Introduction to Equations and Solutions

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

An *equation* states that two expressions are equal. A *solution* is a value of the variable that makes the equation true. To check whether a number is a solution, substitute it for the variable and see if both sides come out equal.

▷ **Example:** Is $x = 4$ a solution of $3x - 5 = 7$? **Work:** Substitute 4 for x: $3(4) - 5 = 12 - 5 = 7$. The left side equals the right side ($7 = 7$).

★ **Answer:** Yes

A solution makes both sides equal.

Practice Problems

Tell whether the value is a solution (Yes/No), or solve the equation.

1. Is $x = 3$ a solution of $x + 5 = 8$? _____

2. Is $x = 2$ a solution of $4x = 12$? _____

3. Is $x = 5$ a solution of $2x - 1 = 9$? _____

4. Is $x = -1$ a solution of $3x + 4 = 1$? _____

5. Is $x = 6$ a solution of $x - 2 = 3$? _____

6. Is $x = 0$ a solution of $5x + 7 = 7$? _____

7. Is $x = 4$ a solution of $\frac{x}{2} = 2$? _____

8. Is $x = 10$ a solution of $x + 3 = 12$? _____

9. Solve $x + 6 = 10$ _____

10. Solve $x - 3 = 5$ _____

11. Solve $2x = 14$ _____

12. Solve $\frac{x}{3} = 4$ _____

13. Is $x = -2$ a solution of $x^2 = 4$? _____

14. Is $x = 3$ a solution of $2x + 1 = x + 4$? _____

Word Problems

15. A number plus 8 equals 15. Write an equation and solve for the number. _____

16. Twice a number is 18. Find the number. _____

17. Maria has $\$x$. After earning $\$5$ she has $\$20$. Solve $x + 5 = 20$. _____

18. Is $t = 4$ a solution of $3t - 2 = 10$? Check by substituting. _____

Answer Keys

1. Yes	**7.** Yes	**13.** Yes
2. No	**8.** No	**14.** Yes
3. Yes	**9.** $x = 4$	**15.** $x = 7$
4. Yes	**10.** $x = 8$	**16.** 9
5. No	**11.** $x = 7$	**17.** $x = 15$
6. Yes	**12.** $x = 12$	**18.** Yes

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 Substitute 3: $3 + 5 = 8$. True, so yes. So the final answer is Yes.

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 Substitute 2: $4(2) = 8$, not 12. So no. So the final answer is No.

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 Substitute 5: $2(5) - 1 = 9$. True, so yes. So the final answer is Yes.

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 Substitute -1: $3(-1) + 4 = -3 + 4 = 1$. True, so yes. So the final answer is Yes.

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 Substitute 6: $6 - 2 = 4$, not 3. So no. So the final answer is No.

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 Substitute 0: $5(0) + 7 = 7$. True, so yes. So the final answer is Yes.

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 Substitute 4: $\frac{4}{2} = 2$. True, so yes. So the final answer is Yes.

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 Substitute 10: $10 + 3 = 13$, not 12. So no. So the final answer is No.

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 Subtract 6 from both sides: $x = 4$. So the final answer is $x = 4$.

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 Add 3 to both sides: $x = 8$. So the final answer is $x = 8$.

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 2: $x = 7$. So the final answer is $x = 7$.

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 Multiply both sides by 3: $x = 12$. So the final answer is $x = 12$.

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 Substitute -2: $(-2)^2 = 4$. True, so yes. So the final answer is Yes.

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 Substitute 3: left $2(3) + 1 = 7$, right $3 + 4 = 7$. Equal, so yes. So the final answer is Yes.

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 The equation is $x + 8 = 15$. Subtract 8: $x = 7$. So the final answer is $x = 7$.

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 The equation is $2x = 18$. Divide by 2: $x = 9$. So the final answer is 9.

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 Subtract 5 from both sides: $x = 15$. So the final answer is $x = 15$.

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 Substitute 4: $3(4) - 2 = 12 - 2 = 10$. True, so yes. So the final answer is Yes.

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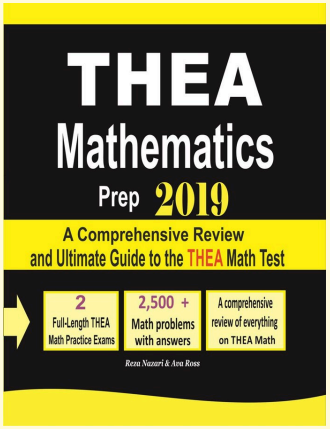

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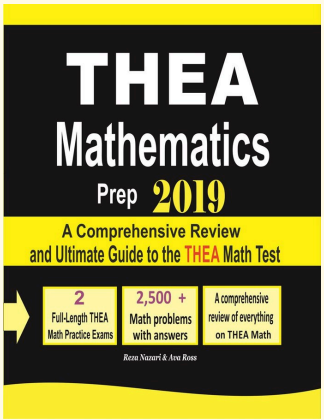

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