

Chapter

6

Automotive Measurement and Math



Name _____ Date _____

Instructor _____ Score _____

Objective: After studying this chapter, you will be able to understand basic math skills and how they are applied to automotive measurements.

Measuring Systems

1. The two measuring systems are the _____ system and the _____ system.

2. Which measuring system is used by most countries?

3. Our customary system originated from sizes taken from parts of the _____.

4. Conversion between metric units is always based on a power of _____.

5. A measuring system _____ is needed when changing from one measuring system to another.

6. What type of chart is commonly used to find equivalent values for fractional inches, decimal inches, and millimeters?

7. What are the equivalent metric values for the following?
 - (A) 1" = _____ mm

 - (B) 3.5" = _____ mm

 - (C) 1 psi = _____ kPa

 - (D) 1/2 quart = _____ liter

 - (E) 55 mph = _____ km/h

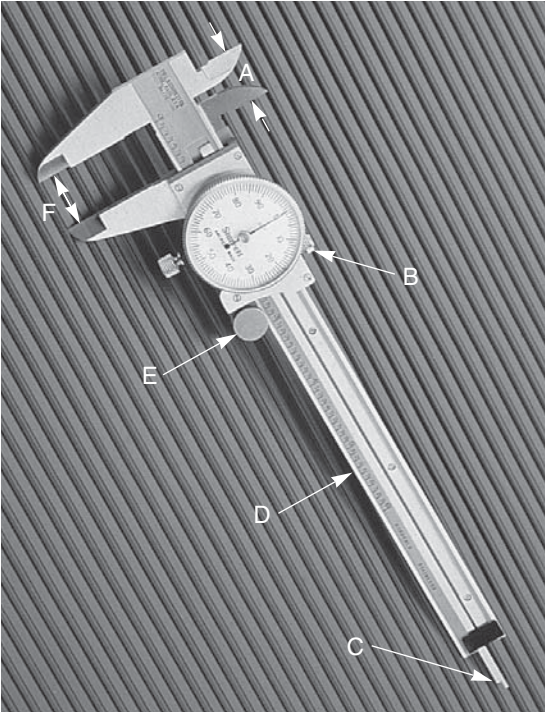
Measuring Tools

8. A(n) _____, or scale, is frequently used to make low-precision linear measurements.

9. A(n) _____ normally has lines representing millimeters.

10. A(n) _____, or tape rule, is sometimes needed for large distance measurements during body, suspension, and exhaust system repairs.

11. Label the parts of the vernier caliper illustrated below.



- (A) _____
- (B) _____
- (C) _____
- (D) _____
- (E) _____
- (F) _____

12. List three types of mikes used in automotive service and repair.

13. A(n) _____ micrometer is used for measuring external dimensions, diameters, or thicknesses.

14. Describe how to use an inside micrometer.

- _____ 15. When using a micrometer, you should _____.
- (A) cradle the frame in the palm of your hand and turn the thimble with your finger
 - (B) check the accuracy after a long period of use
 - (C) never drop or overtighten a micrometer
 - (D) All of the above.

16. A(n) _____ gauge is used to measure small clearances or gaps between parts.

17. List two basic types of feeler gauges.

Name _____

18. A(n) _____ indicator is used to measure part movement in thousandths of an inch. _____
19. What are the automotive service applications of a dial indicator?

20. Specifications are normally given in _____ when measuring rotation of a part or an angle formed by a part. _____
21. What is another word for temperature gauge?

22. Identify the following types of torque wrenches.



A



B



C



D

- (A) _____ (B) _____ (C) _____
 (D) _____

For questions 23–26, match the following terms and identifying phrases.

- | | | |
|-------|---|-----------------------|
| _____ | 23. Used to measure tire air pressure, fuel pump pressure, air conditioning system pressure, or engine compression stroke pressure. | (A) Vacuum gauge |
| _____ | 24. Used to measure negative vacuum in an engine’s intake manifold. | (B) Hole gauge |
| _____ | 25. Used to measure internal part bores or openings. | (C) Pressure gauge |
| _____ | 26. Used for measuring very small holes in parts. | (D) Telescoping gauge |

Review of Shop Math

27. The result of an addition problem is called the _____. _____

28. Solve the following addition problem. _____

$$\begin{array}{r} 654 \\ 765 \\ 644 \\ + 342 \\ \hline \end{array}$$

29. The amount that is left after subtracting is called the _____. _____

30. Solve the following subtraction problem. _____

$$\begin{array}{r} 876 \\ - 645 \\ \hline \end{array}$$

31. The number being divided in a division problem is called the _____. _____

32. A car parts store pays \$980.00 for ten U-joints. How much does each U-joint cost?

33. The result of a multiplication problem is called the _____. _____

34. A customer is told that the six fuel injectors in his/her car need to be replaced. Each injector costs \$46.00. What will it cost to replace the six injectors?

35. Look at the following fraction. Which number is the denominator?
 $\frac{5}{8}$

36. Solve the following decimal problems. _____

(A)
$$\begin{array}{r} 2.5 \\ 765.7 \\ 543.6 \\ + 298.0 \\ \hline \end{array}$$

(B)
$$\begin{array}{r} 342.80 \\ \times 542.54 \\ \hline \end{array}$$

(C)
$$\begin{array}{r} 63.70 \\ - 42.90 \\ \hline \end{array}$$

(D) $70.105 \div 35 =$ _____

Name _____

Percentages

37. How do you convert a percentage to decimal format?

38. If a new strut assembly costs \$137.75 and the sales tax is 8%, what would be the total cost of the part?

39. If a customer pays 40% on a repair bill totaling \$465.00, what would this initial down payment equal?

40. If the compression test on an engine results in readings of 160 psi, 155 psi, 152 psi, and 150 psi, and the manufacturer specifies that there be no more than 8% variation between readings, does this engine pass its compression test?

Ratios

41. A mathematical expression comparing two numbers _____
is called a(n) _____.

42. Describe a gear ratio of 8:1 in terms of the revolutions of each gear.
