $3x + 2y = 14$, set the horizontal coordinate equal to zero. At what vertical coordinate does the line meet the y -axis?

- A. 7
- B. -7
- C. 14
- D. 3

55. Solve the system $x + 2y = 16$ and $x - y = 4$. What is the value of y ?

- A. 3
- B. 6
- C. 4
- D. 12

56. A running path is 2.85 kilometers long. How many meters is that?

- A. 285 meters
- B. 28,500 meters
- C. 0.00285 meter
- D. 2,850 meters

57. A laboratory bottle contains 4.375 liters. How many milliliters does it contain?
- A. 437.5 milliliters
 - B. 4,375 milliliters
 - C. 43,750 milliliters
 - D. 0.004375 milliliter
58. A professional session runs from 1:46 p.m. until 4:23 p.m. Express the entire elapsed time as a number of minutes.
- A. 137 minutes
 - B. 167 minutes
 - C. 237 minutes
 - D. 157 minutes
59. Fencing will follow every edge of an 18.6-meter by 11.4-meter rectangular play area. What total length of fence is required?
- A. 30 meters
 - B. 60 meters
 - C. 212.04 meters
 - D. 84 meters
60. A sign is triangular, with a 16-centimeter base and an 11.5-centimeter altitude drawn perpendicular to that base. How much surface area does the sign have?
- A. 27.5 square centimeters
 - B. 184 square centimeters
 - C. 368 square centimeters
 - D. 92 square centimeters
61. The perpendicular distance between the bases of a parallelogram is 7.2 inches, and one base is 12.5 inches. How many square inches does it cover?
- A. 39.4 square inches
 - B. 45 square inches
 - C. 90 square inches
 - D. 180 square inches
62. The two parallel edges of a trapezoidal panel are 13 centimeters and 21 centimeters long, separated by 6 centimeters. What area is enclosed?
- A. 102 square centimeters
 - B. 78 square centimeters
 - C. 126 square centimeters
 - D. 204 square centimeters
63. A tank has a rectangular interior with dimensions 6.5 feet, 5 feet, and 4 feet. How many cubic feet can the interior contain?
- A. 65 cubic feet
 - B. 110 cubic feet
 - C. 260 cubic feet
 - D. 130 cubic feet

64. Wrapping material must cover all six faces of a 7-inch by 5-inch by 2-inch rectangular prism. What total area must be covered?
- A. 70 square inches
 - B. 94 square inches
 - C. 118 square inches
 - D. 140 square inches
65. A stage covers 168 square feet. If one dimension is 14 feet, what other dimension gives the required rectangular area?
- A. 10 feet
 - B. 14 feet
 - C. 12 feet
 - D. 154 feet
66. A square patio covers 225 square feet. Find the side length first, then determine the total distance around all four sides.
- A. 60 feet
 - B. 15 feet
 - C. 45 feet
 - D. 900 feet
67. One ray splits a straight angle so that one part measures 126° . How many degrees are left for the adjacent part?
- A. 36°
 - B. 126°
 - C. 234°
 - D. 54°
68. Two corners of a triangular frame measure 52° and 71° . How many degrees must the remaining corner measure?
- A. 47°
 - B. 67°
 - C. 57°
 - D. 123°
69. A regular nonagon has perimeter 121.5 centimeters. How long is each side?
- A. 9 centimeters
 - B. 12.5 centimeters
 - C. 15.5 centimeters
 - D. 13.5 centimeters
70. Draw diagonals from one vertex of an 11-gon to partition it into triangles. Using that partition, what is the total of all interior angle measures?
- A. $1,440^\circ$
 - B. $1,620^\circ$
 - C. $1,800^\circ$
 - D. $1,980^\circ$

71. A point starts at $(-8, 5)$. A reflection across the vertical axis moves it to which coordinate?
- A. $(-8, -5)$
 - B. $(8, -5)$
 - C. $(8, 5)$
 - D. $(-5, 8)$
72. A translation moves every point 4 units left and 7 units up. Where does the point $(6, -3)$ land?
- A. $(10, -10)$
 - B. $(2, 4)$
 - C. $(2, -10)$
 - D. $(10, 4)$
73. A segment's endpoints are $(-3, 10)$ and $(9, -4)$. Which point has coordinates equal to the averages of the two endpoint coordinates?
- A. $(6, 6)$
 - B. $(3, 3)$
 - C. $(3, 7)$
 - D. $(-6, 14)$
74. A vertical segment has endpoints $(5, -8)$ and $(5, 9)$. What is its length?
- A. 1 unit
 - B. 13 units
 - C. 17 units
 - D. 18 units
75. Five measurements total 105 units: 12, 16, 19, 24, and 34. If that total is shared equally among the five measurements, what value results?
- A. 21
 - B. 19
 - C. 20
 - D. 22
76. What is the median of the ordered data set 6, 9, 12, 15, 21, 28, 31, 40?
- A. 18
 - B. 15
 - C. 18.5
 - D. 21
77. Among the readings 63, 48, 71, 55, 69, and 52, how many units separate the maximum reading from the minimum reading?
- A. 16
 - B. 19
 - C. 23
 - D. 119

78. Split the ordered list 2, 4, 7, 9, 12, 15, 19, 23 into lower and upper halves. What is $Q_3 - Q_1$?

- A. 8.5
- B. 11.5
- C. 10.5
- D. 15

79. A ten-sided die is numbered 1 through 10. One roll is made. What fraction of all equally likely outcomes are prime numbers?

- A. $\frac{2}{5}$
- B. $\frac{1}{5}$
- C. $\frac{1}{2}$
- D. $\frac{3}{5}$

80. From a bag holding 7 red, 5 blue, and 8 yellow counters, one counter is drawn. What is the chance that its color belongs to the red-or-blue group?

- A. $\frac{1}{4}$
- B. $\frac{7}{20}$
- C. $\frac{4}{5}$
- D. $\frac{3}{5}$

81. A manufacturing defect occurs with probability 0.12 per item. In 250 items, about how many defects are expected?

- A. 12
- B. 30
- C. 21
- D. 120

82. Two fair six-sided number cubes are rolled. What is the probability that both show 6?

- A. $\frac{1}{6}$
- B. $\frac{1}{36}$
- C. $\frac{1}{12}$
- D. $\frac{1}{18}$

83. A course grade uses scores 82, 91, and 76 with weights 25%, 35%, and 40%. What weighted average results?

- A. 81.40
- B. 83.00
- C. 82.75
- D. 249.00

84. The mean of five values is 18. A sixth value of 30 is added. What is the new mean?

- A. 20
- B. 19
- C. 21
- D. 22

85. A machine outputs five sixths of its input. If the input is 42, what output does the proportional rule produce?
- A. 35
 - B. 30
 - C. 36
 - D. 50.4
86. A board measures 114 inches. How many feet is that?
- A. 8.5 feet
 - B. 9 feet
 - C. 10.5 feet
 - D. 9.5 feet
87. A floor plan consists of two nonoverlapping rectangles: one 10 feet by 8 feet and another 6 feet by 3 feet. How many square feet are covered altogether?
- A. 98 square feet
 - B. 80 square feet
 - C. 94 square feet
 - D. 128 square feet
88. An aquarium's interior is 4.2 feet by 3.5 feet by 5 feet. How many cubic feet of space are inside?
- A. 12.7 cubic feet
 - B. 36.75 cubic feet
 - C. 147 cubic feet
 - D. 73.5 cubic feet

Competency 0004: Instruction in Mathematics

89. A learner compares 4,709 and 4,790 by looking first at the ones digits and says 4,709 is larger. Which instructional move most directly rebuilds the comparison strategy?
- A. Tell the student to compare only the final digit because ones always determine which whole number is greater.
 - B. Use a place-value chart to compare thousands, hundreds, tens, and ones in order, showing that the first difference is 9 tens versus 0 tens.
 - C. Have the student add the two numbers and decide that the larger addend must be the number with the larger ones digit.
 - D. Ask the student to round both numbers to the nearest thousand and stop because the rounded values are equal.
90. A student calls one region 'one third' because a rectangle has been split into three pieces, even though the pieces have different areas. What should the teacher emphasize?
- A. Any three pieces are automatically thirds as long as they are inside the same rectangle.
 - B. The largest piece should always be called one third because it is easiest to see.
 - C. Fractional parts of one whole must be equal in area when they are named as thirds.
 - D. Only the number of dividing lines matters when naming a fraction of a whole.

91. A teacher wants students to explain why 8×47 can be found as $8 \times 40 + 8 \times 7$. Which representation best supports the idea?

- A. A number line showing only the final product 376 without decomposing either factor.
- B. A calculator display of $8 \times 47 = 376$ with no representation of the factors.
- C. An area model decomposing 47 into 40 and 7, with partial products 320 and 56.
- D. A chart listing multiplication facts for 8 through 12 but not connecting them to 47.

92. Students calculate $58 \div 8 = 7$ remainder 2 while determining how many eight-seat vans are needed for 58 students. What question should the teacher ask next?

- A. Can the remainder be ignored because remainders never affect answers in word problems?
- B. What does the remainder mean here, and do the two remaining students require another van?
- C. Should the quotient be rounded down to 7 because 7 is the whole-number part?
- D. Can the remainder 2 be written as 0 so every division problem ends with no remainder?

93. When completing $14 + 9 = \underline{\quad} + 11$, a student copies 23 into the blank. Which teacher prompt would best shift the student's view of '=' from 'the answer comes next' to 'both sides have the same value'?

- A. Tell the student that the blank always contains the answer to the calculation on the left side.
- B. Replace the equal sign with an arrow so the student can read the expression as 'makes 23.'
- C. Ask what number added to 11 makes the right side equal the same total, 23, leading to 12.
- D. Have the student memorize that blanks appearing after an equal sign should copy the total on the left.

94. A student writes $7.4 + 0.68$ as though the final digits should line up, producing an incorrect sum. Which teacher move best targets the misconception?

- A. Use a place-value grid to align ones, tenths, and hundredths before adding.
- B. Tell the student to align numbers by their right edges for every decimal addition problem.
- C. Have the student ignore decimal points and insert one randomly after adding the digits.
- D. Ask the student to round both numbers to whole numbers and use that rounded total as the exact answer.

95. A learner claims -9 is greater than -4 because 9 is greater than 4. Which representation best supports correct comparison?

- A. A number line showing -9 to the left of -4, so -9 is less than -4.
- B. A chart comparing only the absolute values 9 and 4 and declaring the larger absolute value greater.
- C. A rule saying every negative number should be treated as positive when comparing values.
- D. A multiplication table showing products of 9 and 4 without locating either integer on a number line.

96. A student extends a ratio table from 4:10 to 5:11 to 6:12 by adding 1 to both quantities. What teacher prompt best develops proportional reasoning?

- A. Confirm that adding the same number to both terms always preserves any ratio.
- B. Ask the student to compare the ratios in each row and use a common multiplicative scale factor from 4:10 to generate equivalent ratios.
- C. Ask the student to subtract the two terms and keep that difference constant in every row.
- D. Have the student ignore the first column and continue counting upward in the second column only.

97. A student says a 9-by-5 rectangle has both area and perimeter equal to 45 because $9 \times 5 = 45$. Which activity best clarifies the distinction?
- A. Have the student memorize that multiplication always means perimeter and addition always means area.
 - B. Ask the student to draw a larger rectangle without measuring or counting any units.
 - C. Give only the formulas and require repeated substitution without connecting them to square and linear units.
 - D. Cover the rectangle with unit squares to model area, then trace the outer edge with unit lengths to model perimeter.
98. A class adds one extremely small value to a data set and notices the mean changes more than the median. Which task best develops understanding of this effect?
- A. Have students recompute and compare both measures before and after the outlier, then explain why the ordered middle position is less sensitive than the total used for the mean.
 - B. Tell students that the mean and median must always change by exactly the same amount.
 - C. Remove the outlier before students calculate anything so they cannot observe its effect.
 - D. Ask students to memorize that the median is always larger than the mean whenever an outlier appears.
99. A fair number cube has produced a 2 on three consecutive rolls. A student says another 2 is now less likely because it has already appeared often. What should the teacher emphasize?
- A. The next roll cannot be 2 because a fair number cube avoids repeating outcomes.
 - B. The probability of 2 becomes $1/12$ after three consecutive appearances.
 - C. A different number is guaranteed because experimental results must match theoretical probabilities in every short sequence.
 - D. Each roll is independent, so the probability of a 2 remains $1/6$ on the next roll.
100. A student says a rectangle with four equal sides is not a square because 'rectangles are supposed to be long.' Which activity best supports hierarchical classification?
- A. Sort shapes only by whether they look tall, wide, or tilted in the picture.
 - B. Sort quadrilaterals by defining properties such as parallel sides, right angles, and equal side lengths, then identify how a square satisfies the rectangle definition.
 - C. Teach that every shape name describes a completely separate category with no overlap.
 - D. Show only one horizontal rectangle and one tilted square and ask students to memorize their appearances.

Practice Exam 6 - Answer Key

1. B	21. C	41. A	61. C	81. B
2. A	22. B	42. D	62. A	82. B
3. A	23. D	43. A	63. D	83. C
4. C	24. D	44. D	64. C	84. A
5. A	25. A	45. D	65. C	85. A
6. D	26. D	46. A	66. A	86. D
7. B	27. D	47. A	67. D	87. A
8. A	28. B	48. B	68. C	88. D
9. A	29. B	49. D	69. D	89. B
10. B	30. D	50. A	70. B	90. C
11. C	31. B	51. C	71. C	91. C
12. C	32. D	52. A	72. B	92. B
13. B	33. C	53. C	73. B	93. C
14. C	34. B	54. A	74. C	94. A
15. C	35. D	55. C	75. A	95. A
16. B	36. D	56. D	76. A	96. B
17. C	37. B	57. B	77. C	97. D
18. D	38. C	58. D	78. B	98. A
19. C	39. B	59. B	79. A	99. D
20. A	40. C	60. D	80. D	100. B

Answer Explanations

1. Correct Answer: B

The digit 4 is the second digit to the right of the decimal point, so it is in the hundredths place. Four hundredths equals $\frac{4}{100}$, or 0.04. The alternatives place the digit in the thousandths, tenths, or ones position rather than using its actual place value. A final check confirms the result.

2. Correct Answer: A

Convert the mixed numbers to improper fractions and use a common denominator of 24. Ten and three eighths is $\frac{249}{24}$, while four and five sixths is $\frac{116}{24}$. Subtracting gives $\frac{133}{24}$, which is $5\frac{13}{24}$. The nearby mixed-number choices reflect regrouping or denominator errors. A final check confirms the result. The original conditions confirm this value.

3. Correct Answer: A

Multiply 5.28 by 0.65 to obtain 3.432. Since 0.65 is a little less than two thirds, the product should be a little less than two thirds of 5.28, which is about 3.5. That estimate supports 3.432 and rules out answers with misplaced decimals. A final check confirms the result. The original conditions confirm this value.

4. Correct Answer: C

A simultaneous repeat occurs at the least common multiple of 18, 24, and 30. Their prime factors require 2^3 , 3^2 , and 5, giving $8 \times 9 \times 5 = 360$. Smaller common multiples do not contain every required factor, while multiplying all three numbers is unnecessarily large. A final check confirms the result.

5. Correct Answer: A

Convert negative seven eighths to -0.875. Among -0.875, -0.84, -0.86, and -0.805, the least value is the one farthest left on the number line, -0.875. For negative numbers, a greater absolute magnitude can correspond to a smaller value, so $-7/8$ is least. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

6. Correct Answer: D

Follow the order of operations. First, $7 - 3 = 4$, and 4 squared is 16. Then $3 \times 16 = 48$ and $48 \div 6 = 8$. Finally, $30 - 8 = 22$. Changing the order of the exponent, multiplication, division, or subtraction produces the distractors. A final check confirms the result.

7. Correct Answer: B

Add 13 to both sides of $6x - 13 = 59$ to obtain $6x = 72$. Dividing both sides by 6 gives $x = 12$. Substitution checks the solution: $6(12) - 13 = 72 - 13 = 59$. The other choices result from incomplete or reversed inverse operations. A final check confirms the result.

8. Correct Answer: A

Percent means parts per hundred, so 45% is $45/100$. Dividing numerator and denominator by 5 reduces the fraction to $9/20$. Converting $9/20$ to a decimal gives 0.45, confirming the equivalence. The other choices represent different values or incorrectly invert or rescale the percent. A final check confirms the result. The original conditions confirm this value.

9. Correct Answer: A

A unit price is total cost divided by number of items. Dividing \$24.30 by 18 gives \$1.35 per folder. Multiplying \$1.35 by 18 returns \$24.30, confirming the rate. The distractors can result from reversing the division, estimating too loosely, or shifting the decimal point incorrectly. A final check confirms the result.

10. Correct Answer: B

Average speed in kilometers per hour is distance divided by time. Dividing 126 by 2.8 gives 45. Multiplying 45 by 2.8 returns 126, which verifies the unit rate. Because 126 kilometers in nearly three hours should be somewhat more than 40 kilometers per hour, 45 is reasonable. A final check confirms the result.

11. Correct Answer: C

The ratio 5:8 means every group of 5 brass buttons corresponds to 8 silver buttons. Forty-five brass buttons make 9 groups of 5. Therefore, the matching silver count is $9 \times 8 = 72$. The ratio 45:72 simplifies back to 5:8, confirming the proportional relationship. A final check confirms the result.

12. Correct Answer: C

The map distance 10.5 centimeters is 3.5 times the reference length of 3 centimeters. Multiply the actual distance by the same scale factor: $22 \times 3.5 = 77$ kilometers. A proportion, $3/22 = 10.5/x$, produces the same answer and confirms the constant scale relationship. A final check confirms the result.

13. Correct Answer: B

Convert 27.5% to 0.275 and multiply by 640. The product is 176. A mental check can split 27.5% into 25% plus 2.5%: one fourth of 640 is 160 and 2.5% is 16, totaling 176. This verifies both the percentage and the arithmetic. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

14. Correct Answer: C

An 18% markdown means the buyer pays 82% of the original price. Multiplying \$320 by 0.82 gives \$262.40. Equivalently, the discount is \$57.60, and subtracting that from \$320 gives \$262.40. The \$57.60 choice is only the amount saved, not the final price. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

15. Correct Answer: C

The increase is $434 - 350 = 84$ participants. Percent increase compares the change with the original amount, so $84/350 \times 100 = 24\%$. Using the new total as the denominator gives a different rate, while 84 is the numerical increase rather than the percentage increase requested. A final check confirms the result.

16. Correct Answer: B

First find the amount per batch: $3.15 \div 9 = 0.35$ kilogram. For 20 batches, multiply 0.35 by 20 to get 7 kilograms. A proportion, $3.15/9 = x/20$, gives the same result. The relationship stays proportional because both quantities are scaled by one constant rate. A final check confirms the result.

17. Correct Answer: C

A proportional relationship has the form $y = kx$ and passes through the origin. With constant of proportionality $k = 1.6$, the equation is $y = 1.6x$. Adding a constant would create a nonzero intercept, while $x = 1.6y$ would make y equal x divided by 1.6. A final check confirms the result.

18. Correct Answer: D

For a proportional relationship, y/x has the same value for every point. Using the first pair gives $25.2 \div 6 = 4.2$. Checking $37.8 \div 9$ and $58.8 \div 14$ also gives 4.2, confirming the constant. The other values do not preserve all three ordered pairs. A final check confirms the result.

19. Correct Answer: C

Direct variation means the amount per minute is constant. Dividing 42 liters by 12 minutes gives 3.5 liters per minute. Multiplying 3.5 by 35 minutes gives 122.5 liters. The proportion $42/12 = x/35$ leads to the same result and checks the multiplicative relationship. A final check confirms the result. The original conditions confirm this value.

20. Correct Answer: A

Convert 18% to 0.18 and multiply by the pre-tip bill: $\$52.50 \times 0.18 = \9.45 . A reasonableness check notes that 20% would be \$10.50, so an 18% tip should be slightly smaller. The total after tip would be \$61.95, not the tip alone. A final check confirms the result. The original conditions confirm this value.

21. Correct Answer: C

Simple interest uses $I = Prt$. Substitute principal 3200, annual rate 0.045, and time 2.5 years: $3200 \times 0.045 \times 2.5 = 360$. The \$144 choice gives one year of interest, while \$3,560 adds principal when only interest is requested. The formula directly matches the situation. A final check confirms the result.

22. Correct Answer: B

Percent error is the absolute difference divided by the accepted value, times 100. The error is 6 centimeters, so $6/150 \times 100 = 4\%$. Dividing by the measured value gives about 3.85%, while reporting 6 confuses the size of the error in centimeters with the percentage error. A final check confirms the result.

23. Correct Answer: D

Each 2 blueprint inches represent 15 actual feet. Since $7.2 \div 2 = 3.6$, multiply 15 feet by 3.6 to obtain 54 feet. Setting up $2/15 = 7.2/x$ gives the same result. The scale factor must be applied multiplicatively to preserve the drawing's proportions. A final check confirms the result.

24. Correct Answer: D

A scale factor of 1.35 multiplies every linear dimension by 1.35. Computing 24×1.35 gives 32.4 centimeters. Because the factor is greater than 1, the image must be longer than the original 24 centimeters. Adding 1.35 or using an unrelated percent increase produces the other choices. A final check confirms the result.

25. Correct Answer: A

The ratio has $4 + 7 = 11$ total equal parts. Raisins account for 4 of those 11 parts, so multiply 55 by $4/11$. Since $55 \div 11 = 5$, the raisin amount is $5 \times 4 = 20$ cups. The remaining 35 cups are nuts, confirming the 4:7 ratio.

26. Correct Answer: D

To find cost per pound, divide total cost by total pounds. The calculation $\$18.75 \div 15 = \1.25 gives the unit price. Multiplying $\$1.25$ by 15 returns $\$18.75$, which checks the answer. The distractors can result from reversed division or incorrect decimal placement. A final check confirms the result. The original conditions confirm this value.

27. Correct Answer: D

The decrease is $960 - 816 = 144$ members. Percent decrease uses the original amount as the base, so $144/960 \times 100 = 15\%$. The new membership is 85% of the original, which explains the 85% distractor. Dividing by the new amount would use the wrong reference quantity. A final check confirms the result.

28. Correct Answer: B

Convert 8.25% to 0.0825 and multiply by the taxable price. The product 64×0.0825 is 5.28, so the tax is \$5.28. Adding the tax to the price would give \$69.28, which is the total purchase amount rather than the separate tax requested. A final check confirms the result. The original conditions confirm this value.

29. Correct Answer: B

Temperature increase is final temperature minus initial temperature. Subtracting a negative gives $6.25 - (-8.5) = 6.25 + 8.5 = 14.75^\circ\text{C}$. On a number line, the change covers 8.5 degrees to reach zero and another 6.25 degrees above zero, for the same total increase. A final check confirms the result.

30. Correct Answer: D

Adding or subtracting negative quantities can be tracked on a number line. Starting at -17, subtracting 8 moves to -25, and adding -5 moves 5 more units left to -30. The positive 30 loses the sign, while -20 and -14 reflect incomplete or reversed operations. A final check confirms the result.

31. Correct Answer: B

Distance between two numbers is the absolute value of their difference. Compute $|-4.75 - 3.6| = |-8.35| = 8.35$. Equivalently, move 4.75 units from -4.75 to zero and another 3.6 units to 3.6. Adding those distances also gives 8.35 units. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

32. Correct Answer: D

Quadrant II contains points with a negative x-coordinate and a positive y-coordinate. The point (-7, 4) has exactly that sign pattern. Points with both coordinates positive are in Quadrant I, both negative are in Quadrant III, and positive x with negative y is in Quadrant IV. A final check confirms the result.

33. Correct Answer: C

Convert the fractions to decimals. Negative thirteen fifteenths is about -0.8667, while negative five sixths is about -0.8333. Comparing these with -0.84 and -0.86 shows that -0.8667 is farthest left on the number line. Therefore, -13/15 is the smallest value listed. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

34. Correct Answer: B

Convert $7 \frac{1}{2}$ to $15/2$ and $1 \frac{1}{4}$ to $5/4$. Dividing by a fraction means multiplying by its reciprocal: $15/2 \times 4/5 = 6$. A multiplication check confirms that 6 pieces of $1 \frac{1}{4}$ feet use exactly $7 \frac{1}{2}$ feet of rope. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

35. Correct Answer: D

The least common denominator of 12 and 18 is 36. Rewrite $\frac{7}{12}$ as $\frac{21}{36}$ and $\frac{5}{18}$ as $\frac{10}{36}$. Adding gives $\frac{31}{36}$ cup. Adding denominators directly would not preserve equal-sized fractional parts, while the mixed-number and product-like choices reflect common fraction-operation errors. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

36. Correct Answer: D

The numbers have opposite signs, so compare their magnitudes. Since 9.08 is larger than 5.72, the result is positive. Subtract 5.72 from 9.08 to get 3.36. The negative 3.36 uses the correct difference with the wrong sign, while -14.80 incorrectly adds magnitudes and keeps a negative sign. A final check confirms the result.

37. Correct Answer: B

Scientific notation requires a coefficient at least 1 but less than 10. Moving the decimal in 0.00000631 six places to the right gives 6.31, so the exponent is -6. A coefficient below 1 or above 10 is not standard form, while changing the exponent changes the measurement's magnitude. A final check confirms the result.

38. Correct Answer: C

Multiply the coefficients, $8 \times 3 = 24$, and add the exponents, $5 + (-3) = 2$. This gives 24×10^2 . Scientific notation requires a coefficient below 10, so rewrite it as 2.4×10^3 . The exponent adjustment preserves the value while standardizing the coefficient. A final check confirms the result.

39. Correct Answer: B

The side length of a square is the square root of its area. Since 17 squared is 289 and 18 squared is 324, the side must lie between 17 and 18 meters. The square root of 310 is about 17.6068, which rounds to 17.6 meters to the nearest tenth. A final check confirms the result.

40. Correct Answer: C

The edge length is the cube root of the cube's volume. Since $14 \times 14 \times 14 = 2,744$, the cube root is 14. Nearby checks show that 13 cubed is 2,197 and 16 cubed is 4,096, so those edge lengths cannot produce the stated volume. A final check confirms the result.

41. Correct Answer: A

When dividing powers with the same base, subtract exponents: $5^7 \div 5^3 = 5^4$. Multiplying by 5^{-2} then adds exponents, giving $5^{(4-2)} = 5^2$. The negative exponent represents a reciprocal contribution; it does not make the final value negative. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

42. Correct Answer: D

The parentheses make the entire -3 the base, so $(-3)^4 = 81$ because an even power produces a positive result. Also, $2^5 = 32$. Subtracting gives $81 - 32 = 49$. Ignoring the parentheses or combining the bases and exponents incorrectly leads to the distractors. A final check confirms the result.

43. Correct Answer: A

Five eighths equals 0.625, while 0.64 is the upper endpoint. The value 0.63 is greater than 0.625 and less than 0.64, so it lies strictly inside the interval. The value 0.625 is exactly the lower endpoint, 0.62 is below it, and $\frac{13}{20}$ equals 0.65. A final check confirms the result.

44. Correct Answer: D

The additive inverse is the number that combines with the original value to make zero. The opposite of -18.35 is 18.35 because $-18.35 + 18.35 = 0$. A reciprocal is a multiplicative inverse, which answers a different question, and keeping the negative sign does not produce a zero sum. A final check confirms the result.

45. Correct Answer: D

Because the points have the same y-coordinate, the segment is horizontal. Its length is the absolute difference between the x-coordinates: $|4 - (-9)| = |13| = 13$ units. Counting from -9 to 0 gives 9 units and from 0 to 4 gives 4 more, confirming the total. A final check confirms the result.

46. Correct Answer: A

Form the fraction $36/120$ and convert it to a percent. The fraction reduces to $3/10$, which equals 0.30 or 30%. Multiplying 120 by 0.30 returns 36, confirming the result. Thirty-six percent simply copies the count as a percent, while 70% is the complement. A final check confirms the result. The original conditions confirm this value.

47. Correct Answer: A

Distribute 5 across both terms in the parentheses: $5(2x - 7) = 10x - 35$. Then combine the like x-terms, $10x + 3x = 13x$, giving $13x - 35$. The distractors reflect incomplete distribution or combining unlike terms incorrectly. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

48. Correct Answer: B

Substitute $p = -2$ and $q = 5$ into $T = 4p^2 - 3q$. Squaring -2 gives 4, so $4p^2$ is 16. Also, $3q$ is 15. Subtracting gives $16 - 15 = 1$. The parentheses around the negative value are important when applying the exponent. A final check confirms the result.

49. Correct Answer: D

Solve $4x + 3 > 27$ by subtracting 3 to get $4x > 24$, then dividing by 4 to get $x > 6$. Of the listed values, only 7 is greater than 6. Direct substitution gives $31 > 27$, while 6 produces equality and therefore does not satisfy the strict inequality.

50. Correct Answer: A

Distribute the 4 to obtain $8x - 4 = 6x + 10$. Subtract $6x$ from both sides to get $2x - 4 = 10$, then add 4 and divide by 2. This gives $x = 7$. Substitution makes both original sides equal 52, confirming the solution. A final check confirms the result.

51. Correct Answer: C

The common difference is 6. The n th term of an arithmetic sequence is the first term plus $n - 1$ differences. For the 18th term, compute $14 + 17(6) = 14 + 102 = 116$. Using 18 differences instead of 17 creates a common off-by-one error. A final check confirms the result.

52. Correct Answer: A

Substitute $x = -3$ into the function. Squaring -3 gives 9, so $2x^2$ contributes 18. The linear term contributes $5(-3) = -15$, and then subtract 1. Combining $18 - 15 - 1$ gives 2. Careful parentheses prevent losing the sign of the substituted value. A final check confirms the result.

53. Correct Answer: C

Slope is change in y divided by change in x . From $(-1, 7)$ to $(5, -2)$, the vertical change is -9 and the horizontal change is 6. Thus the slope is $-9/6 = -3/2$. The negative sign matches the line's downward movement as x increases. A final check confirms the result.

54. Correct Answer: A

The y -intercept occurs where $x = 0$. Substituting $x = 0$ into $3x + 2y = 14$ gives $2y = 14$, so $y = 7$. Therefore the graph crosses the y -axis at $(0, 7)$. The other values arise from ignoring the coefficient on y or changing the sign incorrectly. A final check confirms the result.

55. Correct Answer: C

Subtract the second equation from the first: $(x + 2y) - (x - y) = 16 - 4$, giving $3y = 12$. Therefore $y = 4$. Substitution into $x - y = 4$ gives $x = 8$, and checking $8 + 2(4) = 16$ confirms the system solution. A final check confirms the result.

56. Correct Answer: D

One kilometer equals 1,000 meters. Multiply 2.85 by 1,000, moving the decimal three places to the right, to obtain 2,850 meters. The kilometer measurement is larger than one, so the equivalent number of meters should be in the thousands rather than hundreds or a tiny decimal. A final check confirms the result.

57. Correct Answer: B

One liter contains 1,000 milliliters. Multiply 4.375 liters by 1,000 to obtain 4,375 milliliters. Moving the decimal three places to the right matches the conversion factor. The larger numerical value is expected because milliliters are smaller units than liters, so more of them represent the same volume. A final check confirms the result.

58. Correct Answer: D

Convert each time to minutes after noon or count in intervals. From 1:46 to 2:00 is 14 minutes, from 2:00 to 4:00 is 120 minutes, and from 4:00 to 4:23 is 23 minutes. Adding $14 + 120 + 23$ gives 157 minutes. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

59. Correct Answer: B

Perimeter is the distance around the rectangle. Add the length and width, $18.6 + 11.4 = 30$, and double that sum to account for both pairs of opposite sides. The result is 60 meters. Multiplying length by width gives area, not the amount of boundary fencing needed. A final check confirms the result.

60. Correct Answer: D

Triangle area is one half of base times perpendicular height. Compute $16 \times 11.5 = 184$, then take half to obtain 92 square centimeters. A rectangle with the same base and height would cover 184 square centimeters, so the triangle's area should be exactly half that amount. A final check confirms the result.

61. Correct Answer: C

The area of a parallelogram is base times perpendicular height. Multiplying 12.5 by 7.2 gives 90 square inches. The slanted side length is not needed because area depends on the perpendicular separation of the parallel bases. Halving the product would incorrectly use the triangle area formula. A final check confirms the result.

62. Correct Answer: A

Use the trapezoid area formula $A = \frac{1}{2}(b_1 + b_2)h$. Add the parallel sides: $13 + 21 = 34$. Half of 34 is 17, and $17 \times 6 = 102$ square centimeters. The 204 choice omits the one-half factor, while other choices use incomplete combinations. A final check confirms the result.

63. Correct Answer: D

Volume of a rectangular prism is length times width times height. Multiply $6.5 \times 5 = 32.5$, then $32.5 \times 4 = 130$ cubic feet. Cubic units are required because volume measures three-dimensional space. Adding dimensions or doubling a partial product does not measure the tank's interior capacity. A final check confirms the result.

64. Correct Answer: C

A rectangular prism has two faces for each pair of dimensions. Compute $2(7 \times 5 + 7 \times 2 + 5 \times 2) = 2(35 + 14 + 10) = 118$ square inches. Multiplying all three dimensions gives volume, while omitting a pair of faces produces an incomplete surface area. A final check confirms the result.

65. Correct Answer: C

For a rectangle, area equals length times width. Solve for width by dividing 168 square feet by 14 feet, which gives 12 feet. Multiplying 14 by 12 returns 168, confirming the dimension. Subtracting the length from the area would mix incompatible units and does not represent the area formula. A final check confirms the result.

66. Correct Answer: A

A square with area 225 has side length $\sqrt{225} = 15$ feet. Perimeter is four times the side length, so $4 \times 15 = 60$ feet. The value 15 is only one side, while multiplying the area by four would confuse square units with linear boundary length. A final check confirms the result.

67. Correct Answer: D

Angles forming a straight line are supplementary, so their measures total 180° . Subtract 126° from 180° to obtain 54° . Adding 126° and 54° returns 180° , confirming the linear-pair relationship. Repeating the known angle or adding instead of subtracting cannot fit on one straight angle. A final check confirms the result.

68. Correct Answer: C

The interior angles of a triangle sum to 180° . Add the known angles: $52^\circ + 71^\circ = 123^\circ$. Subtract from 180° to obtain 57° . Checking $52 + 71 + 57 = 180$ verifies the result. The 123° choice is only the sum of the known angles. A final check confirms the result.

69. Correct Answer: D

A regular nonagon has nine congruent sides. Divide the perimeter, 121.5 centimeters, by 9 to find one side: 13.5 centimeters. Multiplying 13.5 by 9 returns 121.5, confirming the result. Using the wrong number of sides or subtracting instead of dividing produces the distractors. A final check confirms the result. The original conditions confirm this value.

70. Correct Answer: B

An n -sided polygon can be divided into $n - 2$ triangles from one vertex. For 11 sides, that creates 9 triangles. Multiplying $9 \times 180^\circ$ gives an interior-angle sum of $1,620^\circ$. The other values correspond to using too few or too many triangles in the decomposition. A final check confirms the result.

71. Correct Answer: C

Reflecting across the y -axis changes the sign of the x -coordinate while leaving the y -coordinate unchanged. Thus $(-8, 5)$ becomes $(8, 5)$. Changing both signs would reflect through the origin, while swapping coordinates is not the rule for a reflection across either coordinate axis. A final check confirms the result. The original conditions confirm this value.

72. Correct Answer: B

The rule subtracts 4 from the x -coordinate and adds 7 to the y -coordinate. Starting from $(6, -3)$, compute $6 - 4 = 2$ and $-3 + 7 = 4$. Therefore the image is $(2, 4)$. Each translation component changes only its corresponding coordinate. A final check confirms the result. The original conditions confirm this value.

73. Correct Answer: B

The midpoint coordinates are the averages of corresponding endpoint coordinates. Average the x -values: $(-3 + 9)/2 = 6/2 = 3$. Average the y -values: $(10 + -4)/2 = 6/2 = 3$. Therefore the midpoint is $(3, 3)$, halfway in both horizontal and vertical directions. A final check confirms the result. The original conditions confirm this value.

74. Correct Answer: C

Because the x -coordinates are the same, the segment is vertical. Its length is the absolute difference between the y -coordinates: $|9 - (-8)| = |17| = 17$ units. Counting 8 units from -8 to zero and 9 more from zero to 9 gives the same total distance. A final check confirms the result.

75. Correct Answer: A

Add the five values: $12 + 16 + 19 + 24 + 34 = 105$. Divide the total by 5 observations to obtain a mean of 21. The mean represents an equal-share or balance value, so multiplying 21 by 5 should reproduce the original total of 105. A final check confirms the result.

76. Correct Answer: A

There are eight ordered values, so the median is the average of the two middle values, the fourth and fifth. Those values are 15 and 21. Their average is $(15 + 21)/2 = 18$. Selecting only one middle value would be appropriate only for a data set with an odd number of observations.

77. Correct Answer: C

Range measures the distance from the smallest value to the largest. The minimum is 48 and the maximum is 71, so the range is $71 - 48 = 23$. Adding the endpoints or subtracting other pairs does not measure the full spread of the data set. A final check confirms the result.

78. Correct Answer: B

Split the ordered data into lower half 2, 4, 7, 9 and upper half 12, 15, 19, 23. $Q1$ is $(4 + 7)/2 = 5.5$, and $Q3$ is $(15 + 19)/2 = 17$. The interquartile range is $17 - 5.5 = 11.5$. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

79. Correct Answer: A

The prime outcomes from 1 through 10 are 2, 3, 5, and 7, giving 4 favorable outcomes out of 10 equally likely outcomes. The probability is $4/10$, which reduces to $2/5$. The number 1 is not prime, so including it would incorrectly change the count. A final check confirms the result.

80. Correct Answer: D

There are 20 counters altogether. Red or blue includes $7 + 5 = 12$ favorable counters. The probability is $12/20$, which reduces to $3/5$. The yellow counters are excluded from the favorable count but included in the total because any counter could be selected. A final check confirms the result.

81. Correct Answer: B

Expected frequency is probability multiplied by number of trials. Compute $0.12 \times 250 = 30$, so about 30 defective items are expected over many comparable groups of 250. This is a long-run expectation rather than a guarantee for a particular sample, but it gives the appropriate predicted count. A final check confirms the result.

82. Correct Answer: B

Each fair number cube has probability $1/6$ of showing a 6. Because the rolls are independent, multiply the probabilities: $1/6 \times 1/6 = 1/36$. Listing the 36 equally likely ordered pairs also shows that only one outcome, (6, 6), satisfies the event. A quick reasonableness check also supports the selected answer and helps reject choices produced by a reversed operation.

83. Correct Answer: C

Multiply each score by its weight and add the contributions: $82(0.25) = 20.5$, $91(0.35) = 31.85$, and $76(0.40) = 30.4$. Their sum is 82.75. Therefore the weighted average is 82.75, reflecting the larger influence of the 40% component compared with the lower-weighted components. A final check confirms the result. The original conditions confirm this value.

84. Correct Answer: A

A mean of 18 for five values means their total is $18 \times 5 = 90$. Adding the sixth value, 30, gives a new total of 120. Divide by 6 observations to get a new mean of 20. The new value is above the old mean, so an increase is expected.

85. Correct Answer: A

Substitute $x = 42$ into $y = (5/6)x$. Since $42 \div 6 = 7$, multiplying 7 by 5 gives $y = 35$. The value is smaller than 42 because the proportionality constant $5/6$ is less than 1. Substitution directly verifies the required output. A final check confirms the result. The original conditions confirm this value.

86. Correct Answer: D

There are 12 inches in one foot. Divide 114 inches by 12 to convert to feet: $114 \div 12 = 9.5$. Multiplying 9.5 feet by 12 inches per foot returns 114 inches. Dividing, rather than multiplying, is appropriate because the target unit is larger. A final check confirms the result.

87. Correct Answer: A

Find each rectangular area separately. The main rectangle has area $10 \times 8 = 80$ square feet, and the alcove has area $6 \times 3 = 18$ square feet. Because the regions do not overlap, add them: $80 + 18 = 98$ square feet. A final check confirms the result.

88. Correct Answer: D

Volume of a rectangular prism is length times width times height. Multiply $4.2 \times 3.5 = 14.7$, then $14.7 \times 5 = 73.5$ cubic feet. Cubic units are required because three dimensions are multiplied. Doubling or halving the product would not match the stated dimensions. A final check confirms the result.

89. Correct Answer: B

Whole-number comparison begins with the greatest place value where the numbers differ. Both numbers have 4 thousands and 7 hundreds, so compare the tens: 4,790 has 9 tens while 4,709 has 0 tens. A place-value chart makes that hierarchy visible and directly addresses the student's mistaken focus on the ones digit.

90. Correct Answer: C

The denominator describes equal-sized parts of a whole, not merely the number of visible regions. To call a region one third, the whole must be partitioned into three equal areas. Comparing equal and unequal partitions lets students connect the symbolic denominator with fair shares and prevents counting pieces without attending to their size.

91. Correct Answer: C

An area model links multiplication to the distributive property by partitioning 47 into 40 and 7. The two partial products, 8×40 and 8×7 , combine to the same total as 8×47 . This makes place-value decomposition visible rather than presenting the algorithm as an unexplained sequence of steps.

92. Correct Answer: B

The quotient and remainder must be interpreted in the context. Seven vans seat only 56 students, leaving two students without seats, so an eighth van is required. Asking what the remainder represents encourages students to connect division calculations to real constraints instead of applying a fixed rounding rule regardless of meaning.

93. Correct Answer: C

The equal sign states that two expressions have the same value. The left side totals 23, so the right side must also total 23. Asking what number plus 11 equals 23 leads to 12 and shifts attention from an 'answer comes next' interpretation to a relationship between equivalent expressions. A final check confirms the result.

94. Correct Answer: A

Decimal addition requires combining like place values. A place-value grid shows that 7.4 is 7 ones and 4 tenths, which can be written as 7.40, while 0.68 has 6 tenths and 8 hundredths. Aligning decimal points then places each digit with the same unit before addition. A final check confirms the result.

95. Correct Answer: A

A number line connects numerical order with position. Values farther left are smaller, so -9 lies below -4 even though 9 has the larger absolute value. The representation helps the learner separate distance from zero from ordering and builds a conceptual basis for comparing negative integers rather than memorizing an isolated sign rule.

96. Correct Answer: B

Equivalent ratios preserve a multiplicative relationship, not a constant additive difference. Comparing $4/10$, $5/11$, and $6/12$ reveals that the ratios are not equal. Asking for a common scale factor directs attention to multiplying both quantities by the same number and helps replace additive thinking with proportional reasoning. A final check confirms the result.

97. Correct Answer: D

Area and perimeter measure different attributes. Unit squares show area as the amount of surface covered, while unit lengths around the boundary show perimeter as distance around the shape. Using both representations on the same rectangle makes the contrast concrete and explains why square units and linear units require different calculations.

98. Correct Answer: A

The mean depends on the total of all values, so an extreme observation can noticeably change it. The median depends mainly on the ordered middle position and is often less affected. Recomputing both measures and explaining the contrast helps students understand resistance to outliers rather than memorizing a rule without evidence.

99. Correct Answer: D

Independent trials do not change one another's probabilities. A fair number cube has six equally likely outcomes on every roll, so the chance of a 2 remains $1/6$ regardless of previous results. Short runs can look uneven without changing the underlying theoretical probability, which emerges more clearly over many trials.

100. Correct Answer: B

Hierarchical classification is based on defining properties rather than visual prototypes. A square has four right angles, so it satisfies the definition of a rectangle, while its four equal sides add another property. Sorting shapes by attributes helps students see category inclusion and prevents orientation or appearance from controlling classification.

Source note: Official test-format information was verified on the NYSTCE website. All practice questions and explanations in this document are independently written for study use.