

**Topic:** Greatest common factor

**Question:** Find the greatest common factor (GCF) of 54 and 100.

**Answer choices:**

- A      2
- B      4
- C      6
- D      8



**Solution: A**

To find the greatest common factor of two positive whole numbers, we want to factor each one down to its product of primes.

$$54$$

$$100$$

$$27 \cdot 2$$

$$50 \cdot 2$$

$$9 \cdot 3 \cdot 2$$

$$25 \cdot 2 \cdot 2$$

$$3 \cdot 3 \cdot 3 \cdot 2$$

$$5 \cdot 5 \cdot 2 \cdot 2$$

To find the greatest common factor, we can only take factors that are common to each prime factorization. There is one factor of 2 in both, so we can take that. But once we take away one 2 from each factorization, we're left with

$$3 \cdot 3 \cdot 3$$

$$5 \cdot 5 \cdot 2$$

And now there are no remaining common factors. Therefore, the greatest common factor of 54 and 100 is

$$2$$



**Topic:** Greatest common factor

**Question:** Find the greatest common factor (GCF) of 120 and 288.

**Answer choices:**

- A      6
- B      12
- C      24
- D      48



**Solution: C**

To find the greatest common factor of two positive whole numbers, we want to factor each one down to its product of primes.

$$120$$

$$60 \cdot 2$$

$$30 \cdot 2 \cdot 2$$

$$15 \cdot 2 \cdot 2 \cdot 2$$

$$5 \cdot 3 \cdot 2 \cdot 2 \cdot 2$$

$$288$$

$$144 \cdot 2$$

$$72 \cdot 2 \cdot 2$$

$$36 \cdot 2 \cdot 2 \cdot 2$$

$$18 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$9 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$3 \cdot 3 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

To find the greatest common factor, we can only take factors that are common to each prime factorization. There are three factors of 2 in both, so we can take those. But once we take away three 2s from each factorization, we're left with

$$5 \cdot 3$$

$$3 \cdot 3 \cdot 2 \cdot 2$$

We can also take one factor of 3 from both for our common factor, but once we take away one factor of 3, we're left with

$$5$$

$$3 \cdot 2 \cdot 2$$

And now there are no remaining common factors. Therefore, the greatest common factor of 120 and 288 is



$$3 \cdot 2^3$$

$$3 \cdot 2 \cdot 2 \cdot 2$$

$$6 \cdot 2 \cdot 2$$

$$12 \cdot 2$$

$$24$$



**Topic:** Greatest common factor

**Question:** Find the greatest common factor (GCF) of the set.

$\{48, 128\}$

**Answer choices:**

- A      8
- B      16
- C      24
- D      32



**Solution: B**

To find the greatest common factor of two numbers, we want to factor each one down to its product of primes.

$$48$$

$$24 \cdot 2$$

$$12 \cdot 2 \cdot 2$$

$$6 \cdot 2 \cdot 2 \cdot 2$$

$$3 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$128$$

$$64 \cdot 2$$

$$32 \cdot 2 \cdot 2$$

$$16 \cdot 2 \cdot 2 \cdot 2$$

$$8 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$4 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

In order to find the greatest common factor, we take all the common factors in these products of primes. The factors that are common to both numbers is four factors of 2. Therefore, the greatest common factor of 48 and 128 is

$$2 \cdot 2 \cdot 2 \cdot 2$$

$$4 \cdot 2 \cdot 2$$

$$8 \cdot 2$$

$$16$$

