

Measurement Inventory for Elementary School Teachers

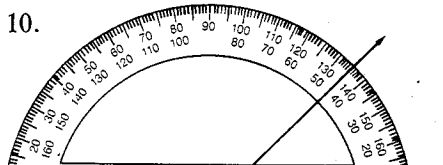
Instructions: This is a test of your knowledge of some of the basic concepts, operations, and instruments associated with measurement. Please read each question carefully and then, on the answer sheet, mark an X through the letter corresponding to the correct answer. Mark only one answer for each question. Please do not use aid from any source while taking the test. Although no time limit is imposed, the test should be completed in one sitting.

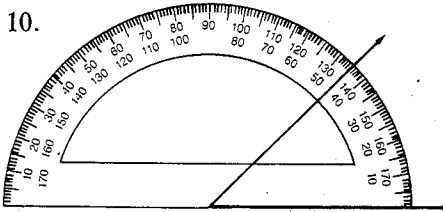
1. Which of the following kinds of measure would be appropriate for the capacity of a car trunk?
 - a. linear measure
 - b. weight measure
 - c. mass measure
 - d. square measure
 - e. cubic measure
2. A six-foot man is standing next to a brick building. If the man casts a shadow of eight feet and the building casts a shadow of sixty feet, how tall is the building?
 - a. 30 feet
 - b. 80 feet
 - c. 48 feet
 - d. 24 feet
 - e. none of the above
3. Which of the following is (are) approximate?

I. 20 inches	III. 2 cookies
II. 15 children	IV. 1½ pounds

 - a. IV only
 - b. II and IV
 - c. I and IV
 - d. II and III
 - e. none of the above
4. 2.36×0.0005 is best reported as—
 - a. 0.001.
 - b. 0.0011.
 - c. 0.0012.
 - d. 0.00118.
 - e. 0.001180.
5. The circumference of a circle is measured in—
 - a. square units.
 - b. cubic units.
 - c. circular units.
 - d. radian units.
 - e. linear units.
6. A certain rectangle with a length equal to 12 feet has a perimeter of 40 feet. What is the area of the rectangle?
 - a. 96 sq. ft.
 - b. 20 sq. ft.
 - c. 48 sq. ft.
 - d. 16 sq. ft.
 - e. none of the above
7. Which of the following has (have) five significant digits?

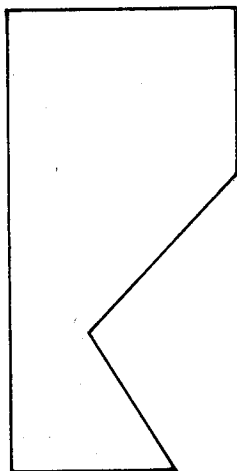
I. 50300	III. .0005
II. 2.0346	IV. 0.0300

 - a. III only
 - b. II and III
 - c. II only
 - d. II, III, IV
 - e. I, II, III, IV
8. A carpenter buys six boards that are each 6 ft. 4 in. long and two boards that are each 4 ft. 6 in. long. At \$0.20 a linear foot, how much will they cost?
 - a. \$8.80
 - b. \$9.30
 - c. \$9.00
 - d. \$9.90
 - e. none of the above
9. Rounded to the nearest hundredth, 485.364 is which of the following?
 - a. 500
 - b. 485.4
 - c. 485.36
 - d. 485.37
 - e. 485.365
10. 
11. Which of the following is (are) example(s) of standard units?
 - I. 12 pints
 - II. a pinch of salt
 - III. a barrel of monkeys
 - IV. a handful
 - V. a meter
 - a. I and V
 - b. V only
 - c. I only
 - d. I and IV
 - e. all of the above
12. 4.21×10^{-2} cm is which of the following?
 - a. 421 cm
 - b. 42100 cm
 - c. 0.421 cm
 - d. 0.0421 cm
 - e. none of the above
13. Consider the measurements 31.68, 4.6, 3.006, 0.0021, and 1.027. The most precise measurement is which of the following?
 - a. 31.68
 - b. 4.6
 - c. 3.006
 - d. 0.0021
 - e. 1.027
14. 45 centimeters is—
 - a. 4.5 meters.
 - b. 0.45 meters.
 - c. 450 meters.
 - d. 4500 millimeters.
 - e. none of the above.



The angle shown in the figure measures—

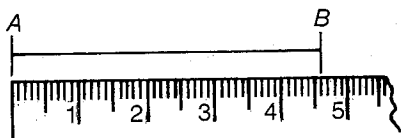
15. square
cm



Estimate in square centimeters the area of the polygonal region shown. It is closest to which of the following:

- a. 8 cm^2
 - b. 17 cm^2
 - c. 6 cm^2
 - d. 13 cm^2
 - e. 18 cm^2
16. A measurement made on a scale that is divided into pounds will have a greatest possible error of—
- a. $\pm 1/2$ pound.
 - b. $\pm 1/4$ pound.
 - c. $\pm 1/8$ pound.
 - d. ± 1 pound.
 - e. none of the above.
17. Which of the following would most likely have a temperature of 3 degrees Celsius?
- a. the human body
 - b. the inside of a refrigerator
 - c. a candle flame
 - d. the Chesapeake Bay in August
 - e. the Arctic Circle in February

18.



What is the length of segment \overline{AB} ?

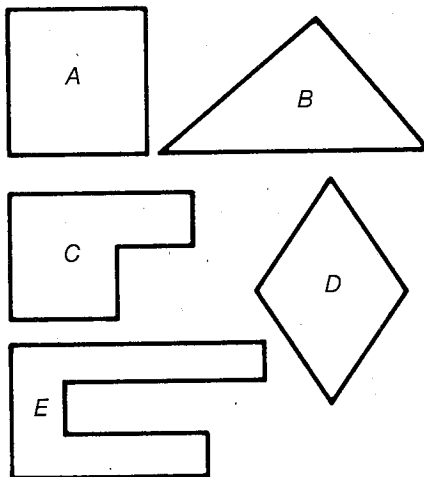
- a. 4.75 cm
- b. 4.5 cm
- c. 4.6 cm
- d. 4.7 cm
- e. none of the above

19. Centigram is to gram as—
- a. milligram is to hectogram.
 - b. penny is to dollar.
 - c. kilometer is to dekameter.
 - d. one degree Fahrenheit is to 100 degrees Celsius.
 - e. none of the above.

20. The circumference of a 45-rpm record is about—
- a. 21 inches.
 - b. 16 inches.
 - c. 10 inches.
 - d. 30 inches.
 - e. none of the above.

21. Which of the following best describes precision?
- a. Precision is the same as accuracy.
 - b. Precision is improved by measuring very carefully.
 - c. Precision is improved by using more refined measuring instruments.
 - d. Precision is a relative error.
 - e. Precision is an absolute error.

22.



If the figures are listed in order of decreasing perimeter, the first is—

- a. A.
- b. B.
- c. C.
- d. D.
- e. E.

23. The capacity of a silo can be found by —

- a. multiplying its height by the diameter of its base.
- b. multiplying its height by the squared radius of its base.
- c. multiplying its height by the circumference of its base.
- d. multiplying its height by the area of its base.
- e. none of the above.

24. Measurement is—

- a. always exact.
- b. always approximate.
- c. sometimes exact and sometimes approximate.
- d. exact only when the instrument is very refined.
- e. approximate only when the measurer is not careful.

25. The volume of a sphere is—

- a. the density of the sphere.
- b. the total surface area of the sphere.
- c. the amount of space the sphere occupies.
- d. the mass of the sphere.
- e. none of the above.

26. Measurement is—

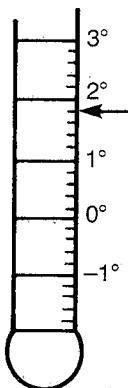
- a. comparison with a standard unit.
- b. naming by units.
- c. describing a large quantity in terms of smaller quantities.
- d. finding the exact amount of something.
- e. none of the above.

27. A plane is at an altitude of 3000 meters. It descends at a rate of 300 meters a minute. How long does it take for the plane to reach the runway?

- a. 100 minutes
- b. 10 minutes
- c. 15 minutes
- d. 3 minutes
- e. none of the above

28. The temperature pictured on the Celsius thermometer is which of the following:

- a. 1.5°C
- b. 1.6°C
- c. 1.75°C
- d. 1.8°C
- e. none of the above



29. Four persons, using the same instrument; measured the diameter of a steel rod to be 3.85, 3.83, 3.90, and 3.88. Which of the following is necessarily true?

- a. The measurements differ in accuracy.
- b. The measurements differ in precision.
- c. Although the measurements differ, their relative errors are all the same.
- d. All of the above are true.
- e. None of the above are true.

30. The measurement of time is—

- a. always direct.
- b. always indirect.
- c. sometimes direct and sometimes indirect.
- d. indirect only if the instrument (watch, clock, etc.) is not precise.
- e. direct if the timekeeper is accurate.

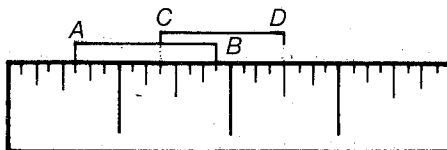
31. Which is the most appropriate unit to the weight of a football player?

- a. centigrams
- b. grams
- c. dekagrams
- d. hectograms
- e. kilograms

32. Which can of soup is the best buy?

- a. Brand A at 15 oz. for 27¢
- b. Brand B at 20 oz. for 36¢
- c. Brand C at 30 oz. for 59¢
- d. Brand D at 6 oz. for 15¢
- e. Brand E at 25 oz. for 40¢

33.



Which of the following is true?

- a. \overline{AB} is longer than \overline{CD} .
- b. \overline{CD} is longer than \overline{AB} .
- c. $\overline{AB} = \overline{CD}$.
- d. $\overline{AB} = 1\frac{3}{8}$ inch.
- e. $\overline{CD} = 1$ inch.

34. A rectangular box has dimensions $2' \times 3' \times 4'$. If each dimension is increased by 1', the volume of the box is increased by—

- a. 3 cu. ft.
- b. 6 cu. ft.
- c. 9 cu. ft.
- d. 12 cu. ft.
- e. none of the above.

35. All circles with area of 45 sq. in.—

- a. have the same circumference.
- b. have the same diameter.
- c. have the same radius.
- d. have all of the above true.
- e. have none of the above true.

36. The dimensions $2' \times 4' \times \frac{1}{2}'$ most likely belong to—

- a. an unabridged dictionary.
- b. a rug.
- c. a garbage can.
- d. a doghouse.
- e. a suitcase.

Focus Issue on Calculators

The Editorial Panel of the *Arithmetic Teacher* invites the submission of articles on the following topics for a focus issue on calculators in the spring of 1987. Five copies of a completed manuscript on one or more of the following topics should be sent for review to the *Arithmetic Teacher*, 1906 Association Drive, Reston, VA 22091, by 15 January 1986.

1. Testing

How should calculators be used in the assessment of mathematical abilities?

2. Estimation

How can calculators be used to help children develop estimating skills?

3. Curriculum

What topics in the K-8 curriculum are affected by the use of calculators? How does the use of calculators alter mathematics instruction?

4. Problem solving—applications

How can calculators be used in problem solving? How does their use give new insight into problem-solving processes? How does their use aid in solving real-world applications?

5. Skills for teachers

How can teachers and students take full advantage of the special features of calculators (i.e., constant operation, memory, percent, etc.)?

6. Concept development

What are some of the concepts that are most suitably developed through calculators? Why are calculators especially appropriate for these concepts?

7. Activities—primary, intermediate, and middle grades

Three different articles are needed to provide classroom-tested activities appropriate for these levels. What are some techniques for

managing the use of calculators in the classroom?

8. Algorithmic development

How can calculators be used to foster the understanding of algorithms?

9. Activities for less able students

What mathematical activities can be used with these students? What is a rationale for using calculators with students who have been unsuccessful in mastering basic computational skills?

10. Exploration of mathematical topics

How can calculators be used with topics in algebra, probability, number theory, and so on? How can their use help students make conjectures, look for patterns, and gain insight into relationships and verify them?

11. Other topics

What other issues or teaching techniques should be discussed with regard to the use of calculators in the classroom?