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*Activity Sheet for the September, 2011, MATHCOUNTS Mini*

# Warm-Up!

Try these problems before watching the lesson.

1. Seven more than twice what number equals thirty-five?

2. If $x$ is 3 more than $y$, and $y$ is 5 less than $z$, then what is $z - x$?

3. Assuming that $x$ is not 0, simplify $x \left( \dfrac{2y + 3}{x} - \dfrac{2y}{x} \right)$.

4. My sister and I are buying a television for our room. Because I am older, I will pay $45 more than my sister. If the television costs $299, then how much does my sister have to pay?

5. Tweedledum says, "The sum of your weight and twice mine is 361 pounds." Tweedledee says, "Contrariwise, the sum of your weight and twice mine is 362 pounds." If they are both correct, how much do Tweedledum and Tweedledee weigh together?

**First Problem:** Kevin, Cindi, and Marcus have a total of 1020 widgets. Marcus has half the number of widgets that Cindi has. Kevin has 219 widgets. How many widgets does Cindi have?

**Second Problem:** If the numerator of a fraction is increased by six, the value of the fraction will increase by one. If the denominator of the original fraction is increased by 36, the value of the original fraction will decrease by one. What is the original fraction?

**Third Problem:** An urn contains marbles of four colors (red, yellow, blue and green). All but 45 of the marbles are red; all but 45 are yellow; all but 45 are blue; and all but 60 are green. How many of the marbles are green?

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# Follow-up Problems

6. Terry is thinking of a fraction. If she adds 3 to the numerator of her fraction, then the new fraction equals 1. If she instead subtracts 7 from the denominator of her fraction, then the new fraction equals 2. What fraction is Terry thinking of?

7. Douglas writes down his favorite number, which is a two-digit positive integer. He then turns the number into a three-digit number by writing a 7 at the end of his favorite number. This new number is 385 more than Douglas's favorite number. What is Douglas's favorite number?

8. The pound has three kinds of dogs: pit bulls, chihuahuas, and mutts. All but 23 of the dogs are pit bulls, all but 17 of the dogs are chihuahuas, and all but 28 of the dogs are mutts. How many dogs are in the pound?

9. In our solution to the third problem in the video, we wrote the equation $r = A - 45$ to represent "All but 45 of the marbles are red." Instead, we could have noted that the number of marbles that are not red is $y + b + g$ (the sum of the numbers of yellow, blue, and green marbles), so $y + b + g = 45$. If we had done similarly for all of information in the problem, we would have the equations
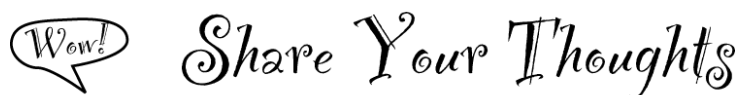
$$y + b + g = 45,$$
$$r + b + g = 45,$$
$$r + y + g = 45,$$
$$r + b + y = 60.$$

How can you quickly find the values of $r$, $y$, $b$ and $g$ using these equations instead of the equations in the video?

# Share Your Thoughts

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community (www.artofproblemsolving.com).