

BUTCHER- TECHNICAL MATH B – 3rd PERIOD – OFF-SITE LEARNING PACKET DAY 4

State Indicator/Competency:

- Explain each step in solving a simple equation as following from the equality of number asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Instructional Objective(s):

- Students will be able to use given formulas and values for variables to solve practical applications with 80% accuracy.

Materials: Note packet, writing utensil, calculator

Method of Instruction: Independent

Activities:

1. Read through lesson and examples.
2. If able, watch suggested videos for extra instruction.
3. Complete the practice problems. Check your answers to see how you're doing.
4. Complete attached worksheet. Show your work. Worksheet will be collected and graded.
5. Questions? Contact me by email. butcherna@mwood.cc

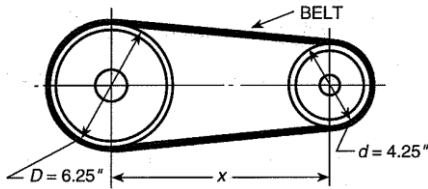
15-3 Substituting Values Directly in Given Formulas

To determine the numerical value of the unknown:

- *Write the original formula*
- *Substitute the known values for their respective letter values*
- *Simplify*
- Then follow the procedure given for solving equations consisting of combined operations.

1. An open belt pulley is shown below. The number of inches between the pulley centers is represented by x . The larger pulley diameter (D) is 6.25 inches, and the smaller pulley diameter (d) is 4.25 inches. The belt length (L) is 56.0 inches. This formula is found in the trade handbook.

$$L = 3.14(0.5D + 0.5d) + 2x$$



$$L = 3.14(0.5D + 0.5d) + 2x$$

Start with Formula

$$56 = 3.14(.5(6.25) + .5(4.25)) + 2x$$

Substitute values in formula

$$56 = 3.14(3.125 + 2.125) + 2x$$

Simplify

$$56 = 3.14(5.25) + 2x$$

$$56 = 16.485 + 2x$$

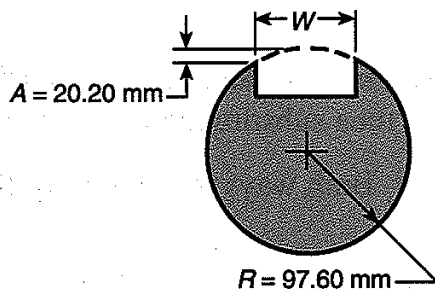
$$39.515 = 2x$$

$$x = 19.7575$$

2. A slot is cut in the circular piece shown. The piece has a radius (R) of 97.60 millimeters. The number of millimeters in the width is represented by W . Dimension A is 20.20 millimeters. The formula is found in a trade handbook is

$$A = R - \sqrt{R^2 - 0.2500W^2}. \text{ Find dimension } W.$$

$$A = R - \sqrt{R^2 - 0.2500W^2}$$



$$20.20 = 97.6 - \sqrt{97.6^2 - .25W^2}$$

$$-77.4 = -\sqrt{97.6^2 - .25W^2}$$

$$5990.76 = 9525.76 - 0.25W^2$$

$$3535 = -0.25W^2$$

$$14140 = W^2$$

$$W = 118.9 \text{ mm}$$

Practice: Complete practice problems and check your answers.

1. This is the formula for finding the circumference of a circle. $C = 2\pi r$

Where C =circumference, $\pi = 3.1416$, r =radius

Solve for r when $C = 13.53$ inches. (Answer: $r = 2.15$ in)

2. This is the formula for finding the hypotenuse of a right triangle. $c = \sqrt{a^2 + b^2}$

Where c = hypotenuse, a = leg of the triangle, b = other leg

Solve for b when $c = 50.00$ mm and $a = 16.00$ mm (Answer: 47.4 mm)

Assignment:

Attached Worksheet 15.3 (10 points)

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Worksheet 15.3

Name _____ Per _____

Section 15.3

The formulas for this set of problems have been taken from various technical fields. Substitute the given numerical values for letter values and solve for the unknown.

1. This is the formula for finding the area of a triangle: $A = \frac{ab}{2}$

Where A = area, a = altitude, and b = base

Solve for a when A = 24 sq ft and b = 8 ft.

2. This formula is used to express a temperature in degrees Celsius as a temperature in degrees Fahrenheit.

$$^{\circ}F = \frac{9}{5}(^{\circ}C) + 32^{\circ}$$

Solve for $^{\circ}C$ when the temperature is 28 $^{\circ}F$.

3. The accumulated amount in a savings account is found from this formula. $A = p + prt$
Where A = amount at end of period, p = principal invested, r = rate, and t = time in yrs.

Solve for t when p = \$1,800; r = 7%, and A = \$3,312.

9. This is a formula for finding horsepower. $hp = \frac{IE(Eff)}{746}$

Where hp = horsepower, E = voltage in volts, I = current in amperes, and Eff = efficiency.

Solve for I when hp = 10.5 horsepower, E = 220 volts, and Eff = 85%