## Unit 2 Lesson 24: Polynomial Identities (Part 2)

### 1 Revisiting an Old Theorem (Warm up)

#### Student Task Statement

Instructions to make a right triangle:

* Choose two integers.
* Make one side length equal to the sum of the squares of the two integers.
* Make one side length equal to the difference of the squares of the two integers.
* Make one side length equal to twice the product of the two integers.

Follow these instructions to make a few different triangles. Do you think the instructions always produce a right triangle? Be prepared to explain your reasoning.

### 2 Theorems and Identities

#### Student Task Statement

Here are the instructions to make a right triangle from earlier:

* Choose two integers.
* Make one side length equal to the sum of the squares of the two integers.
* Make one side length equal to the difference of the squares of the two integers.
* Make one side length equal to twice the product of the two integers.

1. Using and for the two integers, write expressions for the three side lengths.
2. Why do these instructions make a right triangle?

### 3 Identifying Identities (Optional)

#### Student Task Statement

Here is a list of equations. Circle all the equations that are identities. Be prepared to explain your reasoning.

### 4 Egyptian Fractions

#### Student Task Statement



In Ancient Egypt, all non-unit fractions were represented as a sum of distinct unit fractions. For example, would have been written as (and not as or any other form with the same unit fraction used more than once). Let’s look at some different ways we can rewrite as the sum of distinct unit fractions.

1. Use the formula to rewrite the fraction , then show that this formula is an identity.
2. Another way to rewrite fractions of the form is given by the identity . Use it to re-write the fraction , then show that it is an identity.



© CC BY 2019 by Illustrative Mathematics