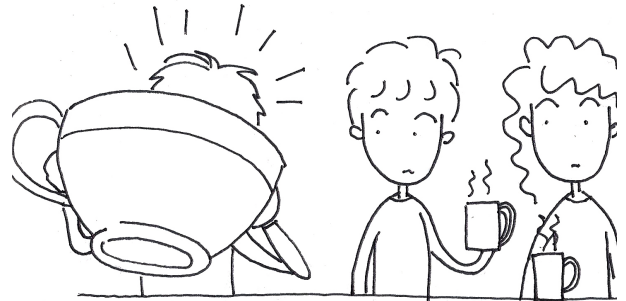


# Middle School Math Problems

Here are some challenging problems to try with your Middle School student:

## Grades 5-6:

**1** Pinocchio drank half a cup of black coffee. He then filled the cup back up with milk and drank one third of the mixture. Again he filled the cup to the top with milk, drank one sixth of the mixture and filled it back to the top with milk one final time before he drank the whole cup. Did he drink more coffee or milk?



**2** Simplify:  $\frac{23232323}{61616161}$

**3 a.** Marco has a bunch of 3-peso and 5-peso bills. Prove that he can pay any whole number of pesos more than seven without making change.



**3 b.** Now Marco only has two 5-peso bills, but he still has a bunch of 3-peso bills. Can he still pay any whole number of pesos greater than seven without making change?

## Grades 7-8:

**4** Prove that  $5^{101} + 5^{99}$  is a multiple of 13

**5** Solve:

a.  $(x - 4)(x - 5)(x - 6)(x - 7) = 1680$

b.  $x^2 - 2x + y^2 - 4y + 5 = 0$

c.  $\frac{1}{x^2+2x-3} + \frac{18}{x^2+2x+2} = \frac{18}{x^2+2x+1}$

**6** Prove:  $11x^2 - 14x + 3 \geq 0$  if  $x \in \mathbb{Z}$

