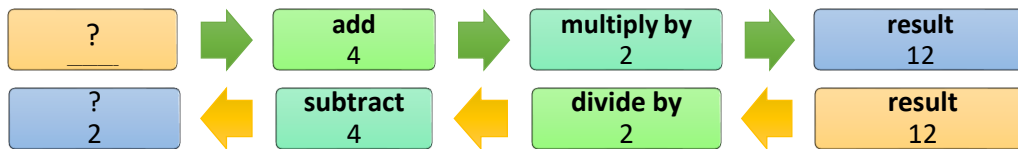# Math Challenge #7

| First Name: _____ | Last Name: _____ | Grade: _____ |
| Teacher: _____ | Parent's email: _____ | |

Working Backward

Welcome to the Math Challenge #7. In this challenge, most problems can be solved by using the "Working Backwards" strategy. You will need to start with the final solution and work back one step at a time to get to the beginning. In mathematics, when we use the 'working backward' strategy, we can reverse the operation or use the opposite operation than the one given.

Example:

| ? ____ | → | add 4 | → | multiply by 2 | → | result 12 |
| ? 2 | ← | subtract 4 | ← | divide by 2 | ← | result 12 |

To see other examples of how reversing the operation are used in working backward strategy, visit https://www.mathinaction.org/uploads/1/9/5/3/19539617/work_backward_ed.pdf.

Kinder & First Grade: solve at least 3 problems.
Second & Third Grade: solve at least 7 problems.
Fourth Grade and above: solve at least 12 problems.

		Answer
1.	Lisa had some money. Then Grandma Jean gave her $5 and now she has a total of $8. How much money did she have at the beginning?	
2.	Cole baked some cupcakes in the morning. He gave 4 cupcakes to Mrs. Niles who lives nextdoor. He ate one and now he has only 5 cupcakes left. How many cupcakes did he bake?	
3.	After Cinar gave 4 baseball cards to Andy, he received 5 new cards from grandpa Will. If Cinar has 12 cards now, how many baseball cards did he have at the beginning?	
4.	Julia's mom left a plate of cookies on the kitchen counter. Julia ate 2 of them, her dad ate 3 of them and they gave 12 of the cookies to their neighbor. At the end of the day, only 5 cookies are left on the plate. How many cookies did Julia's mom make?	
5.	Tommy is wondering how much money he had in his pocket to begin with. He has only $7 now. He spent $12 at the bookstore and $56 at the shoe store. How much did he have at the beginning?	
6.	The temperature changed many times throughout the day. This morning it dropped 3 degrees. By noon, the temperature rose 10 degrees. By sunset, the temperature dropped 5 degrees and it is now 64 degrees. What was the temperature at the beginning of the day?	

7.	At 7 p.m. there are 11 boats in the harbor, 5 more than there were at 5 p.m. At 3 p.m. there were half as many boats as there were at 5 p.m. How many boats were there at 3 p.m.? *Hint: read carefully. Not all events are backwards.*	
8.	Jordan put half of his birthday money into his savings account. Then he paid back the $10 that he owed Marvin for school's play ticket. Lastly, he spent $3 on snack at school. At the end of the day he was left with $12. How much money did Jordan receive for his birthday?	
9.	Joseline and Amit eat lunch at a café and their bill is $21.65. Amit gives the cashier a coupon for $6 off their bill, and also hands the cashier two bills. If he receives $4.35 in change, what were the denominations of the two bills he gave the cashier?	
10.	Cody had quite a few baseball cards, and Lisa had some of her own. Cody gave Lisa as many baseball cards as she already had. Lisa then gave Cody back as many cards as he had left. Finally, Cody gave Lisa back as many cards as she had left. This left Cody with no cards and Lisa with a total of 40 cards. How many baseball cards did each of them have before these exchanges took place?	*Cody:* *Lisa:*
11.	Peter needs to leave for the bus stop 15 minutes earlier than his friend Ryan. Ryan leaves 5 minutes later than Lily but 10 minutes earlier than Ronald. If Ronald leaves for the bus stop at 8:15 a.m., what time does Peter need to leave?	
12.	A number is divided by 6. Then 7 is added to the quotient. After dividing by 4, the result is 34. What is the number?	

?	→	divided by 6	→	add 7	→	divided by 4	→	result 34

13.	Sally is thinking of a number. She multiplied this number by 3, subtracted 8, and doubled the result, then added 14. Then she subtracted 50% of what she had, and then added on 11. Then Sally divided the result by 5. After all that, she was left with 8. What number did Sally start with?	
14.	Captain Cook and his crew found some bars of gold. The captain decided that he was going to share all the treasure among his friend and his crew. He set aside 2/5 of the treasure for himself. He gave ½ of what was left to his friend, Boris. He then shared 2/3 of the remaining treasure equally between the rest of the crew. He buried the remaining 4 bars on a secret island. How many bars of gold did Captain Cook and his crew find? *Hint: Draw a model and work backward.*	
15.	Abby, Bianca, and Catherine had different numbers of coins at first. Then Abby gave Bianca 12 coins. Bianca gave Catherine 10 coins and Catherine gave Abby 4 coins. In the end, they all had 20 coins each. How many coins did each of them have at first?	*Abby:* *Bianca:* *Catherine:*

16.	Erica cuts a wire into 3 equal pieces. She then cuts 3 inches off one piece. This piece was then cut into 5 equal pieces. This small piece is now 9 inches long. How long was the original wire?	

17.	In a dancing competition all the contestants started dancing together. After three minutes half the people were eliminated. During the next ten minutes half of the remaining group was eliminated. At the 15-minute mark, again half of the dancers still dancing were eliminated, and at the 20-minute mark, half of those still remaining were eliminated. In the last two minutes one more contestant was eliminated leaving a winner of the competition. How many dancers were there in the beginning?	

18.	Subtract 7.5 from a secret number, then multiply the result by 0.4. The result is then divided by 5. Then, subtract 2.25 from the result on the last step. The final result is 12. What is the original secret number?	

?	subtract 7.5	multiply by 0.4	divide by 5	subtract 2.25	result 12

Solution is available on January 24, 2020 at www.mathinaction.org