

Factors, Multiples, and Primes

Higher worksheet

- 1) Find the highest common factor of 20 and 12.

- 2) Find the highest common factor of 32 and 44.

- 3) Find the highest common factor of 7 and 9.

- 4) Find the lowest common multiple of 30 and 70.

- 5) Is 1 a prime number?

- 6) Is 17 a prime number?

- 7) Is 27 a prime number?

- 8) Write 96 as a product of prime numbers.

- 9) Write 165 as a product of prime numbers.

Factors, Multiples, and Primes

Higher worksheet

- 10) Using your answers to questions 17 and 18, find the highest common factor of 96 and 165.
- 11) Using your answers to questions 17 and 18, find the lowest common multiple of 96 and 165.
- 12) By writing 4200 as a product of prime numbers, find how many factors 4200 has.
- 13) $x = 3^2 \times 7^4 \times 13^3 \times 17^{10}$
What is the greatest factor of x that is also a square number?
- 14) $x = 3^2 \times 7^4 \times 13^3 \times 17^{10}$
What is the greatest factor of x that is also a cube number?
- 15) $x = 3^2 \times 7^4 \times 13^3 \times 17^{10}$
What is the lowest multiple of x that is also a square number?

Factors, Multiples, and Primes

Higher worksheet

- 1) Find the highest common factor of 20 and 12.
The factors of 20 are: 1, 2, 4, 5, 10, 20.
The factors of 12 are: 1, 2, 3, 4, 6, 12.
Therefore, the highest common factor of 20 and 12 is 4.
- 2) Find the highest common factor of 32 and 44.
The factors of 32 are: 1, 2, 4, 8, 16, 32.
The factors of 44 are: 1, 2, 4, 11, 22, 44.
Therefore, the highest common factor of 32 and 44 is 4.
- 3) Find the highest common factor of 7 and 9.
The factors of 7 are: 1 and 7.
The factors of 9 are: 1, 3, 9.
Therefore, the highest common factor of 7 and 9 is 1.
- 4) Find the lowest common multiple of 30 and 70.
The multiples of 30 are: 30, 60, 90, 120, 150, 180, 210, 240, 270, ...
The multiples of 70 are: 70, 140, 210, 280, 350, ...
Therefore, the lowest common multiple of 30 and 70 is 210.
- 5) Is 1 a prime number?
No: a prime number has exactly two factors.
1 is not a prime number because it only has one factor: 1.
- 6) Is 17 a prime number?
Yes: a prime number has exactly two factors.
17 is a prime number because it only has two factors: 1 and 17.
- 7) Is 27 a prime number?
No: $3 \times 9 = 27$, so 27 is not a prime number because it has more than two factors (remember 1 and 27 are also factors of 27).
- 8) Write 96 as a product of prime numbers.
 $96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$ or $96 = 2^5 \times 3$
- 9) Write 165 as a product of prime numbers.
 $165 = 3 \times 5 \times 11$

Factors, Multiples, and Primes

Higher worksheet

- 10) Using your answers to questions 17 and 18, find the highest common factor of 96 and 165.

$$3$$

- 11) Using your answers to questions 17 and 18, find the lowest common multiple of 96 and 165.

$$2^5 \times 3 \times 5 \times 11 = 5280$$

- 12) By writing 4200 as a product of prime numbers, find how many factors 4200 has.

$$4200 = 2^3 \times 3 \times 5^2 \times 7 = 2^3 \times 3^1 \times 5^2 \times 7^1$$

$$4200 \text{ has } (3 + 1) \times (1 + 1) \times (2 + 1) \times (1 + 1) = 4 \times 2 \times 3 \times 2 = 24 \text{ factors.}$$

- 13) $x = 3^2 \times 7^4 \times 13^3 \times 17^{10}$

What is the greatest factor of x that is also a square number?

$$3^2 \times 7^4 \times 13^2 \times 17^{10}$$

- 14) $x = 3^2 \times 7^4 \times 13^3 \times 17^{10}$

What is the greatest factor of x that is also a cube number?

$$7^3 \times 13^3 \times 17^9$$

- 15) $x = 3^2 \times 7^4 \times 13^3 \times 17^{10}$

What is the lowest multiple of x that is also a square number?

$$3^2 \times 7^4 \times 13^4 \times 17^{10}$$