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Activity Sheet for the April, 2015, MATHCOUNTS Mini

Try these problems before watching the lesson.

1. There are two solutions for the equation $x^2 - x - 6 = 0$. What is the product of these two solutions?
2. The product of a number M and six less than M is -5. What is the sum of all possible values of M?
3. Find the value of k for which $kx^2 - 5x - 12 = 0$ has solutions $x = 3$ and $x = -\frac{4}{3}$.
4. Find the mean of all solutions for x when $x^3 + 3x^2 - 10x = 0$.

First Problem: The nonzero roots of the equation $x^2 + 6x + k = 0$ are in the ratio $2 : 1$. What is the value of k?

Second Problem: The fourth degree polynomial equation $x^4 - 7x^3 + 4x^2 + 7x - 4 = 0$ has four real roots, a, b, c, and d. What is the value of the sum $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}$?

Follow-up Problems

5. If a and b are the solutions to the equation $x^2 - 5x + 9 = 0$, what is the value of $(a-1)(b-1)$?

6. Both roots of the quadratic equation $x^2 - 63x + k = 0$ are prime numbers. What is the number of possible values of k?

7. What is the sum of the reciprocals of the roots of the equation $\frac{2003}{2004}x + 1 + \frac{1}{x} = 0$?

8. The quadratic equation $x^2 + mx + n = 0$ has roots that are twice those of $x^2 + px + m = 0$, and none of m, n and p is zero. What is the value of n/p?

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).