

Measurequest — Activity Book

A Spark & Anvil activity book — puzzles, questions, and fun from Measurequest.

Write in the book, circle your answers, and check the Answer Key at the back.

1. Length and Distance Measurement

Circle the correct answer

1. You're measuring a pencil with a ruler. The pencil starts at the 0 mark and ends exactly at the 7-inch mark. How long is the pencil?
(A) 6 inches (B) 8 inches (C) 7 feet (D) 7 inches
2. A book is placed on a ruler starting at the 2-inch mark and ending at the 11-inch mark. How long is the book?
(A) 11 inches (B) 13 inches (C) 2 inches (D) 9 inches
3. Which unit would you use to measure the length of a school bus?
(A) Inches (B) Ounces (C) Miles (D) Feet
4. How many inches are in 1 foot?
(A) 6 inches (B) 12 inches (C) 10 inches (D) 3 inches
5. Convert 3 feet to inches.
(A) 24 inches (B) 15 inches (C) 30 inches (D) 36 inches
6. How many feet are in 1 yard?
(A) 4 feet (B) 2 feet (C) 12 feet (D) 3 feet

Write the answer

7. A garden is 5 yards long. How many feet is that?
Answer: _____
8. What is the length of an object if a centimeter ruler shows it stretching from 0 cm to 15 cm?
Answer: _____
9. How many centimeters are in 1 meter?
Answer: _____

10. Which is longer: 1 inch or 1 centimeter?

Answer: _____

Match each question to its answer

1. A ribbon is 48 inches long. How many feet is that? →
2. You measure a caterpillar and it's 3 and 1/2 inches long. Your friend says it's between 8 and 9 centimeters. Is your friend's estimate reasonable? →
3. A hallway is 12 yards long. A teacher walks from one end to the other and back. How many total feet does the teacher walk? →
4. You need to measure the length of your classroom. Which tool would be BEST to use? →
5. A worm is 4 centimeters long. A snake is 200 centimeters long. How many times longer is the snake than the worm? →

- (A) A tape measure
 - (B) 72 feet
 - (C) 50 times longer
 - (D) Yes — $3.5 \text{ inches} \times 2.54 \approx 8.9 \text{ cm}$, so between 8 and 9 cm is correct
 - (E) 4 feet
-

2. Weight, Mass, and Capacity

Circle the correct answer

11. Which unit would you use to measure the weight of a watermelon?
(A) Ounces (B) Pounds (C) Tons (D) Gallons
12. How many ounces are in 1 pound?
(A) 12 ounces (B) 8 ounces (C) 16 ounces (D) 10 ounces
13. A bag of apples weighs 3 pounds. How many ounces is that?
(A) 36 ounces (B) 48 ounces (C) 32 ounces (D) 30 ounces
14. How many grams are in 1 kilogram?
(A) 500 grams (B) 100 grams (C) 1000 grams (D) 10 grams
15. A recipe calls for 500 grams of flour. You have a 2-kilogram bag. After making the recipe, how many grams of flour are left in the bag?
(A) 1.5 grams (B) 1000 grams (C) 2500 grams (D) 1500 grams
16. How many cups are in 1 quart?
(A) 3 cups (B) 8 cups (C) 2 cups (D) 4 cups

Write the answer

17. How many quarts are in 1 gallon?

Answer: _____

18. A fish tank holds 3 gallons of water. How many cups of water is that?

Answer: _____

19. How many milliliters are in 1 liter?

Answer: _____

20. A juice box holds 250 milliliters. How many juice boxes would it take to fill a 1-liter bottle?

Answer: _____

Match each question to its answer

1. Which is heavier: 1 kilogram of feathers or 1 kilogram of rocks? →

2. A recipe needs 2 cups of milk. You only have a 1-pint carton. Is that enough? →

3. You're mailing a package. The post office says it can't weigh more than 70 pounds. Your package weighs 1050 ounces. Can you mail it? →

4. A water cooler holds 5 gallons. Water bottles at the store come in 2-liter sizes. Approximately how many 2-liter bottles do you need to fill the cooler? (Hint: 1 gallon ≈ 3.8 liters) →

5. Which measuring tool would you use to find the weight of a letter? →

(A) Yes — 1 pint equals exactly 2 cups, which is exactly what the recipe needs

(B) About 10 bottles (5 gallons ≈ 19 liters ÷ 2 liters/bottle ≈ 9.5, round up to 10)

(C) They weigh exactly the same — both are 1 kilogram

(D) A kitchen scale or postal scale (measured in ounces or grams)

(E) No — $1050 \text{ ounces} \div 16 = 65.625 \text{ pounds}$... wait, that's under 70 pounds, so YES you can mail it

3. Time and Temperature

Circle the correct answer

21. A clock shows the hour hand between the 2 and 3, and the minute hand on the 7. What time is it?

(A) 7:10 (B) 3:35 (C) 2:35 (D) 2:07

22. How many minutes are in 1 hour?

(A) 60 minutes (B) 45 minutes (C) 100 minutes (D) 30 minutes

23. A movie starts at 3:15 PM and ends at 5:00 PM. How long is the movie?
(A) 1 hour and 45 minutes (B) 2 hours and 15 minutes (C) 2 hours and 45 minutes
(D) 1 hour and 15 minutes

24. School starts at 8:30 AM. You need 45 minutes to get ready and 15 minutes to walk to school. What time should you wake up at the latest?
(A) 7:00 AM (B) 7:45 AM (C) 8:00 AM (D) 7:30 AM

25. How many hours are in 1 day?
(A) 48 hours (B) 24 hours (C) 12 hours (D) 60 hours

26. Water freezes at what temperature in Fahrenheit?
(A) 100°F (B) 0°F (C) 32°F (D) 212°F

Write the answer

27. Water boils at 100°C. What is this temperature in Fahrenheit?
Answer: _____

28. At 6:00 AM the temperature was 45°F. By noon it had risen 20 degrees. By 6:00 PM it dropped 8 degrees from noon. What was the temperature at 6:00 PM?
Answer: _____

29. A bus arrives every 20 minutes starting at 7:00 AM. You arrive at the bus stop at 7:35 AM. How long do you wait for the next bus?
Answer: _____

30. A doctor's appointment lasts from 2:45 PM to 3:30 PM. How many minutes does the appointment last?
Answer: _____

Match each question to its answer

1. Is 25°C hot or cold? What kind of clothing would you wear? →
2. How many days are in a regular (non-leap) year? →
3. A thermometer shows 68°F. The temperature drops 40 degrees overnight. Is the temperature now above or below freezing? →
4. A cake needs to bake for 1 hour and 15 minutes. You put it in the oven at 4:50 PM. When should you take it out? →
5. Which is colder: -5°C or 3°C? →

- (A) 365 days
- (B) 6:05 PM
- (C) Warm/comfortable — about 77°F, you'd wear a t-shirt and shorts
- (D) -5°C is colder (negative temperatures are below zero)

(E) Below freezing — $68 - 40 = 28^{\circ}\text{F}$, which is below 32°F

4. Perimeter and Area

Circle the correct answer

31. What is the perimeter of a rectangle that is 8 cm long and 5 cm wide?

(A) 40 cm (B) 13 cm (C) 30 cm (D) 26 cm

32. What is the area of a rectangle that is 8 cm long and 5 cm wide?

(A) 40 centimeters (B) 13 square centimeters (C) 40 square centimeters (D) 26 square centimeters

33. What is the difference between perimeter and area?

(A) Perimeter measures inside; area measures outside (B) Perimeter measures the distance around a shape; area measures the space inside a shape (C) They measure the same thing but use different formulas (D) Perimeter uses multiplication; area uses addition

34. A square has a side length of 9 meters. What is its perimeter?

(A) 27 meters (B) 81 meters (C) 36 meters (D) 18 meters

35. A square has a side length of 9 meters. What is its area?

(A) 36 square meters (B) 81 square meters (C) 9 square meters (D) 18 square meters

36. A farmer wants to build a fence around a rectangular field that is 120 feet long and 80 feet wide. Fencing costs \$5 per foot. How much will the fence cost?

(A) \$48,000 (B) \$600 (C) \$1,000 (D) \$2,000

Write the answer

37. You need to buy carpet to cover a room that is 12 feet by 10 feet. Carpet is sold by the square foot at \$3 per square foot. How much will the carpet cost?

Answer: _____

38. Two rectangles have the same perimeter of 24 cm. Rectangle A is $10\text{ cm} \times 2\text{ cm}$. Rectangle B is $7\text{ cm} \times 5\text{ cm}$. Which has the greater area?

Answer: _____

39. Count the square units to find the area of an L-shaped figure made of two rectangles: a 4×3 rectangle on the left connected to a 2×3 rectangle on the right at the bottom.

Answer: _____

40. A picture frame is 10 inches wide and 8 inches tall on the outside. The frame border is 1 inch wide all around. What is the area of just the frame (not the picture inside)?

Answer: _____

Match each question to its answer

1. A rectangle has a perimeter of 30 cm and a length of 10 cm. What is the width? →
2. A garden has an area of 72 square feet. If the length is 12 feet, what is the width? →
3. Which would you calculate to determine how much paint is needed to cover a wall: perimeter or area? →
4. A rectangular playground is 50 meters long. The perimeter is 160 meters. What is the area of the playground? →
5. A tile is 1 foot × 1 foot. How many tiles do you need to cover a bathroom floor that is 8 feet by 6 feet? →

- (A) Area — paint covers the surface of the wall
 - (B) 1500 square meters
 - (C) 48 tiles
 - (D) 6 feet
 - (E) 5 cm
-

5. Volume and 3D Measurement

Circle the correct answer

41. What does volume measure?

- (A) The distance around a shape (B) How loud a sound is (C) The flat surface area of a shape (D) The amount of space a 3D object takes up, measured in cubic units

42. A rectangular prism is made of unit cubes. It has 4 cubes along the length, 3 cubes along the width, and 2 cubes along the height. How many unit cubes make up the prism?

- (A) 24 cubic units (B) 9 cubic units (C) 12 cubic units (D) 18 cubic units

43. What is the volume of a box that is 10 cm long, 6 cm wide, and 4 cm tall?

- (A) 240 centimeters (B) 20 cubic centimeters (C) 40 square centimeters (D) 240 cubic centimeters (cm^3)

44. A cube has edges that are each 5 inches long. What is the volume?

- (A) 15 cubic inches (B) 25 cubic inches (C) 125 cubic inches (D) 150 cubic inches

45. A fish tank is 24 inches long, 12 inches wide, and 16 inches tall. If you fill it to a depth of 14 inches, what volume of water is in the tank?

(A) 336 cubic inches (B) 4,032 cubic inches (C) 4,608 cubic inches (D) 2,688 cubic inches

46. How many 1-centimeter cubes fit in a box that is 10 cm $\times$ 5 cm $\times$ 3 cm?

(A) 150 cubes (B) 18 cubes (C) 15 cubes (D) 50 cubes

Write the answer

47. A shipping box has a volume of 2,400 cubic inches. The base is 20 inches $\times$ 15 inches. How tall is the box?

Answer: _____

48. An L-shaped solid is made by combining a 5 $\times$ 4 $\times$ 3 rectangular prism with a 3 $\times$ 4 $\times$ 3 rectangular prism attached to its side. What is the total volume?

Answer: _____

49. 1 cubic foot equals how many cubic inches? (Hint: 1 foot = 12 inches)

Answer: _____

50. A moving box is 2 feet long, 1.5 feet wide, and 2 feet tall. How many cubic feet of items can it hold?

Answer: _____

Match each question to its answer

1. Which holds more water: a container that is 10 cm $\times$ 10 cm $\times$ 10 cm, or one that is 20 cm $\times$ 5 cm $\times$ 8 cm? $\rightarrow$

2. A sandbox is 6 feet long, 4 feet wide, and 1 foot deep. Sand is sold in bags of 0.5 cubic feet each. How many bags do you need to fill the sandbox? $\rightarrow$

3. If you double the length of a cube but keep the width and height the same, what happens to the volume? $\rightarrow$

4. A rectangular pool is 12 m long, 8 m wide, and 2 m deep. 1 cubic meter = 1,000 liters. How many liters of water does the pool hold when completely full? $\rightarrow$

5. A cereal box is 30 cm tall, 20 cm wide, and 8 cm deep. A new design makes the box 15 cm tall, 20 cm wide, and 16 cm deep. Does the new box hold more, less, or the same amount of cereal? $\rightarrow$

(A) 48 bags

(B) The 10 $\times$ 10 $\times$ 10 container (1000 cm³) holds more than the 20 $\times$ 5 $\times$ 8 container (800 cm³)

(C) The volume doubles

(D) 192,000 liters

(E) The same — both have a volume of $4,800 \text{ cm}^3$

6. Data Representation and Graphs

Circle the correct answer

51. A line plot shows the lengths of caterpillars found in a garden. There are X marks at 1 inch, $1\frac{1}{2}$ inches, $1\frac{1}{2}$ inches, 2 inches, 2 inches, 2 inches, $2\frac{1}{2}$ inches, and 3 inches. What is the most common caterpillar length?

(A) 2 inches (B) $1\frac{1}{2}$ inches (C) 3 inches (D) $2\frac{1}{2}$ inches

52. Students measured the heights of bean plants in centimeters and recorded: 12, 15, 15, 18, 20, 22, 22, 22, 25. Which type of graph would best show how many plants are at each height?

(A) Scatter plot (B) Circle graph (C) Bar graph (D) Line graph

53. A bar graph shows the number of books read by four students: Ana (8), Ben (5), Cara (10), Dan (7). How many more books did Cara read than Ben?

(A) 2 books (B) 3 books (C) 15 books (D) 5 books

54. A picture graph uses a symbol of a sun to represent 4 sunny days. The row for June shows 6 suns. How many sunny days were there in June?

(A) 6 days (B) 10 days (C) 24 days (D) 12 days

55. A line plot shows quiz scores for a class: two X's at 70, five X's at 80, eight X's at 90, and five X's at 100. How many students took the quiz?

(A) 20 students (B) 8 students (C) 340 students (D) 15 students

56. A scientist records the outdoor temperature every hour from 8 AM to 4 PM and wants to show how the temperature changed over time. Which graph type is most appropriate?

(A) Line graph (B) Circle graph (C) Picture graph (D) Bar graph

Write the answer

57. A double bar graph compares boys and girls in a school's favorite sport. The bars show: Soccer (boys 25, girls 30), Basketball (boys 20, girls 15), Swimming (boys 10, girls 20). Which sport has the biggest difference between boys and girls?

Answer: _____

58. Students measured the lengths of leaves in a garden to the nearest $\frac{1}{4}$ inch. The data set is: $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3, 3, 3, $3\frac{1}{4}$, $3\frac{1}{4}$, $3\frac{1}{2}$. What fraction of the leaves are 3 inches or longer?

Answer: _____

59. A coordinate graph plots points for a lemonade stand: (1, \$3), (2, \$6), (3, \$9), (4, \$12). The first number is cups sold and the second is total earnings. What pattern do you notice?

Answer: _____

60. A circle graph (pie chart) shows how Maya spends her day: Sleep 33%, School 25%, Homework 13%, Sports 8%, Free time 21%. If there are 24 hours in a day, approximately how many hours does Maya spend at school?

Answer: _____

Match each question to its answer

1. A histogram shows the ages of people at a park: 0–9 years (12 people), 10–19 years (8 people), 20–29 years (15 people), 30–39 years (10 people), 40–49 years (5 people). Which age group has the most people? →

2. A line plot shows the amount of rainfall (in inches) each day for a week: 0, 0, $\frac{1}{2}$, $\frac{1}{4}$, 0, 1, $\frac{3}{4}$. What is the total rainfall for the week? →

3. A stem-and-leaf plot shows test scores:

Stem | Leaves

6 | 5 8

7 | 0 2 5 5 8

8 | 0 3 5 7 9

9 | 2 5 8

How many students scored 80 or above? →

4. Which statement correctly describes the difference between a bar graph and a histogram? →

5. A line graph shows a plant's height over 6 weeks: Week 1 (2 cm), Week 2 (3 cm), Week 3 (5 cm), Week 4 (8 cm), Week 5 (8 cm), Week 6 (9 cm). During which week did the plant grow the most? →

(A) $2\frac{1}{2}$ inches

(B) A bar graph shows categories, while a histogram shows ranges of continuous data

(C) 8 students

(D) 20–29 years

(E) Week 4

7. Statistics: Measures of Center and Spread

Circle the correct answer

61. Find the mean (average) of this data set: 12, 15, 18, 20, 25.
(A) 18 (B) 19 (C) 15 (D) 20
62. Find the median of this data set: 3, 7, 9, 12, 15, 18, 21.
(A) 15 (B) 12.14 (C) 9 (D) 12
63. Find the median of this data set: 4, 8, 11, 15, 20, 24.
(A) 13 (B) 12 (C) 11 (D) 15
64. What is the mode of this data set: 5, 8, 8, 10, 12, 12, 12, 15?
(A) 10.25 (B) 10 (C) 12 (D) 8
65. What is the range of this data set: 34, 42, 51, 58, 67, 73, 89?
(A) 55 (B) 51 (C) 34 (D) 89
66. A basketball player scored these points in 6 games: 12, 15, 14, 45, 13, 16. The mean is 19.2. Which measure of center better represents her typical game — the mean or the median?
(A) The mean, because it uses all the data (B) The median (14.5), because the 45-point game is an outlier that pulls the mean up (C) The mode, because it's the most frequent (D) Neither — both are equally good

Write the answer

67. A teacher says the class average on a test was 82. There are 20 students. What was the total of all students' scores combined?
Answer: _____
68. A student has test scores of 88, 92, 76, and 84. What score does she need on the 5th test to have a mean of exactly 85?
Answer: _____
69. Two data sets have the same mean of 50. Set A: 48, 49, 50, 51, 52. Set B: 20, 35, 50, 65, 80. Which set has greater variability?
Answer: _____
70. The prices of 7 items at a store are: \$2, \$3, \$5, \$5, \$8, \$10, \$45. Calculate the mean and median. Which is higher?
Answer: _____

Match each question to its answer

1. A data set of daily high temperatures ($^{\circ}\text{F}$) has a mean of 72 and a Mean Absolute Deviation (MAD) of 4. What does the MAD tell you? →
2. Calculate the Mean Absolute Deviation (MAD) for this data set: 10, 12, 14, 16, 18. (The mean is 14.) →
3. A dot plot shows student heights in a class. The dots cluster in the middle (around 55–60 inches) with roughly equal tails on both sides. What is this distribution shape called? →
4. Home prices in a neighborhood: \$150K, \$155K, \$160K, \$165K, \$170K, \$800K. The distribution is skewed right due to the \$800K mansion. Which measure of center should a realtor use to describe the 'typical' home price? →
5. A data set has 5 values. The mean is 20, the median is 18, and the mode is 15. Which statement must be true? →

- (A) On average, each temperature is about 4°F away from the mean of 72°F
 - (B) At least two values in the data set are 15
 - (C) Symmetric (or approximately normal)
 - (D) Median (\$162,500), because it isn't affected by the extreme value
 - (E) 2.4
-

8. Master Measurement Scientist Capstone

Circle the correct answer

- 71.** A recipe calls for $2\frac{1}{2}$ cups of flour, $1\frac{3}{4}$ cups of sugar, and $\frac{3}{4}$ cup of butter. You want to make 3 batches. How many total cups of ingredients do you need?
(A) $7\frac{1}{2}$ cups (B) 15 cups (C) 5 cups (D) 10 cups
- 72.** A rectangular swimming pool is 25 meters long, 10 meters wide, and 2 meters deep. How many liters of water does it hold? (1 cubic meter = 1,000 liters)
(A) 500 liters (B) 5,000 liters (C) 50,000 liters (D) 500,000 liters
- 73.** A city recorded daily high temperatures ($^{\circ}\text{F}$) for one week: 68, 72, 75, 75, 78, 82, 90. Find the mean, median, and range. Which measure is most affected by the 90°F day?
(A) The mean (77.1°F) is most affected; median is 75°F , range is 22°F (B) The median is most affected (C) All three are equally affected (D) The range is most affected
- 74.** A farmer's rectangular field is 120 yards long and 80 yards wide. How many acres is the field? (1 acre = 4,840 square yards)
(A) 9,600 acres (B) 0.5 acres (C) About 1.98 acres (D) 4,840 acres

75. A shipping company charges by weight: \$5 for the first pound plus \$2 for each additional pound. A package weighs 3 kg. Given that $1 \text{ kg} \approx 2.2$ pounds, what is the shipping cost?

(A) \$11.00 (B) \$6.60 (C) \$17.00 (D) \$16.20

76. An experiment tracks a plant's height each week. Week 1: 3 cm, Week 2: 5 cm, Week 3: 8 cm, Week 4: 12 cm, Week 5: 17 cm, Week 6: 23 cm. Is the growth rate constant, increasing, or decreasing?

(A) Increasing — the plant grows more each week (2, 3, 4, 5, 6 cm per week) (B) Cannot be determined from this data (C) Decreasing — it slows down over time (D) Constant — it grows the same amount each week

Write the answer

77. A room is 12 feet long, 10 feet wide, and 8 feet tall. You need to paint all four walls (not the ceiling or floor). One gallon of paint covers 350 square feet. How many gallons do you need to buy?

Answer: _____

78. A race starts at 9:45 AM. Runner A finishes at 10:18 AM. Runner B finishes at 10:32 AM. Runner C finishes at 10:07 AM. List the runners from fastest to slowest and find the range of finish times.

Answer: _____

79. A landscape architect designs a park with a rectangular walking path around the outside. The park is 200 m by 150 m. The path is 3 m wide on all sides. What is the area of the path itself (not including the park)?

Answer: _____

80. Water freezes at 0°C (32°F) and boils at 100°C (212°F). A science experiment requires water at exactly 60°C . Using the formula $F = (9/5)C + 32$, what is 60°C in Fahrenheit?

Answer: _____

Match each question to its answer

1. A student surveys 30 classmates about how far they live from school (in miles): mean = 3.2, median = 2.5, mode = 1.5. What does it tell you that the mean is higher than the median? →

2. A moving truck's cargo area is 6 feet wide, 12 feet long, and 7 feet tall. You have boxes that are each $2 \text{ ft} \times 2 \text{ ft} \times 2 \text{ ft}$. What is the maximum number of boxes that can fit? →

3. Ten students measured the length of the same table. Results (in cm): 152, 153, 152, 151, 153, 152, 175, 153, 152, 151. One measurement seems off. Identify the outlier and

explain what likely happened. →

4. A trail map shows distances between landmarks: Trailhead to Waterfall = 2.3 km, Waterfall to Viewpoint = 1.8 km, Viewpoint to Campsite = 3.1 km. The hike starts at 8:30 AM and averages 4 km/hour. What time does the group reach the Campsite? →

5. A garden bed is L-shaped. The main section is 8 ft × 4 ft. A 3 ft × 4 ft section extends from one end. You need to buy enough soil to fill it 6 inches deep. Soil costs \$3 per cubic foot. What is the total cost? →

(A) \$66

(B) A few students live very far away, pulling the mean higher — the distribution is skewed right

(C) 175 cm is an outlier — the student likely made a measurement error (misread the ruler or measured the wrong dimension)

(D) 54 boxes

(E) About 10:18 AM

9. Foundational Concepts Review

Circle the correct answer

81. What is the length of an object if a centimeter ruler shows it stretching from 0 cm to 15 cm?

(A) 14 centimeters (B) 16 centimeters (C) 15 centimeters (D) 15 inches

82. Which is heavier: 1 kilogram of feathers or 1 kilogram of rocks?

(A) Cannot compare without knowing the exact type of rocks (B) The feathers are heavier because you need more of them (C) They weigh exactly the same — both are 1 kilogram (D) The rocks are heavier because rocks are denser

83. A swimming pool holds about 80,000 liters of water. If a garden hose fills the pool at a rate of 1000 liters per hour, how many hours would it take to fill the pool?

(A) 80,000 hours (B) 80 hours (C) 800 hours (D) 8 hours

84. An airplane flight departs at 10:30 AM Eastern Time and arrives at 12:15 PM Eastern Time, but you cross into Central Time Zone (1 hour behind). What time does your watch show when you land if you don't change it?

(A) 11:45 AM, which is what you get when you apply the distributive property here (B) 1:15 PM, according to the standard procedure for solving this kind of equation (C) 12:15 PM (your watch still shows Eastern Time) (D) 11:15 AM, based on the standard mathematical approach for this type of problem

85. Why do scientists use Celsius instead of Fahrenheit for most measurements?

(A) Fahrenheit wasn't invented until after Celsius, which is why this approach is recommended by experts (B) Celsius is based on water's freezing (0°C) and boiling (100°C) points, making it connect directly to scientific experiments (C) Celsius is more accurate than Fahrenheit, making this the most widely accepted explanation (D) Celsius numbers are always smaller and easier to calculate, as this directly follows from the underlying principles

86. A square has a side length of 9 meters. What is its perimeter?

(A) 18 meters (B) 27 meters (C) 81 meters (D) 36 meters

Write the answer

87. What is the area of a rectangle that is 8 cm long and 5 cm wide?

Answer: _____

88. Two rectangles have the same perimeter of 24 cm. Rectangle A is $10\text{ cm} \times 2\text{ cm}$. Rectangle B is $7\text{ cm} \times 5\text{ cm}$. Which has the greater area?

Answer: _____

89. A delivery truck can carry a maximum of 500 cubic feet. Which combination of packages can the truck carry? Package A: $8 \times 6 \times 4\text{ ft}$, Package B: $10 \times 5 \times 3\text{ ft}$, Package C: $6 \times 6 \times 6\text{ ft}$.

Answer: _____

90. Students measured the lengths of leaves in a garden to the nearest $\frac{1}{4}$ inch. The data set is: $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3, 3, 3, $3\frac{1}{4}$, $3\frac{1}{4}$, $3\frac{1}{2}$. What fraction of the leaves are 3 inches or longer?

Answer: _____

Match each question to its answer

1. A scientist records the outdoor temperature every hour from 8 AM to 4 PM and wants to show how the temperature changed over time. Which graph type is most appropriate? →

2. A double bar graph compares boys and girls in a school's favorite sport. The bars show: Soccer (boys 25, girls 30), Basketball (boys 20, girls 15), Swimming (boys 10, girls 20). Which sport has the biggest difference between boys and girls? →

3. A picture graph uses a symbol of a sun to represent 4 sunny days. The row for June shows 6 suns. How many sunny days were there in June? →

4. A coordinate graph plots points for a lemonade stand: (1, \$3), (2, \$6), (3, \$9), (4, \$12). The first number is cups sold and the second is total earnings. What pattern do you notice? →

5. A circle graph (pie chart) shows how Maya spends her day: Sleep 33%, School 25%,

Homework 13%, Sports 8%, Free time 21%. If there are 24 hours in a day, approximately how many hours does Maya spend at school? →

- (A) 24 days
 - (B) Line graph
 - (C) Earnings increase by \$3 for each cup sold
 - (D) Swimming
 - (E) 6 hours
-

10. Applied Problem Solving

Circle the correct answer

91. A book is placed on a ruler starting at the 2-inch mark and ending at the 11-inch mark. How long is the book?

- (A) 9 inches (B) 2 inches (C) 13 inches (D) 11 inches

92. How many grams are in 1 kilogram?

- (A) 10 grams (B) 1000 grams (C) 100 grams (D) 500 grams

93. You fill a container with water using a 500 mL measuring cup. After pouring 7 full cups, the container overflows at about halfway through the 8th cup. About how many liters does the container hold?

- (A) About 3.75 liters ($7.5 \times 500 \text{ mL} = 3750 \text{ mL}$) (B) About 3.5 liters (C) About 8 liters
(D) About 4 liters

94. How many minutes are in 1 hour?

- (A) 45 minutes (B) 30 minutes (C) 60 minutes (D) 100 minutes

95. Water boils at 100°C . What is this temperature in Fahrenheit?

- (A) 180°F (B) 212°F (C) 100°F (D) 200°F

96. A soccer field is approximately 100 meters long and 70 meters wide. What is the approximate perimeter of the field in kilometers?

- (A) 0.34 kilometers (340 meters) (B) 170 kilometers (C) 3.4 kilometers (D) 7000 meters

Write the answer

97. A tile is 1 foot $\times$ 1 foot. How many tiles do you need to cover a bathroom floor that is 8 feet by 6 feet?

Answer: _____

98. What is the difference between perimeter and area?

Answer: _____

99. A rectangular pool is 12 m long, 8 m wide, and 2 m deep. 1 cubic meter = 1,000 liters. How many liters of water does the pool hold when completely full?

Answer: _____

100. A line plot shows the lengths of caterpillars found in a garden. There are X marks at 1 inch, $1\frac{1}{2}$ inches, $1\frac{1}{2}$ inches, 2 inches, 2 inches, 2 inches, $2\frac{1}{2}$ inches, and 3 inches. What is the most common caterpillar length?

Answer: _____

Match each question to its answer

1. A student wants to compare the monthly rainfall in two cities over a year. She has 12 data points for each city. What is the best way to display BOTH data sets on a single graph for easy comparison? →

2. A bar graph shows the number of books read by four students: Ana (8), Ben (5), Cara (10), Dan (7). How many more books did Cara read than Ben? →

3. How many milliliters are in 1 liter? →

4. Plot the following ordered pairs on a coordinate plane: A(1, 3), B(4, 3), C(4, 7), D(1, 7). What shape do these four points form? →

5. The prefix 'kilo-' means 1000. How many meters are in 1 kilometer? →

(A) 1000 meters

(B) 5 books

(C) 1000 milliliters

(D) A double line graph with one line per city

(E) A rectangle

11. Critical Analysis & Evaluation

Circle the correct answer

101. Four students measured the same desk. Student A got 91 cm, Student B got 93 cm, Student C got 92 cm, and Student D got 108 cm. Which student most likely made a measurement error?

(A) Student B (93 cm is the largest of the close measurements) (B) Student A (91 cm is the smallest) (C) All students made errors since their measurements differ (D) Student D (108 cm is much farther from the others)

102. Which measuring tool would you use to find the weight of a letter?

(A) A measuring cup (measures liquid volume) (B) A ruler (measures length, not weight) (C) A thermometer (measures temperature) (D) A kitchen scale or postal scale (measured in ounces or grams)

103. A water cooler holds 5 gallons. Water bottles at the store come in 2-liter sizes. Approximately how many 2-liter bottles do you need to fill the cooler? (Hint: 1 gallon $\approx$ 3.8 liters)

(A) About 2 or 3 bottles, as this is what research and standard practice suggests (B) About 10 bottles (5 gallons $\approx$ 19 liters $\div$ 2 liters/bottle $\approx$ 9.5, round up to 10) (C) About 5 bottles, which is why this approach is recommended by experts (D) About 20 bottles, and this principle applies across similar situations

104. A doctor's appointment lasts from 2:45 PM to 3:30 PM. How many minutes does the appointment last?

(A) 30 minutes (B) 85 minutes (C) 15 minutes (D) 45 minutes

105. A thermometer shows 68°F. The temperature drops 40 degrees overnight. Is the temperature now above or below freezing?

(A) Above freezing — 28°F is still above 0°F (B) Below freezing — $68 - 40 = 28^\circ\text{F}$, which is below 32°F (C) Exactly at freezing — 28°F equals 32°F (D) Cannot determine without knowing the Celsius temperature

106. A farmer wants to build a fence around a rectangular field that is 120 feet long and 80 feet wide. Fencing costs \$5 per foot. How much will the fence cost?

(A) \$2,000 (B) \$1,000 (C) \$48,000 (D) \$600

Write the answer

107. Count the square units to find the area of an L-shaped figure made of two rectangles: a 4×3 rectangle on the left connected to a 2×3 rectangle on the right at the bottom.

Answer: _____

108. Which would you calculate to determine how much paint is needed to cover a wall: perimeter or area?

Answer: _____

109. A cube of side 3 cm has a volume of 27 cm³. If each side doubles to 6 cm, what is the new volume? How many times bigger is it?

Answer: _____

110. A line plot shows quiz scores for a class: two X's at 70, five X's at 80, eight X's at 90, and five X's at 100. How many students took the quiz?

Answer: _____

Match each question to its answer

1. Which statement correctly describes the difference between a bar graph and a histogram? →
2. A rectangular playground is 50 meters long. The perimeter is 160 meters. What is the area of the playground? →
3. A school day starts at 8:15 AM and ends at 3:00 PM. If there's a 45-minute lunch break, how many minutes of instruction time are there? →
4. Which is a better estimate for the capacity of a bathtub: 300 liters or 300 milliliters? →
5. A recipe calls for $\frac{3}{4}$ cup of sugar. You only have a $\frac{1}{4}$ -cup measuring cup. How many times do you need to fill it? →

- (A) A bar graph shows categories, while a histogram shows ranges of continuous data
 - (B) 3 times
 - (C) 360 minutes (6 hours minus 45 minutes = 5 hours 15 min... wait: $6\text{h}45\text{m} - 45\text{m} = 6\text{h}$ exactly = 360 min)
 - (D) 1500 square meters
 - (E) 300 liters
-

12. Advanced Integration & Synthesis

Circle the correct answer

111. Which unit would you use to measure the length of a school bus?
(A) Feet (B) Miles (C) Ounces (D) Inches
112. How many ounces are in 1 pound?
(A) 16 ounces (B) 8 ounces (C) 12 ounces (D) 10 ounces
113. A recipe calls for $2\frac{1}{2}$ cups of flour, $1\frac{3}{4}$ cups of sugar, and $\frac{3}{4}$ cup of butter. You want to make 3 batches. How many total cups of ingredients do you need?
(A) 10 cups (B) 5 cups (C) $7\frac{1}{2}$ cups (D) 15 cups
114. A clock shows the hour hand between the 2 and 3, and the minute hand on the 7. What time is it?
(A) 3:35 (B) 2:07 (C) 7:10 (D) 2:35
115. A thermometer shows 72°F . A recipe says the bread dough needs to rise in a 'warm place' between 75°F and 85°F . Your room is 72°F . Is it warm enough?
(A) Yes — 72°F is already considered warm (B) No — 72°F is below the minimum 75°F needed for the dough to rise properly (C) Yes — 72°F is close enough to 75°F

(D) Cannot determine without a Celsius thermometer

116. A rectangle has a perimeter of 30 cm and a length of 10 cm. What is the width?

(A) 5 cm (B) 3 cm (C) 10 cm (D) 20 cm

Write the answer

117. You need to buy carpet to cover a room that is 12 feet by 10 feet. Carpet is sold by the square foot at \$3 per square foot. How much will the carpet cost?

Answer: _____

118. A landscape designer charges \$2 per square foot for grass seed and \$4 per foot for edging. A yard is 20 ft × 15 ft. What is the total cost for grass AND edging?

Answer: _____

119. A shipping box has a volume of 2,400 cubic inches. The base is 20 inches × 15 inches. How tall is the box?

Answer: _____

120. A line plot shows the amount of rainfall (in inches) each day for a week: 0, 0, $\frac{1}{2}$, $\frac{1}{4}$, 0, 1, $\frac{3}{4}$. What is the total rainfall for the week?

Answer: _____

Match each question to its answer

1. Students measured the heights of bean plants in centimeters and recorded: 12, 15, 15, 18, 20, 22, 22, 22, 25. Which type of graph would best show how many plants are at each height? →

2. A survey records the number of pets owned by 10 families: 0, 0, 1, 1, 1, 2, 2, 3, 3, 7. Calculate the mean AND the median. How do they compare? →

3. How many 1-centimeter cubes fit in a box that is 10 cm × 5 cm × 3 cm? →

4. A relay race has 4 runners. Their times are: Runner 1: 58 seconds, Runner 2: 1 minute 3 seconds, Runner 3: 55 seconds, Runner 4: 1 minute 10 seconds. What is the total relay time? →

5. 1 cubic foot equals how many cubic inches? (Hint: 1 foot = 12 inches) →

(A) 1,728 cubic inches ($12 \times 12 \times 12 = 1,728$)

(B) Bar graph

(C) 150 cubes

(D) 4 minutes 6 seconds

(E) Mean = 2, Median = 1.5. The mean is higher because 7 pets pulls it up

13. Line Graphs

Circle the correct answer

121. You're mailing a package. The post office says it can't weigh more than 70 pounds. Your package weighs 1050 ounces. Can you mail it?

(A) No — $1050 \text{ ounces} \div 16 = 65.625 \text{ pounds}$... wait, that's under 70 pounds, so YES you can mail it (B) No — 1050 ounces is way more than 70 pounds (C) Cannot determine without a scale (D) Yes — but only if you remove some items first

122. Which is colder: -5°C or 3°C ?

(A) 3°C is colder because $3 < 5$ (B) -5°C is colder (negative temperatures are below zero) (C) Cannot compare positive and negative temperatures (D) They are equally cold

123. A square has a side length of 9 meters. What is its area?

(A) 81 square meters (B) 9 square meters (C) 18 square meters (D) 36 square meters

124. Ten students measured the length of the same table. Results (in cm): 152, 153, 152, 151, 153, 152, 175, 153, 152, 151. One measurement seems off. Identify the outlier and explain what likely happened.

(A) 151 cm is the outlier because it's the smallest (B) 175 cm is an outlier — the student likely made a measurement error (misread the ruler or measured the wrong dimension) (C) There are no outliers; all measurements are valid (D) 153 cm is the outlier because it appears too often

125. The prices of 7 items at a store are: \$2, \$3, \$5, \$5, \$8, \$10, \$45. Calculate the mean and median. Which is higher?

(A) The mean (\$11.14) is higher than the median (\$5) (B) They are equal (C) The mean (\$5) is lower than the median (\$11.14) (D) The median is higher than the mean

126. A cube has edges that are each 5 inches long. What is the volume?

(A) 150 cubic inches (B) 15 cubic inches (C) 25 cubic inches (D) 125 cubic inches

Write the answer

127. A class collected data on the weights of backpacks (in pounds). The five-number summary is: Min = 5, Q1 = 8, Median = 12, Q3 = 15, Max = 28. A doctor says backpacks over 15% of body weight are unhealthy. If the average student weighs 90 pounds, what percentage of students likely carry unhealthy backpacks?

Answer: _____

128. What is the volume of a box that is 10 cm long, 6 cm wide, and 4 cm tall?

Answer: _____

129. A student surveys 30 classmates about how far they live from school (in miles): mean = 3.2, median = 2.5, mode = 1.5. What does it tell you that the mean is higher than the median?

Answer: _____

130. A room has a rectangular floor (15 ft × 12 ft) with a rectangular closet (3 ft × 4 ft) built into one corner. How many square feet of carpet do you need for the room (not including the closet)?

Answer: _____

Match each question to its answer

1. You are a sports reporter writing about a basketball player's season. Her scoring data: Games 1–10 averaged 15 points (MAD of 2). Games 11–20 averaged 22 points (MAD of 7). Write a two-sentence summary using both the mean and MAD to describe how her season changed. →

2. A newspaper reports: 'The average salary at XYZ Corp is \$250,000.' But most employees earn between \$40,000 and \$80,000, and the CEO earns \$5,000,000. What is misleading about this report? →

3. A city recorded daily high temperatures (°F) for one week: 68, 72, 75, 75, 78, 82, 90. Find the mean, median, and range. Which measure is most affected by the 90°F day? →

4. A data set of daily high temperatures (°F) has a mean of 72 and a Mean Absolute Deviation (MAD) of 4. What does the MAD tell you? →

5. Water freezes at 0°C (32°F) and boils at 100°C (212°F). A science experiment requires water at exactly 60°C. Using the formula $F = (9/5)C + 32$, what is 60°C in Fahrenheit? →

(A) 140°F

(B) The player improved from averaging 15 points to 22 points in the second half. However, her scoring became less consistent, with individual games varying by about 7 points from her average compared to only 2 points earlier.

(C) The CEO's extreme salary skews the mean far above what most employees earn

(D) The mean (77.1°F) is most affected; median is 75°F, range is 22°F

(E) On average, each temperature is about 4°F away from the mean of 72°F

14. Line Graphs

Circle the correct answer

131. You cut a 1-yard piece of ribbon into 4 equal pieces. How many inches long is each piece?

(A) 36 inches (B) 12 inches (C) 9 inches (D) 3 inches

132. A puppy weighs 4 kilograms at birth and gains 500 grams each week. How much will it weigh after 6 weeks?

(A) 4500 grams (B) 7 kilograms (C) 10 kilograms (D) 3004 grams

133. A recipe needs 2 cups of milk. You only have a 1-pint carton. Is that enough?

(A) Yes — 1 pint equals exactly 2 cups, which is exactly what the recipe needs (B) No — a pint is only 1 cup (C) No — you need 2 pints for 2 cups (D) Yes — a pint is more than 2 cups

134. At 6:00 AM the temperature was 45°F . By noon it had risen 20 degrees. By 6:00 PM it dropped 8 degrees from noon. What was the temperature at 6:00 PM?

(A) 37°F (B) 65°F (C) 73°F (D) 57°F

135. What is the perimeter of a rectangle that is 8 cm long and 5 cm wide?

(A) 40 cm (B) 30 cm (C) 26 cm (D) 13 cm

136. A building has a step-shaped design: the bottom section is $20\text{ m} \times 20\text{ m} \times 10\text{ m}$, and a smaller section on top is $10\text{ m} \times 10\text{ m} \times 10\text{ m}$. What is the total volume of the building?

(A) 5,000 cubic meters ($4,000 + 1,000$) (B) 1,000 cubic meters (C) 8,000 cubic meters (D) 4,000 cubic meters

Write the answer

137. A researcher measures the same chemical reaction 5 times and gets temperatures of: 42.3°C , 42.1°C , 42.4°C , 42.2°C , 42.5°C . Why is it important that these measurements are very close together?

Answer: _____

138. A rectangular prism has a volume of 360 cm^3 . The length is 10 cm and the width is 9 cm. What is the height?

Answer: _____

139. An L-shaped solid is made by combining a $5 \times 4 \times 3$ rectangular prism with a $3 \times 4 \times 3$ rectangular prism attached to its side. What is the total volume?

Answer: _____

140. A room is 12 feet long, 10 feet wide, and 8 feet tall. You need to paint all four walls (not the ceiling or floor). One gallon of paint covers 350 square feet. How many gallons do you need to buy?

Answer: _____

Match each question to its answer

1. A hiking trail is marked every 500 meters. You pass 6 markers. How many kilometers have you hiked? →
 2. A box plot shows: minimum = 40, $Q1 = 55$, median = 65, $Q3 = 75$, maximum = 95. What is the interquartile range (IQR)? →
 3. A dot plot shows student heights in a class. The dots cluster in the middle (around 55–60 inches) with roughly equal tails on both sides. What is this distribution shape called? →
 4. A rectangular room has an area of 96 square feet and a perimeter of 40 feet. What are the dimensions of the room? →
 5. Is 25°C hot or cold? What kind of clothing would you wear? →
 - (A) Warm/comfortable — about 77°F , you'd wear a t-shirt and shorts
 - (B) 12 feet $\times$ 8 feet
 - (C) 20
 - (D) 3 kilometers
 - (E) Symmetric (or approximately normal)
-

15. Line Graphs

Circle the correct answer

- 141.** A recipe calls for 500 grams of flour. You have a 2-kilogram bag. After making the recipe, how many grams of flour are left in the bag?
(A) 1500 grams (B) 2500 grams (C) 1.5 grams (D) 1000 grams
- 142.** An L-shaped room consists of a 10 ft $\times$ 8 ft rectangle with a 4 ft $\times$ 4 ft square removed from one corner. What is the perimeter of the L-shaped room?
(A) 44 feet (B) 36 feet (C) 28 feet (D) 52 feet
- 143.** Design a rectangular dog park with an area of exactly 200 square meters. The park must have the smallest possible perimeter (to minimize fencing cost). What dimensions should you choose?
(A) 20 m $\times$ 10 m (perimeter = 60 m), as this is what research and standard practice suggests (B) Approximately 14.14 m $\times$ 14.14 m (a square with side $\sqrt{200} \approx 14.14$ m gives minimum perimeter ≈ 56.6 m) (C) 100 m $\times$ 2 m (perimeter = 204 m), and this has been consistently demonstrated in practice (D) 50 m $\times$ 4 m (perimeter = 108 m), and this principle applies across similar situations
- 144.** How many days are in a regular (non-leap) year?
(A) 365 days (B) 360 days (C) 52 days (D) 366 days

145. Design the dimensions for a toy box that must hold at least 10,000 cubic centimeters but fit through a doorway that is 80 cm wide. What dimensions would work?

(A) $50\text{ cm} \times 50\text{ cm} \times 3\text{ cm}$ (only $7,500\text{ cm}^3$, not enough volume) (B) $75\text{ cm} \times 50\text{ cm} \times 30\text{ cm} = 112,500\text{ cm}^3$ (fits through 80 cm doorway and exceeds 10,000 cm^3) (C) $90\text{ cm} \times 20\text{ cm} \times 5\text{ cm}$ (only $9,000\text{ cm}^3$, not enough volume) (D) $100\text{ cm} \times 100\text{ cm} \times 100\text{ cm}$ (too wide for the doorway at 100 cm)

146. You need to measure the length of your classroom. Which tool would be BEST to use?

(A) A bathroom scale (B) A 12-inch ruler (C) A teaspoon (D) A tape measure

Write the answer

147. You measure a line with a ruler marked in half-inches. The line ends between the 3-inch and $3\frac{1}{2}$ -inch marks, closer to the $3\frac{1}{2}$ -inch mark. What is the best estimate for the line's length?

Answer: _____

148. Design a daily schedule for a field trip. The bus leaves at 8:00 AM, the museum tour takes 2 hours 30 minutes, lunch is 45 minutes, the nature walk is 1 hour 15 minutes, and the bus ride home takes 40 minutes. What time does the field trip end?

Answer: _____

149. A doctor tracks a patient's temperature every 4 hours: 98.6°F , 99.2°F , 100.1°F , 101.8°F , 100.4°F , 99.0°F . When should the doctor be most concerned, and why? Normal body temperature is 98.6°F .

Answer: _____

150. A garden is 5 yards long. How many feet is that?

Answer: _____

Match each question to its answer

1. A moving box is 2 feet long, 1.5 feet wide, and 2 feet tall. How many cubic feet of items can it hold? →

2. A sandbox is 6 feet long, 4 feet wide, and 1 foot deep. Sand is sold in bags of 0.5 cubic feet each. How many bags do you need to fill the sandbox? →

3. A race starts at 9:45 AM. Runner A finishes at 10:18 AM. Runner B finishes at 10:32 AM. Runner C finishes at 10:07 AM. List the runners from fastest to slowest and find the range of finish times. →

4. A garden bed is L-shaped. The main section is $8\text{ ft} \times 4\text{ ft}$. A $3\text{ ft} \times 4\text{ ft}$ section extends from one end. You need to buy enough soil to fill it 6 inches deep. Soil costs \$3 per cubic foot. What is the total cost? →

5. A hallway is 12 yards long. A teacher walks from one end to the other and back. How many total feet does the teacher walk? →

(A) 6 cubic feet

(B) 72 feet

(C) Fastest to slowest: C (22 min), A (33 min), B (47 min). Range: 25 minutes

(D) 48 bags

(E) \$66

16. Line Graphs

Circle the correct answer

151. An irregular shape is drawn on a grid of 1-cm squares. You count 23 full squares inside and 8 half-squares along the edge. What is the approximate area?

(A) 31 square centimeters, which is why this approach is recommended by experts
(B) 27 square centimeters (23 full + 8 halves = $23 + 4 = 27$) (C) 23 square centimeters, making this the most widely accepted explanation (D) 184 square centimeters, and this has been consistently demonstrated in practice

152. A data set has 5 values. The mean is 20, the median is 18, and the mode is 15. Which statement must be true?

(A) The range is 5 (B) At least two values in the data set are 15 (C) The largest value is 20 (D) All values are between 15 and 20

153. Calculate the Mean Absolute Deviation (MAD) for this data set: 10, 12, 14, 16, 18. (The mean is 14.)

(A) 2.4 (B) 14 (C) 4 (D) 8

154. Which holds more water: a container that is 10 cm × 10 cm × 10 cm, or one that is 20 cm × 5 cm × 8 cm?

(A) The 20×5×8 container because it's longer (B) They hold the same amount because the dimensions are similar (C) The 10×10×10 container (1000 cm³) holds more than the 20×5×8 container (800 cm³) (D) Cannot determine without filling them with water

155. A data set has these properties: mean = 50, median = 50, mode = 50, range = 20. What can you say about the distribution shape?

(A) The distribution is skewed left (B) All values in the data set are 50 (C) The distribution is likely symmetric, with the center at 50 (D) The distribution is skewed right

156. How many inches are in 1 foot?

- (A) 3 inches (B) 12 inches (C) 10 inches (D) 6 inches

Write the answer

157. A storage unit is 10 ft × 10 ft × 8 ft. You have boxes that are each 2 ft × 2 ft × 2 ft. What is the maximum number of boxes that can fit in the storage unit?

Answer: _____

158. A construction worker digs a rectangular hole that is 3 m long, 2 m wide, and 1.5 m deep. How many cubic meters of dirt were removed?

Answer: _____

159. School starts at 8:30 AM. You need 45 minutes to get ready and 15 minutes to walk to school. What time should you wake up at the latest?

Answer: _____

160. Design a recipe card that uses at least 3 different capacity measurements. Your recipe should use cups, tablespoons, and liters (or milliliters). Which of these recipe descriptions uses all three correctly?

Answer: _____

Match each question to its answer

1. How many hours are in 1 day? →

2. How many quarts are in 1 gallon? →

3. A ribbon is 48 inches long. How many feet is that? →

4. You buy 5 pounds of potatoes and use 2 pounds for dinner. You then use 8 ounces for a recipe the next day. How many ounces of potatoes remain? →

5. A rectangular swimming pool is 25 meters long, 10 meters wide, and 2 meters deep. How many liters of water does it hold? (1 cubic meter = 1,000 liters) →

(A) 24 hours

(B) 40 ounces

(C) 4 quarts

(D) 4 feet

(E) 500,000 liters

Riddle & Joke Break

Guess the answer, then check the key!

161. Why did the ruler feel so important?

- 162.** I tried to weigh a rainbow, but it was too light -- it only comes in light spectrum.
- 163.** Why don't scientists trust atoms to measure anything?
- 164.** The metric system is the ruler of the world -- it really measures up!
- 165.** Why did the thermometer go to school?
- 166.** Converting inches to centimeters is a cinch -- once you get the point!
-

Answer Key

1. D — 7 inches
2. D — 9 inches
3. D — Feet
4. B — 12 inches
5. D — 36 inches
6. D — 3 feet
7. 15 feet
8. 15 centimeters
9. 100 centimeters
10. 1 inch is longer (1 inch $\approx$ 2.54 centimeters)
Matching (Length and Distance Measurement): 1→E, 2→D, 3→B, 4→A, 5→C
11. B — Pounds
12. C — 16 ounces
13. B — 48 ounces
14. C — 1000 grams
15. D — 1500 grams
16. D — 4 cups
17. 4 quarts
18. 48 cups
19. 1000 milliliters

20. 4 juice boxes

Matching (Weight, Mass, and Capacity): 1→C, 2→A, 3→E, 4→B, 5→D

21. C — 2:35

22. A — 60 minutes

23. A — 1 hour and 45 minutes

24. D — 7:30 AM

25. B — 24 hours

26. C — 32°F

27. 212°F

28. 57°F

29. 5 minutes (the next bus comes at 7:40 AM)

30. 45 minutes

Matching (Time and Temperature): 1→C, 2→A, 3→E, 4→B, 5→D

31. D — 26 cm

32. C — 40 square centimeters

33. B — Perimeter measures the distance around a shape; area measures the space inside a shape

34. C — 36 meters

35. B — 81 square meters

36. D — \$2,000

37. \$360

38. Rectangle B (area = 35 cm²) has greater area than Rectangle A (area = 20 cm²)

39. 18 square units (12 + 6 = 18)

40. 32 square inches (outer area 80 – inner area 48 = 32)

Matching (Perimeter and Area): 1→E, 2→D, 3→A, 4→B, 5→C

41. D — The amount of space a 3D object takes up, measured in cubic units

42. A — 24 cubic units

43. D — 240 cubic centimeters (cm³)

44. C — 125 cubic inches

45. B — 4,032 cubic inches

46. A — 150 cubes

47. 8 inches

48. 96 cubic units ($60 + 36 = 96$)

49. 1,728 cubic inches ($12 \times 12 \times 12 = 1,728$)

50. 6 cubic feet

Matching (Volume and 3D Measurement): $1 \rightarrow B$, $2 \rightarrow A$, $3 \rightarrow C$, $4 \rightarrow D$, $5 \rightarrow E$

51. A — 2 inches

52. C — Bar graph

53. D — 5 books

54. C — 24 days

55. A — 20 students

56. A — Line graph

57. Swimming

58. $6/10$ or $3/5$

59. Earnings increase by \$3 for each cup sold

60. 6 hours

Matching (Data Representation and Graphs): $1 \rightarrow D$, $2 \rightarrow A$, $3 \rightarrow C$, $4 \rightarrow B$, $5 \rightarrow E$

61. A — 18

62. D — 12

63. A — 13

64. C — 12

65. A — 55

66. B — The median (14.5), because the 45-point game is an outlier that pulls the mean up

67. 1,640 points

68. 85

69. Set B, because the values are more spread out from the mean

70. The mean (\$11.14) is higher than the median (\$5)

Matching (Statistics: Measures of Center and Spread): 1→A, 2→E, 3→C, 4→D, 5→B

71. B — 15 cups

72. D — 500,000 liters

73. A — The mean (77.1°F) is most affected; median is 75°F, range is 22°F

74. C — About 1.98 acres

75. D — \$16.20

76. A — Increasing — the plant grows more each week (2, 3, 4, 5, 6 cm per week)

77. 1 gallon (352 sq ft of wall, so 1 gallon is barely enough — but you might want 2)

78. Fastest to slowest: C (22 min), A (33 min), B (47 min). Range: 25 minutes

79. 2,136 square meters

80. 140°F

Matching (Master Measurement Scientist Capstone): 1→B, 2→D, 3→C, 4→E, 5→A

81. C — 15 centimeters

82. C — They weigh exactly the same — both are 1 kilogram

83. B — 80 hours

84. C — 12:15 PM (your watch still shows Eastern Time)

85. B — Celsius is based on water's freezing (0°C) and boiling (100°C) points, making it connect directly to scientific experiments

86. D — 36 meters

87. 40 square centimeters

88. Rectangle B (area = 35 cm²) has greater area than Rectangle A (area = 20 cm²)

89. All three packages (192 + 150 + 216 = 558 cubic feet)... that exceeds 500, so the truck CANNOT carry all three

90. 6/10 or 3/5

Matching (Foundational Concepts Review): 1→B, 2→D, 3→A, 4→C, 5→E

91. A — 9 inches

92. B — 1000 grams

93. A — About 3.75 liters ($7.5 \times 500 \text{ mL} = 3750 \text{ mL}$)
94. C — 60 minutes
95. B — 212°F
96. A — 0.34 kilometers (340 meters)
97. 48 tiles
98. Perimeter measures the distance around a shape; area measures the space inside a shape
99. 192,000 liters
100. 2 inches
Matching (Applied Problem Solving): $1 \rightarrow \text{D}$, $2 \rightarrow \text{B}$, $3 \rightarrow \text{C}$, $4 \rightarrow \text{E}$, $5 \rightarrow \text{A}$
101. D — Student D (108 cm is much farther from the others)
102. D — A kitchen scale or postal scale (measured in ounces or grams)
103. B — About 10 bottles ($5 \text{ gallons} \approx 19 \text{ liters} \div 2 \text{ liters/bottle} \approx 9.5$, round up to 10)
104. D — 45 minutes
105. B — Below freezing — $68 - 40 = 28^{\circ}\text{F}$, which is below 32°F
106. A — \$2,000
107. 18 square units ($12 + 6 = 18$)
108. Area — paint covers the surface of the wall
109. 216 cm^3 , which is 8 times bigger
110. 20 students
Matching (Critical Analysis & Evaluation): $1 \rightarrow \text{A}$, $2 \rightarrow \text{D}$, $3 \rightarrow \text{C}$, $4 \rightarrow \text{E}$, $5 \rightarrow \text{B}$
111. A — Feet
112. A — 16 ounces
113. D — 15 cups
114. D — 2:35
115. B — No — 72°F is below the minimum 75°F needed for the dough to rise properly
116. A — 5 cm
117. \$360

118. \$880 (\$600 for grass + \$280 for edging)

119. 8 inches

120. $2\frac{1}{2}$ inches

Matching (Advanced Integration & Synthesis): $1 \rightarrow B$, $2 \rightarrow E$, $3 \rightarrow C$, $4 \rightarrow D$, $5 \rightarrow A$

121. A — No — $1050 \text{ ounces} \div 16 = 65.625 \text{ pounds}$... wait, that's under 70 pounds, so YES you can mail it

122. B — -5°C is colder (negative temperatures are below zero)

123. A — 81 square meters

124. B — 175 cm is an outlier — the student likely made a measurement error (misread the ruler or measured the wrong dimension)

125. A — The mean (\$11.14) is higher than the median (\$5)

126. D — 125 cubic inches

127. About 25% — those above Q3 (15 pounds), since $15\% \text{ of } 90 \text{ lb} = 13.5 \text{ lb}$, and $Q3 = 15 \text{ lb} > 13.5 \text{ lb}$

128. 240 cubic centimeters (cm^3)

129. A few students live very far away, pulling the mean higher — the distribution is skewed right

130. 168 square feet

Matching (Line Graphs): $1 \rightarrow B$, $2 \rightarrow C$, $3 \rightarrow D$, $4 \rightarrow E$, $5 \rightarrow A$

131. C — 9 inches

132. B — 7 kilograms

133. A — Yes — 1 pint equals exactly 2 cups, which is exactly what the recipe needs

134. D — 57°F

135. C — 26 cm

136. A — 5,000 cubic meters ($4,000 + 1,000$)

137. Close measurements show high precision (repeatability), which increases confidence in the results

138. 4 cm

139. 96 cubic units ($60 + 36 = 96$)

140. 1 gallon (352 sq ft of wall, so 1 gallon is barely enough — but you might want 2)
Matching (Line Graphs): 1→D, 2→C, 3→E, 4→B, 5→A
141. A — 1500 grams
142. B — 36 feet
143. B — Approximately $14.14\text{ m} \times 14.14\text{ m}$ (a square with side $\sqrt{200} \approx 14.14\text{ m}$ gives minimum perimeter $\approx 56.6\text{ m}$)
144. A — 365 days
145. B — $75\text{ cm} \times 50\text{ cm} \times 30\text{ cm} = 112,500\text{ cm}^3$ (fits through 80 cm doorway and exceeds $10,000\text{ cm}^3$)
146. D — A tape measure
147. About $3\frac{1}{4}$ inches
148. 1:10 PM
149. At the 4th reading (101.8°F) — it's the peak fever, 3.2°F above normal
150. 15 feet
Matching (Line Graphs): 1→A, 2→D, 3→C, 4→E, 5→B
151. B — 27 square centimeters ($23\text{ full} + 8\text{ halves} = 23 + 4 = 27$)
152. B — At least two values in the data set are 15
153. A — 2.4
154. C — The $10 \times 10 \times 10$ container (1000 cm^3) holds more than the $20 \times 5 \times 8$ container (800 cm^3)
155. C — The distribution is likely symmetric, with the center at 50
156. B — 12 inches
157. 100 boxes
158. 9 cubic meters
159. 7:30 AM
160. Lemonade: 2 liters of water, 1 cup of sugar, 3 tablespoons of lemon juice concentrate
Matching (Line Graphs): 1→A, 2→C, 3→D, 4→B, 5→E
161. Because it was the measure of all things!

162. I tried to weigh a rainbow, but it was too light -- it only comes in light spectrum.

163. Because they make up everything!

164. The metric system is the ruler of the world -- it really measures up!

165. To get a few more degrees!

166. Converting inches to centimeters is a cinch -- once you get the point!

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