

October 2018 #19

Given three positive integers  $a$ ,  $b$ , and  $c$ , such that  $a^2 + b^2 = c^2$ . Prove that  $(2a + b + 2c)^2 + (a + 2b + 2c)^2 = (2a + 2b + 3c)^2$ .

April 2014 #12

If

$$\begin{aligned}f(x) &= x^2 + bx + c, \\f(1) &= 9, \text{ and} \\f(3) - f(2) &= 8,\end{aligned}$$

find  $f(4)$ .

September 2014 #14

Find the sum of the solutions to the equation  $3(3^{2x}) - 28(3^x) = -9$ . (Use a calculator in the final step.)

October 2014 #13

Solve the following system of equations:

$$\begin{cases} \frac{3}{x+1} + \frac{5}{y-2} = 1 \\ \frac{6}{x+1} + \frac{1}{y-2} = 5 \end{cases}$$

Math Team Oct 2017 #3

If  $p * q = (p - q)(p + q)$  and  $p \Delta q = (p + q)^2 - 2pq$ , find  $(3 * 4)(3 \Delta 4)$ .