

Use the Euclidian Algorithm to find  $\gcd(3451, 7019)$

**Problem Solving** - What are the terms/strategies I may need? What do I know?

Euclidean Algorithm for finding  $\gcd(a, b)$

Start with finding  $a = q_0b + r_0$

Then continue to iterate  $b = q_1r_0 + r_1$

$$r_0 = q_2r_1 + r_2$$

...

Continue until the remainder is 0, then we have that  $r_{n-1}$  is our GCD

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**Steps & Process** – Try to answer the question writing in many steps to avoid small errors.

We start of the algorithm:

$$7019 = 2 \times 3451 + 117 \quad (\text{We find } \frac{7019}{3451} = 2 + R117)$$

$$3451 = 29 \times 117 + 58 \quad (\text{We find } \frac{3451}{117} = 29 + R58)$$

$$117 = 2 \times 58 + 1 \quad (\text{We find } \frac{117}{58} = 2 + R1)$$

$$58 = 58 \times 1 + 0 \quad (\text{We find } \frac{58}{1} = 58 + 0)$$

In this case we see that the  $\gcd(3451, 7019) = 1$

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**Solidify Understanding** – Explain why the steps makes sense by connecting to math you know.

Why does the Euclid Algorithm work?

For Video Please click the link below:

[Video](#)