

**Professional Certification Review Manual**  
**APPRENTICE DRAFTER**  
**ARCHITECTURAL**

**Competency 5**  
**Architectural Mathematic & Geometry**

**ITEMS TO REVIEW for COMPETENCY 5:**

- Line definition
- Finding the point of intersection of a line and plane
- Distance around a circle
- Percentages
- Dividing a line equally
- Finding areas of objects and spaces
  - Triangles
  - Squares
- Types of angles
- Algebraic functions

**TERMS TO BE DEFINED OR IDENTIFIED for COMPETENCY 5**

- True angle
- Bisecting an angle
- Rectified length
- Perimeter
- Skew
- Oblique
- Foreshortened
- Area
- Arc

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**ESTIMATING: EXAMPLE**

An Architect estimates that it will take 56 hours to complete a proposed design for a customer. The design was finished in 52 hours. The actual amount is within what percent of the estimate? There are two ways to find this as shown below.

$$52 \div 56 = .9285 \text{ (93\%)}$$
$$100\% - 93\% = 7\%$$

$$56 - 52 = 4 \text{ hours}$$
$$4 \div 56 = .0714 \text{ (7\%)}$$

If you were to use a calculator, you would input as shown below.

$$56 \boxed{-} 52 \boxed{=} 4 \boxed{\div} 56 \boxed{=} .07 \text{ (7\%)}$$

MOVE THE DECIMAL 2 PLACES RIGHT  
TO OBTAIN THE WHOLE NUMBER PERCENTAGE

**POWERS AND ROOTS:**



Below is an example of how to use your calculator to figure powers and roots.

**BASIC PRINCIPLES OF POWERS AND ROOTS**

Powers and roots are often used in finding distances between different parts of machine drawings.


Powers or exponents is a convenient way to indicate the number of times a quantity is to be multiplied by itself. The exponent is the small number written to the right and slightly above the given quantity as shown.

$$4^2 = (4 \times 4) = 16 \qquad 3^3 = (3 \times 3 \times 3) = 27$$

 4 (y<sup>x</sup>) 2 (=) 16       3 (y<sup>x</sup>) 3 (=) 27


A number can be raised to any power by using it as a factor that number of times as shown.

$$2^6 = (2 \times 2 \times 2 \times 2 \times 2 \times 2) = 64$$

 2 (y<sup>x</sup>) 6 (=) 64


The root of a number is opposite its power. Determining the square root of a number means finding what number multiplied by itself will equal that number. The square root of 49 is 7. The square root of 49 is 7 because 7 squared equals 49. In finding the square root of a number, the number is placed under the radical sign (  $\sqrt{\quad}$  ) and no number is used outside the radical sign.

$$\sqrt{36} = 6$$

 49 (√x) 7       36 (√x) 6

However, if a root other than a square root is to be determined, a small number is placed outside the radical sign to indicate what root is to be found.

$$\sqrt[3]{216} = 6$$

 216 (2ND) (√x) 6

As an Architectural drafter, you will have many situations that you are required to do calculations and many of those will include powers and roots.

**REVIEW QUESTIONS:**

1. What is an arc?
2. What is the edge view of a plane called?
3. What is the distance around a circle called?

4. What do you call a line that appears shorter than it really is?
5. How many 4 inch segments are there in a line 112 inches long?
  - a. 32
  - b. 28
  - c. 30
  - d. 26
6. Non-parallel, non-intersecting lines are considered
  - a. Offset
  - b. Skew
  - c. Perpendicular
  - d. None of the above
7. An oblique plane does not appear as a line in any of the three (3) standard views.
  - a. T
  - b. F
8. What is the area in sq/ft of the side elevation shown, minus the window area?
  - a. 620 sq/ft
  - b. 618 sq/ft
  - c. 618.5 sq/ft
  - d. 617 sq/ft

