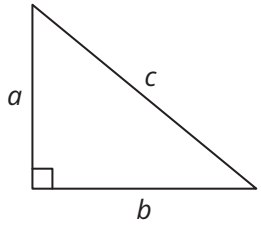
Assignment

Write

Given positive integers r and s, where $r > s$, write the terms in Euclid's Formula that correspond to each side length in a right triangle, a, b, and c.



Remember

Euclid's formula is a formula used to generate Pythagorean triples given any two positive integers r and s, where $r > s$:
$(r^2 + s^2) = (r^2 - s^2) + (2rs)^2$.

Practice

1. Use polynomial identities and number properties to calculate 25^3.
2. Jordan measures the side lengths of a triangular piece of sheet metal. The side lengths are 156 cm, 133 cm, and 205 cm.
   a. Verify that the triangular piece of sheet metal is a right triangle.
   b. Use Euclid's Formula to determine the positive integers r and s, where $r > s$, that will generate these 3 side lengths.
3. Verify $(a + b)^3(a - b)^3 = (a^2 - b^2)(a^4 - 2a^2b^2 + b^4)$ by transforming one side of the equation to show that it is equivalent to the other side of the equation.

Stretch

Dave and Sandy created their own numbers. Their definitions are shown.

- The Dave numbers are any numbers that can be generated using the formula $a^3 + b^3$, where a and b are positive integers and $a > b$.
- The Sandy numbers are any numbers that can be generated using the formula $a^3 - b^3$, where a and b are positive integers and $a > b$.

The tables show the first few Dave numbers, and the first few Sandy numbers. The shaded cells with red indicate cells where a is not greater than b.

Dave Numbers: $a^3 + b^3$

		b				
		1	2	3	4	5
a	1					
	2	$2^3 + 1^3 = 9$				
	3	$3^3 + 1^3 = 28$	$3^3 + 2^3 = 35$			
	4	$4^3 + 1^3 = 65$	$4^3 + 2^3 = 72$	$4^3 + 3^3 = 91$		
	5	$5^3 + 1^3 = 126$	$5^3 + 2^3 = 133$	$5^3 + 3^3 = 152$	$5^3 + 4^3 = 189$	

Sandy's Numbers: $a^3 - b^3$

		b				
		1	2	3	4	5
a	1					
	2	$2^3 - 1^3 = 7$				
	3	$3^3 - 1^3 = 26$	$3^3 - 2^3 = 19$			
	4	$4^3 - 1^3 = 63$	$4^3 - 2^3 = 56$	$4^3 - 3^3 = 37$		
	5	$5^3 - 1^3 = 124$	$5^3 - 2^3 = 117$	$5^3 - 3^3 = 98$	$5^3 - 4^3 = 61$	

1. Determine whether each number is a Dave number, a Sandy number, both, or neither. Explain your reasoning.
   a. 35
   b. 5

Review

1. Determine which function has the greater degree. Explain your reasoning.

$f(x) = -2(x - 1)^2 + 4$	A polynomial function $p(x)$ that has 1 relative minimum and 1 relative maximum.

2. Consider the polynomial functions $m(x) = x^2$ and $n(x) = m(x - 1) + 2$. Which function has the greatest minimum? Explain your reasoning.
3. Use the Factor Theorem to determine whether each linear expression is a factor of the polynomial $2x^4 + 7x^3 - 4x^2 - 27x - 18$.
   a. $x + 1$ b. $x + 3$
   c. $x - 1$ d. $x - 2$
4. Identify the extrema, zeros, and intercepts of the graph of the polynomial function.