



Try these problems before watching the lesson.


- Expand the product $(x + 1)(x + 1)$.
 - Expand the product $(x + 2)(x + 2)$.
 - Expand the product $(x + y)(x + y)$.
- 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).