Name _____ Date _____

Literal Equations: Solving a Formula for a Variable

Directions: Each question works with a formula from geometry, science or money. Read what each letter stands for before you answer.

1. A pottery studio charges a one-time membership fee of b dollars plus m dollars for each class, where b and m are positive. The total cost of k classes is $T = b + mk$. To solve this formula for k, which step should come first?

A. Subtract b from both sides.
B. Subtract m from both sides.
C. Add b to both sides.
D. Divide both sides by k.

2. Simple interest is found with $I = Prt$, where I is the interest earned in dollars, P is the amount deposited in dollars, r is the yearly interest rate written as a decimal, and t is the time in years. P and r are positive. Which equation shows the formula solved for t?

A. $t = IPr$
B. $t = I/(Pr)$
C. $t = I - Pr$
D. $t = Pr/I$

3. A rain barrel is shaped like a cylinder with radius r and height h, so its volume is $V = \pi r^2 h$. To solve for h, Nadia divides both sides by πr^2 and gets $h = V/(\pi r^2)$. Why is it allowed to divide by πr^2 here?

A. Both sides of an equation can be divided by any expression, even one equal to zero.
B. Because π is positive, πr^2 is positive even when the radius is zero.
C. The height h is a positive length, so h is not zero.
D. The radius r is a positive length, so πr^2 is not zero.

4. The formula $F = 1.8C + 32$ changes a temperature of C degrees Celsius into F degrees Fahrenheit. Solve the formula for C, then find C when $F = 59$.

_____ °C

5. Density is mass divided by volume: $D = m/V$, where D is the density in grams per cubic centimeter, m is the mass in grams and V is the volume in cubic centimeters. All three are positive. Solve the formula for V.

A. $V = m/D$
B. $V = m - D$
C. $V = D/m$
D. $V = mD$

6. The area of a trapezoid is $A = h(a + b)/2$, where a and b are the lengths of the parallel sides and h is the height. Theo solved the formula for b, and one step in his work is wrong.

1. $2A = h(a + b)$
2. $2A = ha + b$
3. $2A - ha = b$

Which step is wrong?

A. From $2A = ha + b$ to $2A - ha = b$
B. From $A = h(a + b)/2$ to $2A = h(a + b)$
C. From $2A = h(a + b)$ to $2A = ha + b$

7. Match each geometry formula to the same formula solved for h. In every formula, h is a height, and the other letters stand for positive lengths, areas or volumes.

Write the letter of the matching answer on each line.

1. _____ Parallelogram: $A = bh$
2. _____ Triangle: $A = bh/2$
3. _____ Rectangular prism: $V = lwh$
4. _____ Square pyramid: $V = s^2h/3$

A. $h = A/(2b)$
B. $h = lw/V$
C. $h = V/(lw)$
D. $h = V/(3s^2)$
E. $h = A/b$
F. $h = 3V/s^2$
G. $h = 2A/b$

8. A rectangle with length l and width w has perimeter $P = 2l + 2w$. Which equations show this formula correctly solved for w? Select the two correct equations.

☐ A. $w = P - l$ ☐ B. $w = P/2 - 2l$ ☐ C. $w = P/2 - l$
☐ D. $w = (P - l)/2$ ☐ E. $w = (P - 2l)/2$

9. When P dollars are deposited at a yearly simple interest rate r (a positive decimal), the account holds $A = P + Prt$ dollars after t years, where t is positive. Which equation gives P in terms of A, r and t?

A. $P = A/(rt)$ B. $P = A - Prt$ C. $P = A/(1 + rt)$ D. $P = A/(2rt)$

10. A gift box in the shape of a rectangular prism has surface area $S = 2lw + 2lh + 2wh$, where l is its length, w is its width and h is its height. The box needs a surface area of 94 square inches, a length of 5 inches and a width of 3 inches. What height should it have?

_____ inches