Activity Sheet for the March, 2016, MATHCOUNTS Mini

Try these problems before watching the lesson.

1. If $f(x) = \sqrt{x+4}$, for what value of x does $f(x) = 3$?
2. Expand the product $(a+b)(a+b)$.
3. Find the value of u given the following two equations:

$$u+v+w+x+y+z = 45,$$
$$v+w+x+y+z = 21.$$

4. Find the sum of the reciprocals of two numbers if the sum of the two numbers is 6 and the product of the two numbers is 7.

First Problem: If $\sqrt{x+7} = 2+\sqrt{x}$, what is the value of x?

Second Problem: If $x + \frac{1}{x} = 3$, what is the value of $x^4 + \frac{1}{x^4}$?

Third Problem: If $\frac{a}{4-a} = \frac{b}{5-b} = \frac{c}{7-c} = 3$, what is the value of $a+b+c$?

Follow-up Problems

5. If x, y, and z are positive numbers such that $xy = 4$, $yz = 18$, and $zx = 50$, then what is xyz?

6. If $xyz = 45$ and $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = \frac{1}{5}$, then what is the arithmetic mean of the three products xy, yz, and zx?

7. Find $a^3 + \frac{1}{a^3}$ if $a + \frac{1}{a} = 3$.

8. If $x + \frac{1}{y} = 2$ and $y + \frac{1}{z} = \frac{1}{2}$, then what is the value of the product xyz?

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).