Literal Equations – Geometric Formulas

1. For each equation, solve for the given variable. Explain the meaning of the "new" equation.
Example:
Solve $P = 4s$, for s, where P = the perimeter of a square and s = the side of a square. To receive full credit for this section, first show the steps needed to solve for the given variable.

In order to solve $P = 4s$ for s, divide both sides by 4. The result is $s = \frac{P}{4}$. Second, explain the meaning of the answer. In this case, an acceptable answer would be: The side of a square is the perimeter of the square divided by 4.

a. Solve $A = lw$ for w, where A = area of a rectangle, l = length of the rectangle, and w = width of the rectangle.

b. Solve $A = \frac{bh}{2}$ for b, where A = area of a triangle, b = base of the triangle, and h = height of the triangle.

c. Solve $C = 2\pi r$ for π, where C = circumference of a circle and r = the radius of the circle.

d. Solve $V = Bh$ for B, where V = volume of a prism, B = the area of the base of the prism, and h = the height of the prism.

e. Solve $S = Ph$ for P, where S = the lateral surface area of a prism, P = the perimeter of the base of the prism, and h = the height of the prism.

f. Solve $S = Ph + 2B$ for B, where S = the total surface area of a prism, P = the perimeter of the base of the prism, h = the height of the prism, and B = the area of the base of the prism.

g. Solve $A = \frac{(b_1 + b_2)h}{2}$ for b_1, where A = area of a trapezoid, h = height of the trapezoid, and b_1 and b_2 are the lengths of the two bases of the trapezoid.

h. Solve $P = 2(l + w)$ for w, where P is a rectangle's perimeter, l is the length, and w is the width.

i. Solve $V = \frac{1}{3}Bh$ for B, where V = the volume of a pyramid, B = the area of the base of the pyramid, and h = the height of the pyramid.

j. Solve $A = \pi r^2$ for π where A = the area of a circle and r = the radius of the circle.

k. Solve $S = 2\pi rh + 2\pi r^2$ for h where S = the total surface area of a cylinder, r = the radius of the cylinder, and h = the height of the cylinder.

2. The formula to determine the area of a square is $A=s^2$ where A represents the area of the square and s is the side of a square.

$$A=s^2$$
$$\sqrt{A}=\sqrt{s^2}$$
$$\sqrt{A}=|s|$$

Since s is the side of the square, $s>0$, $s=\sqrt{A}$.

When appropriate, use this process to solve the following questions. Remember to show the steps needed to solve for the given variable and to explain the meaning of the answer.

a. Solve $S = 6s^2$ for s, where S = the surface area of a cube and s = the length of the side of a cube.

b. Solve $a^2+b^2=c^2$ for a, where a and b are the legs of a right triangle and c is the hypotenuse of the same right triangle.

c. Solve $V=\frac{4}{3}\pi r^3$ for r, where V is the volume of a sphere and r is the radius of the sphere.