

Literal Equations and Formulas

Name: _____

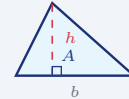
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Quick Review and Helpful Hints

A *literal equation* contains more than one variable (often a formula). To solve for one variable, isolate it with inverse operations, treating the other letters as if they were numbers. The result lets you plug in values any time.

▶ **Example:** Solve $A = \frac{1}{2}bh$ for h . **Work:** Multiply both sides by 2:
 $2A = bh$. Divide both sides by b : $h = \frac{2A}{b}$. ★ **Answer:** $h = \frac{2A}{b}$



$$A = \frac{1}{2}bh, \text{ so } h = \frac{2A}{b}.$$

◆ Practice Problems

Solve each for the indicated variable.

1. $d = rt$ for r

2. $A = lw$ for w

3. $P = 4s$ for s

4. $C = 2\pi r$ for r

5. $y = mx + b$ for b

6. $y = mx + b$ for m

7. $P = 2l + 2w$ for l

8. $A = \frac{1}{2}bh$ for b

9. $V = lwh$ for h

10. $F = ma$ for a

11. $I = Prt$ for t

12. $2x + y = 10$ for y

13. $ax = b$ for x

14. $\frac{x}{c} = d$ for x

◆ Word Problems

15. The area of a rectangle is $A = lw$. Solve for l , then find l when $A = 24$ and $w = 4$.

16. Distance is $d = rt$. Solve for t , then find t when $d = 120$ and $r = 40$.

17. Perimeter is $P = 2l + 2w$. Solve for w , then find w when $P = 20$ and $l = 6$.

18. Simple interest is $I = Prt$. Solve for r , then find r when $I = 60$, $P = 500$, $t = 2$.



Answer Keys

1. $r = \frac{d}{t}$

2. $w = \frac{A}{l}$

3. $s = \frac{P}{4}$

4. $r = \frac{C}{2\pi}$

5. $b = y - mx$

6. $m = \frac{y - b}{x}$

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

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

9. $h = \frac{V}{lw}$

10. $a = \frac{F}{m}$

11. $t = \frac{I}{Pr}$

12. $y = 10 - 2x$

13. $x = \frac{b}{a}$

14. $x = cd$

15. $l = \frac{A}{w} = 6$

16. $t = \frac{d}{r} = 3$

17. $w = \frac{P - 2l}{2} = 4$

18. $r = \frac{I}{Pt} = 0.06$

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by t : $r = \frac{d}{t}$. So the final answer is $r = \frac{d}{t}$.

2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by l : $w = \frac{A}{l}$. So the final answer is $w = \frac{A}{l}$.

3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by 4: $s = \frac{P}{4}$. So the final answer is $s = \frac{P}{4}$.

4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by 2π : $r = \frac{C}{2\pi}$. So the final answer is $r = \frac{C}{2\pi}$.

5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract mx from both sides: $b = y - mx$. So the final answer is $b = y - mx$.

6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract b : $y - b = mx$. Divide by x : $m = \frac{y - b}{x}$. So the final answer is $m = \frac{y - b}{x}$.

7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract $2w$: $P - 2w = 2l$. Divide by 2: $l = \frac{P - 2w}{2}$. So the final answer is $l = \frac{P - 2w}{2}$.

8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Multiply by 2: $2A = bh$. Divide by h : $b = \frac{2A}{h}$. So the final answer is $b = \frac{2A}{h}$.

9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by lw : $h = \frac{V}{lw}$. So the final answer is $h = \frac{V}{lw}$.

10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by m : $a = \frac{F}{m}$. So the final answer is $a = \frac{F}{m}$.

11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by Pr : $t = \frac{I}{Pr}$. So the final answer is $t = \frac{I}{Pr}$.

12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Subtract $2x$ from both sides: $y = 10 - 2x$. So the final answer is $y = 10 - 2x$.

13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Divide both sides by a : $x = \frac{b}{a}$. So the final answer is $x = \frac{b}{a}$.

14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Multiply both sides by c : $x = cd$. So the final answer is $x = cd$.

15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $l = \frac{A}{w} = \frac{24}{4} = 6$. So the final answer is $l = \frac{A}{w} = 6$.

16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $t = \frac{d}{r} = \frac{120}{40} = 3$. So the final answer is $t = \frac{d}{r} = 3$.

17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $w = \frac{P - 2l}{2} = \frac{20 - 12}{2} = 4$. So the final answer is $w = \frac{P - 2l}{2} = 4$.

18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is $r = \frac{I}{Pt} = \frac{60}{1000} = 0.06$. So the final answer is $r = \frac{I}{Pt} = 0.06$.



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