



Try these problems before watching the lesson.


- Expand the product $(x + 1)(x + 1)$.
 - Expand the product $(x + 2)(x + 2)$.
 - Expand the product $(x + 3)(x + 3)$.
- Expand the product $(x - 1)(x + 1)$.
 - Expand the product $(x - 2)(x + 2)$.
 - Expand the product $(x - y)(x + y)$.
- Evaluate $5^2 - 4^2$.
 - Evaluate $6^2 - 5^2$.
 - Evaluate $7^2 - 6^2$.
 - Evaluate $8^2 - 7^2$.
 - Do you notice a pattern in your answers to the first four parts? Will the pattern continue? Why or why not?
- Compute the following in your head:

$$\begin{aligned} &13 \cdot 47 + 13 \cdot 21 + 13 \cdot 12 \\ &+ 21 \cdot 47 + 21 \cdot 21 + 21 \cdot 12 \\ &+ 46 \cdot 47 + 46 \cdot 21 + 46 \cdot 12 \end{aligned}$$

 *Follow-up Problems*

5. Compute $20122011^2 - 2(20122011)(20122009) + 20122009^2$.
6. Given that $55555^2 = 3086358025$, find 55556^2 .
7. Find the prime factorization of $3^8 - 2^6$. As an extra challenge, see if you can find it without writing anything down!
8. What is the sum of the digits of 299999999^2 ?
9. Compute the product

$$\frac{(1998^2 - 1996^2)(1998^2 - 1995^2) \cdots (1998^2 - 0^2)}{(1997^2 - 1996^2)(1997^2 - 1995^2) \cdots (1997^2 - 0^2)}$$

 *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).