Lesson 7: Mental Math

Classwork

Opening Exercise

* 1. How are these two equations related?
  2. Explain the relationship between the polynomial identities and .

Exercises 1–3

1. Compute the following products using the identity . Show your steps.
2. Find two additional factors of .
3. Show that is divisible by .

Lesson Summary

Based on the work in this lesson, we can convert differences of squares into products (and vice versa) using

If , , and are integers and , then numbers of the form are not prime because

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Problem Set

1. Using an appropriate polynomial identity, quickly compute the following products. Show each step. Be sure to state your values for and .
2. Give the general steps you take to determine and when asked to compute a product such as those in Problem 1.
3. Why is easier to compute than ?
4. Rewrite the following differences of squares as a product of two integers.
5. Quickly compute the following differences of squares.
6. Is prime? Use the fact that and an identity to support your answer.
7. The number is prime and so are and . Does that mean is prime? Explain why or why not.
8. Show that is not prime without using a calculator or computer.
9. Show that is not prime without using a calculator or computer.
10. Find a value of so that the expression is always divisible by for any positive integer . Explain why your value of works for any positive integer .
11. Find a value of so that the expression is always divisible by for any positive integer . Explain why your value of works for any positive integer .
12. Find a value of so that the expression is divisible by both and 9 for any positiveinteger . Explain why your value of works for any positive integer .