

Literal Equations

What we are going to work on now is a topic called Literal Equations. They are just like solving equations except you do not get an answer like $x = \frac{1}{2}$ or $y = -23$. Instead, you'll get an answer like $k = \frac{b-h}{g}$. I know that looks REALLY WEIRD, but after we see a few examples it will make more sense.

You've actually done this before, we just didn't call it "literal equations." When we graphed linear equations (including the systems you did in the last packet), we constantly had to go from standard form or point slope form to slope intercept form ($y = mx + b$). We just kept saying, "we need to get the y by itself." That's what literal equations are. When given a certain equation with multiple variables (letters), we're asked to get one of the letters by itself.

For this packet, we will do an example and I'll post a video for it. You will then have several questions just like it. Then we will increase the difficulty. For each new type of question, I will post a video for the first problem and then several similar problems. We'll start with a review of getting the y by itself and putting into slope intercept form:

A) Solve the following equation for y:

$$y + 4 = -\frac{2}{3}(x - 9)$$

$$33x - 11y = -44$$

1) $y + 2 = 3(x + 3)$

2) $15x + 5y = 30$

3) $y - 12 = -4(x + 3)$

4) $21x - 35y = 70$

Next, we will look at some 2-step linear equations that you have seen before with only 1 variable. Now, there will be multiple variables. You will see the steps to isolate a variable are the same steps that you have been using all year. Your answers will just look different due to the presence of multiple variables. We'll first do one with a single variable, then we will look at two similar problems with multiple variables.

B) Solve for x:

$$6x - 7 = -19$$

C) Solve for x:

$$bx - g = w$$

D) solve for m:

$$mr + q = z$$

5) Solve for r:

$$Sr + h = i$$

6) Solve for f:

$$z - ef = x$$

7) Solve for j:

$$jk - v = n$$

Those first two types are the more basic and straight forward examples. They can get a little more tricky. Watching the videos for these examples is important. You may have to even go back and watch the videos more than once.

E) Solve for r:

$$A = \pi r^2$$

F) Solve for d:

$$g - y\sqrt{d} = n$$

8) Solve for b:

$$rg + kb^2 = j$$

9) Solve for w:

$$x\sqrt{w} - f = N$$

10) Solve for q:

$$\frac{q^2}{g} - c = d$$

11) Solve for k:

$$b + g\sqrt{k} = v$$

What we're going to look at now are examples that have more than one of the variable present in the equation. To me, this is the most difficult of the literal equations. You're going to have to get all the terms that have the given letter together on one side of the equation and all the terms without the given letter on the other side of the equations. We can then use a GCF to pull out the variable we are looking to solve for. This will be more easily explained through the video.

G) Solve for j:

$$fj - tj = z$$

H) Solve for t:

$$st - g = dt + h$$

I) Solve for r:

$$hr + r = x$$

12) Solve for p:

$$pd + bp = x - y$$

13) Solve for k:

$$bk + c = kv - f$$

14) Solve for v:

$$nv - v = b$$

15) solve for z:

$$vz - q = hz + k$$

The last type of literal equations we will look at is literal equations that have numbers and multiple variables in the same equation. These can be a little confusing because up until now, we have just been moving terms around, but there were no like terms involved. Since there were no like terms involved, there was no simplifying or combining like terms. These problems will include some examples where we do have to combine like terms.

J) Solve for t:

$$5t + 2cg = 5cg - 4t$$

K) Solve for h:

$$7f - 4h = 2 - 11h$$

16) Solve for g:

$$6g - y = 4g + j$$

17) Solve for d:

$$8f + 5d = 3d + 13f$$

Mixed Problems:

1) Solve the following equation for y: $y - 2 = \frac{1}{2}(x - 8)$

2) Solve the following equation for g: $B = fg - h$

3) Solve the following equation for c: $cd - ce = f$

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4) Solve the following equation for s: $sw - s = H$

5) Solve the following equation for l: $A = lw$

6) Solve the following equation for w: $P = 2l + 2w$

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7) Solve the following equation for a: $a^2 + b^2 = c^2$

8) Solve the following equation for h: $A = \frac{1}{2}bh$

9) Solve the following equation for c: $4c - 11d = 5d$

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10) Solve the following equation for d : $bd - cd = e$

11) Solve the following equation for j : $jk - j = p$

12) Solve the following equation for q : $7r - 5q = 25t - 3r$

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13) Solve for g: $6g^2 - h = k$

14) Solve for d: $\frac{d^2}{b} = a$

15) Solve for t: $f\sqrt{t} - c = w$