



Try these problems before watching the lesson. Do not use a calculator.

- 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?
- The sum of five consecutive integers is 300. What is the largest of these integers?
- Find the positive integer t such that the product $(t + 4)(t - 26)$ is a prime number.



First Problem: Given 3 consecutive positive integers, what is the positive difference between the square of the middle integer and the product of the first and last integers?

Second Problem: What is the product of all integer values of x for which the value of $|x^2 - 9|$ is a prime number?

Third Problem: What is the value of $52,683 \times 52,683 - 52,660 \times 52,706$?

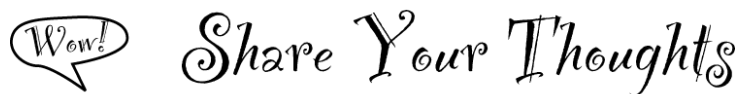


Do not use a calculator on the following problems.

5. Which is greater, 6070809^2 or $(6070807)(6070811)$?
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. Suppose a , b , and c are consecutive positive odd integers with $c > b > a$. If we have $b^2 - a^2 = 344$, then what is $c^2 - b^2$?
9. Find all pairs of positive integers m and n such that m^2 is 105 greater than n^2 .



Think you can make a better video than Richard can? Go to www.reelmath.org to learn more about the newest challenge from MATHCOUNTS!



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).