

Finding $\gcd(2163, 824)$

- We compute:

$$2163 = 2 * 824 + 515,$$

$$824 = 1 * 515 + 309,$$

$$515 = 1 * 309 + 206,$$

$$309 = 1 * 206 + 103,$$

$$206 = 2 * 103 + 0,$$

so the gcd is 103.

- In fact, $2163 = 21 * 103$ and $824 = 8 * 103$.

We can also write

$$103 = 1 * 309 - 1 * 206$$

$$= 1 * 309 - 1(515 - 309) = 2 * 309 - 1 * 515$$

$$= 2(824 - 515) - 1 * 515 = 2 * 824 - 3 * 515$$

$$= 2 * 824 - 3(2163 - 2 * 824) = 8 * 824 - 3 * 2163$$