

LITERAL EQUATIONS

AGENDA

Warm-Up

HW Check

Foldable (p.16)

HW: One page

REMINDERS

Test Friday!

ESSENTIAL QUESTION

How do I isolate
a variable inside
a formula?

WARM-UP TUESDAY

1. Distribute & Simplify

$$3(2x - 5) - 1(x + 4)$$

$$\underline{6x} + \underline{-15} - \underline{x} + \underline{4} = \boxed{5x - 19}$$

2. Solve for x.

$$4 - 5(x + 1) = 2 - 3x$$

$$\underline{4} - \underline{5x} - \underline{5} = \underline{2} - \underline{3x}$$

$$-5x - 1 = 2 - 3x$$

$$+5x \quad \quad \quad +5x$$

$$-1 = 2 + 2x$$

$$\underline{-2} \quad \underline{-2}$$

$$\underline{\underline{-3}} = \underline{\underline{2x}}$$

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

HOMEWORK CHECK

1. $10 = x$

3. $d = 12$

5. No solution

7. Infinite solutions

2. $n = 2$

4. $x = -3$

6. No solution

8. $a = 42$

10. $2x - 2 = 64 + x; x = 66$

11. $x = 5$; 28 meters of fencing

12. 16 hours

13. 52.5° and 127.5° 14. 65°

Algebra I - Unit 1: Topic 2 – Solving Multi-Step Equations with Variables on Both Sides

Practice - Solving Multi-Step Equations with Variables on Both Sides pp 100-106

Name _____ Date _____ Per _____

Solve the following problems, and then check your answer.

1. $6x + 7 = 8x - 13$

2. $2(5n - 2) = 4(n + 2)$

3. $3d - 18 = -d + 30$

4. $2(x + 4) = \frac{-3x - 7}{2} \cdot 2$

$$\begin{array}{r} 2x + 8 = -3x - 7 \\ \underline{+3x} \quad \underline{+3x} \\ 5x + 8 = -7 \end{array}$$

$$\begin{array}{r} -8 \quad -8 \\ \hline 5x = -15 \\ \hline x = -3 \end{array}$$

5. $-x + 3 = -x$

6. $6(y + 2) - 4 = 6y$

7. $-8 - x^3 = x - 4(2 + x)$

8. $4(2a - 8) = \frac{1}{7}(49a + 70)$

$$\begin{array}{r} 8a - 32 = 7a + 10 \\ \underline{-7a} \quad \underline{-7a} \\ a - 32 = 10 \\ +32 \quad +32 \\ \hline a = 42 \end{array}$$

Algebra I - Unit 1: Topic 2 – Solving Multi-Step Equations with Variables on Both Sides

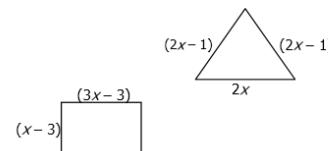
Define a variable, set up an equation, then solve. Write your answer in a complete sentence.

10. Two less than 2 times a number is 64 plus the same number. Find the number.

$$\begin{aligned} 2x - 2 &= 64 + x \\ -x &\quad \quad \quad -x \\ x - 2 &= 64 \\ +2 &\quad \quad \quad +2 \end{aligned}$$

$x = 66$

11. Claire purchased just enough fencing (in meters) to border either a rectangular or triangular garden shown below whose perimeters are the same. What is the value of
- x
- and how much fencing did she buy?



12. A moving company charges \$800 plus \$16 per hour. Another moving company charges \$720 plus \$21 per hour. How long is a job that costs the same no matter which company they use?

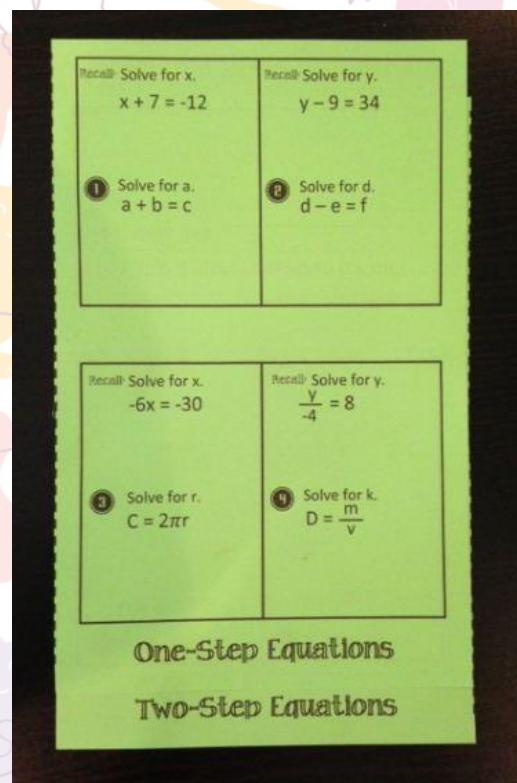
13. The measure of an angle is
- 75°
- more than its supplement. Find the measure of each angle.

14. The complement of an angle is
- 15°
- more than twice the measure of the angle. Find the measure of the largest angle.

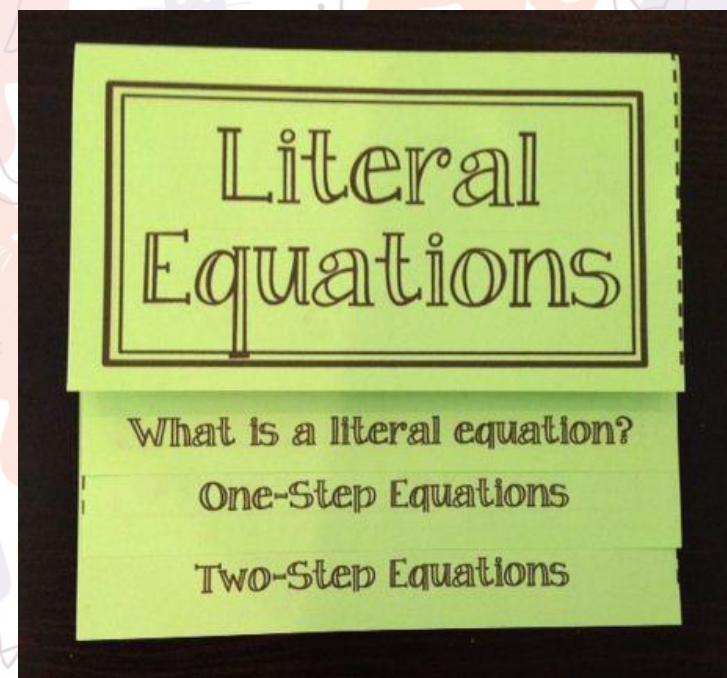
LITERAL EQUATIONS P. 16

EQ: How do I isolate a variable inside a formula?

Step 1: Line up the pages as shown.



Step 2: fold the top portion down.
Your final result:



Step 3: Staple or glue the pages together. Glue onto page 16.

LITERAL EQUATIONS P. 16

EQ: How do I isolate a variable inside a formula?

A literal equation is an equation with two or more variables. Also called a formula.

To solve a literal equation for one variable, use **inverse operations!**

Add \leftrightarrow subtract multiply \leftrightarrow divide

(circle)

Find/highlight the variable.

What is a literal equation?

LITERAL EQUATIONS P. 16

EQ: How do I isolate a variable inside a formula?

Recall: Solve for x.

$$\begin{array}{r} x + 7 = -12 \\ -7 \cancel{+7} \\ x = -19 \end{array}$$

Recall: Solve for y.

$$\begin{array}{r} y - 9 = 34 \\ +9 \cancel{-9} \\ y = 43 \end{array}$$

① Solve for a.

$$\begin{array}{r} a + b = c \\ -b \cancel{+b} \\ a = c - b \end{array}$$

*to combine, the terms must be like (same letter)

② Solve for d.

$$\begin{array}{r} d - e = f \\ +e \cancel{-e} \\ d = f + e \end{array}$$

Recall: Solve for x.

$$\begin{array}{r} -6x = -30 \\ -6 \cancel{-6} \\ x = 5 \end{array}$$

Recall: Solve for y.

$$\begin{array}{r} -4 \cdot \frac{y}{-4} = 8 \cdot (-4) \\ y = -32 \end{array}$$

③ Solve for r.

$$\begin{array}{r} C = 2\pi r \\ \cancel{2\pi} \cancel{\cancel{2\pi}} \\ \frac{C}{2\pi} = r \end{array}$$

④ Solve for m.

$$\begin{array}{r} D = \frac{m}{V} \cdot V \\ VD = m \end{array}$$

One-Step Equations

LITERAL EQUATIONS P. 16

EQ: How do I isolate a variable inside a formula?

- 5 Solve for w.
perimeter (rect/angle)

$$P = 2l + 2w$$

$$\begin{array}{r} -2l \quad -2l \\ \hline P - 2l \quad 2w \end{array}$$

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

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

- 6 Solve for b.

Area Δ

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

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

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

- 7 Solve for l.

$$S = \pi r l + \pi r^2$$

$$\begin{array}{r} -\pi r^2 \quad -\pi r^2 \\ \hline S - \pi r^2 \quad \pi r l \end{array}$$

$$\frac{S - \pi r^2}{\pi r} = l$$

- 8 Solve for w.

$$S = \frac{w - 10e}{m}$$

$$\begin{array}{r} m \quad m \\ \hline mS \quad w - 10e \end{array}$$

$$\begin{array}{r} +10e \quad +10e \\ \hline mS + 10e = w \end{array}$$

Two-Step Equations

fraction = fraction cross-multiply

Name: _____ Date: _____ Period: _____

What did Dr. Judd say to the boy who swallowed a spoon?



Solve the formula for the indicated variable, then circle the letter next to your answer. Write this letter in the box at the bottom of the page containing the exercise number. Use the back or a piece of scratch paper to show your work.

$$\frac{W=rt}{r} \quad \frac{t=}{r}$$

1. $W = rt$, for t
D $t = \frac{W}{r}$

2. $h = \frac{A}{b}$, for A

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

O $A = bh$

3. $I = \frac{P}{E}$, for E

G $E = \frac{I}{P}$

T $E = \frac{P}{I}$

4. $P = \frac{V^2}{R}$, for R

S $R = V^2 P$

I $R = \frac{V^2}{P}$

5. $K = \frac{abc}{3y}$, for y

N $y = \frac{abc}{3K}$

P $y = \frac{Ka}{3bc}$

~~$\frac{M}{N} = \frac{P}{Q}$~~

E $Q = \frac{PM}{N}$

O $Q = \frac{NP}{M}$

7. $a = \frac{v - v_i}{t}$, for v

D $v = at + v_i$

R $v = a - tv_i$

~~$\frac{E}{e} = \frac{B+b}{b}$~~

U $e = \frac{E+b}{Eb}$

A $e = \frac{Eb}{B+b}$

Q $m = mc(T_f - T_i)$, for T_i

S $T_i = \frac{-Q}{mc} + T_f$

O $T_i = \frac{Q}{mc} - T_f$

10. $PV = nRT$, for V

L $V = \frac{nRT}{P}$

T $V = nPRT$

~~$\frac{m}{h} = \frac{p}{n}$~~

11. $A = \frac{1}{2}(b_1 + b_2)h$,
for h

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

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

12. $A = \frac{1}{2}dP$, for P

A $P = \frac{A}{2a}$

E $P = \frac{2A}{a}$

13. $y = mx + b$, for b

T $b = y - mx$

R $b = y - mx$

~~$F_e = k_e \left(\frac{q_1 q_2}{d^2} \right)$~~

N $B = \frac{hd^2}{kg}$

O $B = \frac{kd^2}{gh}$

T $q_1 = \frac{F_e d^2}{k_e q_2}$

S $q_1 = \frac{k_e q_2}{F_e d^2}$

10	16	12	7	2	15	5	8	14	1	11	6	17	3	9	18	4	13
----	----	----	---	---	----	---	---	----	---	----	---	----	---	---	----	---	----

