1.4 Rewriting Equations and Formulas

Name: KEY

Topic:

Formula:

An equation that relates 2 or more variables (unknowns). They usually have a real-life application.

Sometimes formulas need to be rearranged in order to help you solve for different variables.

Examples:

1. Given $F = \frac{9}{5}C + 32$ and it is $-10°C$, what is the temperature in Fahrenheit?

$F = \frac{9}{5}(-10) + 32$

$F = -18 + 32$

$F = 14°F$

2. What if it is $68°F$, rearrange the formula so you can find the temperature in Celsius.

$F = \frac{9}{5}C + 32$

$-32 \quad -32$

$F - 32 = \frac{9}{5}C$

$\left(\frac{5}{9}\right)F - 32 = \frac{9}{5}C\left(\frac{5}{9}\right)$

$C = \frac{5}{9}(F - 32)$

$C = \frac{5}{9}(68 - 32)$

$C = \frac{5}{9}(36)$

$C = 20°C$

3. Solve the formula $P = 2l + 2w$ for w. Then find the width of a rectangle with a length of 12 meters and a perimeter of 41 meters.

$P = 2l + 2w$

$-2l \quad -2l$

$P - 2l = 2w$

$\frac{P - 2l}{2} = \frac{2w}{2}$

$w = \frac{P - 2l}{2}$

$w = \frac{41 - 2(12)}{2}$

$w = \frac{41 - 24}{2}$

$w = \frac{17}{2}$

$w = 8.5$ meters

4. Solve the formula $A = \frac{1}{2}bh$ for h. Then find the height of a triangle in the base is 12 inches and the area is $84\ in^2$.

$\frac{A}{b} = \frac{\frac{1}{2}bh}{b}$

$(2)\frac{A}{b} = \frac{1}{2}h(2)$

$h = \frac{2A}{b}$

$h = \frac{2(84)}{12}$

$h = 14$ inches

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5. Solve the formula $A = \frac{1}{2}(b_1 + b_2)h$ for b_1. Then find b_1 if b_2 is 8 inches, the height is 10 inches, and the area is 70 in^2.

$\frac{A}{h} = \frac{\frac{1}{2}(b_1 + b_2)h}{h}$

$\frac{2A}{h} = \frac{1}{2}(b_1 + b_2) \cdot 2$

$\frac{2A}{h} = b_1 + b_2$

$-b_2 \quad -b_2$

$\boxed{b_1 = \frac{2A}{h} - b_2}$

$b_1 = \frac{2(70)}{10} - 8$

$\boxed{b_1 = 6 \text{ inches}}$

6. Solve $9x - 4y = 7$ for y. Then find the value of y when x = -5.

$9x - 4y = 7$

$-9x \quad -9x$

$\frac{-4y}{-4} = \frac{-9x + 7}{-4}$

$\boxed{y = \frac{-9x + 7}{-4}}$

$y = \frac{-9(-5) + 7}{-4}$

$y = \frac{52}{-4}$

$\boxed{y = -13}$

7. Given the equation $xy - x = 4$, find the value of y when x = -4 and when x = 2.

Solve for y first:

$xy - x = 4$

$+x \quad +x$

$\frac{xy}{x} = \frac{x + 4}{x}$

$\boxed{y = 1 + \frac{4}{x}}$

$\boxed{x = -4}$

$y = 1 + \frac{4}{-4}$

$y = 1 - 1$

$\boxed{y = 0}$

$\boxed{x = 2}$

$y = 1 + \frac{4}{2}$

$y = 1 + 2$

$\boxed{y = 3}$