

GCD and Euclid's algorithm — the oldest algorithm, run live

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Practice problems

1. Find the greatest common divisor of 108 and 30 using Euclid's algorithm.
2. Determine if 143 and 25 are relatively prime by computing their GCD.
3. Find the GCD of 1234 and 56.

Solutions

1. Find the greatest common divisor of 108 and 30 using Euclid's algorithm.

- Divide 108 by 30: $108 = 3 \cdot 30 + 18$.
- Divide 30 by 18: $30 = 1 \cdot 18 + 12$.
- Divide 18 by 12: $18 = 1 \cdot 12 + 6$.
- Divide 12 by 6: $12 = 2 \cdot 6 + 0$.
- The last non-zero remainder is 6.

Answer: 6

2. Determine if 143 and 25 are relatively prime by computing their GCD.

- Divide 143 by 25: $143 = 5 \cdot 25 + 18$.
- Divide 25 by 18: $25 = 1 \cdot 18 + 7$.
- Divide 18 by 7: $18 = 2 \cdot 7 + 4$.
- Divide 7 by 4: $7 = 1 \cdot 4 + 3$.
- Divide 4 by 3: $4 = 1 \cdot 3 + 1$.
- Divide 3 by 1: $3 = 3 \cdot 1 + 0$.
- The GCD is 1.

Answer: Yes, they are relatively prime because $\gcd(143, 25) = 1$.

3. Find the GCD of 1234 and 56.

- Divide 1234 by 56: $1234 = 22 \cdot 56 + 2$.
- Divide 56 by 2: $56 = 28 \cdot 2 + 0$.
- The last non-zero remainder is 2.

Answer: 2