

Variables and Formulas, continued

IV. Formulas and Equations, continued

B. Finding Other Values

Sometimes a formula is not given in the most convenient form for use in a particular situation. Using the formulas above *in the form given*, solve the following problems.

1. Find the width of a rectangle with length $3/2$ inches and area 12 square inches.
2. Before long, the temperature in my office will reach $-40^\circ F$. Find the temperature in degrees Celsius.
3. Find the height of a triangle with base of length 13.5 cm and area 9 cm^2 . (Give your answer as a fraction.)
4. If a car travels 120 miles at a rate of 25 miles per hour, how long will the trip take?
5. Find the approximate radius of a circle with area 17 square inches.

C. New Formulas from Old

If are given several values of the variable on the left hand side of one of the formulas and wish to find the variable on the right, it may be more convenient to “rearrange” the formula so that a more appropriate variable is isolated on one side of the equation.

1. A professor in a cold office is said to be in a state of moderate hypothermia if his core body temperature is between $93^\circ F$ and $95^\circ F$. Core temperatures below $93^\circ F$ correspond to severe hypothermia. At a core temperature of $86^\circ F$, his body is said to be in a state of “metabolic icebox.”
(<http://www.princeton.edu/~oa/safety/hypocold.shtml>)
 - (a) Rewrite the temperature conversion formula so that the Celsius temperature C is given in terms of the Fahrenheit temperature F .
 - (b) Convert the given body temperatures to degrees Celsius.
2. We would like to investigate how the height of a triangle with a given area varies as the length of the base varies. To do this, we compute the height of the triangle if the area is 21 square inches and the length of the base is 1, 2, 3, 4, or 5 inches.
 - (a) Rewrite the triangle area formula so that the height is given in terms of the area and the length of the base.
 - (b) Use this formula to find the height for the given values of the area and base length.
3. Use the formula for the area of a circle to find a formula for the radius in terms of the area. Find the radius of a circle whose area 13 m^2 .
4. Use the formulas for the area and diameter of a circle in terms of the radius to find a formula for the area in terms of the diameter.