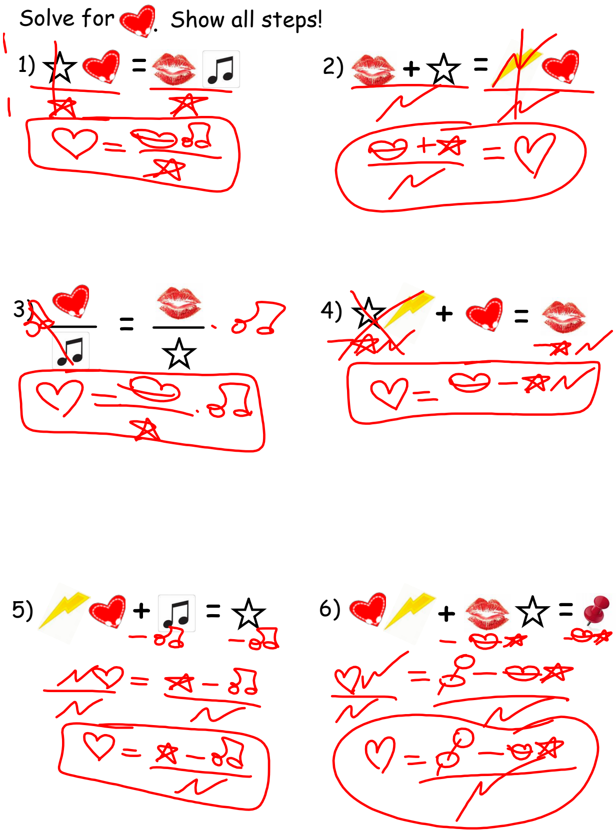
Warm - Up

Solve for Heart worksheet

ex) ☆ + ♡ = ♫
−☆ −☆
$\boxed{♡ = ♫ − ☆}$



The New Math - Solve for Heart WS

Name: ______________________ Date: _________ Hr: __

Solve for ♥. Show all steps!

1)

2)

3)

4)

5)

6)

Algebra 1

2.3 Solving for a Variable

Use the same rules as for solving equations

The equations $2x + 5 = 11$ and $6x + 3 = 15$ have the general form $ax + b = c$.

The equation $ax + b = c$ is called a **literal equation** because the coefficients and constants have been replaced by letters.

ex 1) Solve $ax + b = c$ for x

$ax + b = c$
$-b \quad -b$

$\frac{ax}{a} = \frac{c-b}{a}$

$\boxed{x = \frac{c-b}{a}}$

$\underset{6}{a}\underset{x}{x} + \underset{3}{b} = \underset{15}{c}$

$6x + 3 = 15$

$x = \frac{15-3}{6} = \frac{12}{6} = 2$

ex 2) Solve $ax + b = c$ for x

Then use the solution to solve $2x + 5 = 11$ ($ax + b = c$)

$x = \frac{c-b}{a}$

$x = \frac{11-5}{2} = \frac{6}{2}$

$x = 3$

ex 3) $a - bx = c$
$-a \quad\quad -a$

$\frac{-bx}{-b} = \frac{c-a}{-b}$

$\boxed{x = \frac{c-a}{-b}}$

& $15 - 3x = -3$ ($a - bx = c$)

$a = 15$

$b = 3$

$c = -3$

$x = \frac{-3-15}{-3} \quad \frac{-18}{-3}$

$x = 6$

ex 4) $ax = c - \cancel{bx}$
$+bx \quad\quad +\cancel{bx}$

$ax + bx = c$

$\frac{(a+b)x}{a+b} = \frac{c}{a+b}$

$\boxed{x = \frac{c}{a+b}}$

& $2x = 3 - 4x$
$+4x \quad\quad +4x$

$(2+4)x$

$6x$

$a = 2$

$b = 4$

$c = 3$

$x = \frac{3}{2+4} = \frac{3}{6}$

$\boxed{x = \frac{1}{2}}$

Note:

VARIABLES IN DENOMINATORS In Example 1, you must assume that $a \neq 0$ in order to divide by a. In general, if you have to divide by a variable when solving a literal equation, you should assume that the variable does not equal 0.

Try this:

Solve the literal equation for x. Then use the solution to solve the specific equation.

1. $a - bx = c$; $12 - 5x = -3$

$-bx = c - a$

$x = \frac{c-a}{-b}$

$x = \frac{-3-12}{-5}$

$x = \frac{-15}{-5}$

$x = 3$

2. $ax = bx + c$; $11x = 6x + 20$

$(a-b)x = c$

$x = \frac{20}{11-6}$

$x = \frac{20}{5}$

$x = 4$

TWO OR MORE VARIABLES An equation in two variables, such as $3x + 2y = 8$, or a formula in two or more variables, such as $A = \frac{1}{2}bh$, can be rewritten so that one variable is a function of the other variable(s).

ex) Write $-2x + 3y = 6$ so that y is a function of x.

$y =$

$3y = 2x + 6$

$y = \frac{2x}{3} + \frac{6}{3}$

$y = \frac{2}{3}x + 2$

ex) Write $4x - 6y = 24$ so that y is a function of x.

$-6y = -4x + 24$

$y = \frac{2}{3}x - 4$

$4x - 6(\frac{2}{3}x - 4) = 24$

$\cancel{4x} - \cancel{4x} + 24 = 24$

$24 = 24$

ex) Write $-8x - 5y = -40$ so that x is a function of y.

$-8x = 5y - 40$

$x = \frac{5y}{-8} - \frac{40}{-8}$

$x = -\frac{5}{8}y + 5$

ex) The area for a rectangle is given by the formula $A = lw$, where l is the length and w is the width.

a) Solve the formula for the length l.

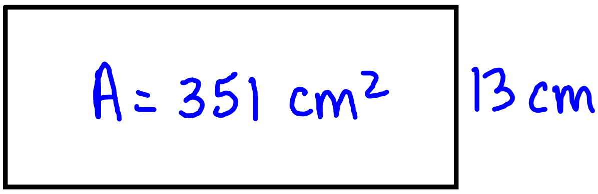
$$\frac{A}{w} = \frac{\ell \cancel{w}}{\cancel{w}}$$

$$\frac{A}{w} = \ell$$

b) Use the rewritten formula to find the length of this rectangle.

$$\ell = \frac{351}{13}$$

$$\boxed{\ell = 27 \text{ cm}}$$



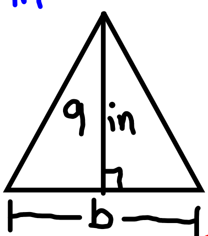
ex) For the formula $A = \frac{1}{2}bh$ solve for b.

$$\frac{A}{\frac{1}{2}h} = \frac{\cancel{\frac{1}{2}}b\cancel{h}}{\cancel{\frac{1}{2}h}}$$

$$\frac{2}{1} \cdot \frac{A}{1h} = b$$

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

Use the rewritten formula to solve for the base of the triangle below when the $A = 36 \text{ in}^2$



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

$$\frac{2 \cdot 36}{9} = \frac{72}{9} = 8$$

$$\boxed{b = 8 \text{ in}}$$

Try this:

3. Write $5x + 4y = 20$ so that y is a function of x.

$$-5x \quad -5x$$

$$\frac{4y}{4} = \frac{-5x}{4} + \frac{20}{4}$$

$$\boxed{y = -\frac{5}{4}x + 5}$$

4. The perimeter P of a rectangle is given by the formula $P = 2\ell + 2w$ where ℓ is the length and w is the width.

a. Solve the formula for the width w.

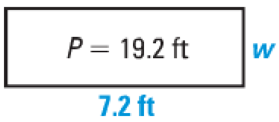
$$P = 2\ell + 2w$$

$$-2\ell \quad -2\ell$$

$$\frac{P - 2\ell}{2} = \frac{\cancel{2}w}{\cancel{2}}$$

$$\boxed{\frac{P}{2} - \ell = w}$$

b. Use the rewritten formula to find the width of the rectangle shown.



$$\frac{19.2}{2} - 7.2$$

$$\boxed{2.4 \text{ ft}}$$

Homework:

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