



## Algebra & Operations 7th/8th

1	Scientists studying a lake of trout wish to determine the total number of trout in the lake. One day, they capture 48 trout and tag each one. A week later, they catch 30 trout and find that 5 are tagged. Assuming this is a representative sample, how many trout are in the lake?
2	Paolo is trying to clean his room, but his sister is constantly messing it up. Without disturbances, Paolo can clean his room in an hour. His sister can mess up a room in 15 minutes. If Paolo is halfway through cleaning his room when his sister begins messing it up, how many minutes will it take for the room to be completely messy again, assuming Paolo continues to clean?
3	What is the sum of the series $1 + 4 + 7 + \dots + 100$ ?
4	The function $g(x)$ is defined as $g(x) = 2g(2x)$ . If $g(1536) = 5$ , what is $g(6)$ ?
5	Edna and Edmund are buying school supplies. Edna buys 3 notebooks and 4 pens for \$10.01. Edmund buys 4 notebooks and 6 pens for \$13.94. What is the positive difference, in cents, between the cost of a notebook and the cost of a pen?
6	Six years ago, Sandy's age in years was two-thirds his sister's age. Currently, his age is four-fifths hers. How old, in years, is Sandy's sister?
7	Pierre and Yvonne live 5 miles apart. They agree to meet for lunch and begin walking toward each other's houses at the same time. Pierre walks at a speed of 3 miles per hour while Yvonne walks at 4 miles per hour. How many miles away from Pierre's house are they when they meet?
8	Rose is making Kool-Aid. She initially follows instructions and uses a ratio of 1: 3 of Kool-Aid mix to water to make a quarter liter of Kool-Aid. However, she thinks it is too sweet and determines that she wants a 1: 4 ratio of Kool-Aid mix to water. How many liters of water should she add to the quarter liter of Kool-Aid?
9	What is the minimum value of $y$ if $y = 2x^2 - 8x + 9$ for all real $x$ ?
10	Olivia writes the integers from 1 to 100 in a row. What is the 100th digit she writes?