

CBSE Class 6 Mathematics

Prime Time – Prime Factorisation Worksheet

Name: _____ Class: _____ Date: _____

Instructions

- Show your working wherever asked.
- Continue until every factor is prime.
- For factor trees, stop when all branches end in prime numbers.
- For co-prime questions, compare the prime factors of both numbers.

1. Multiple Choice Questions – Prime Factorisation (10)

1. Which is the prime factorisation of 84? (A) $2 \times 3 \times 14$ (B) $2^2 \times 3 \times 7$ (C) $2 \times 6 \times 7$ (D) 4×21
2. The prime factorisation of 180 is: (A) $2^2 \times 3^2 \times 5$ (B) $2 \times 3^2 \times 10$ (C) $2^2 \times 9 \times 5$ (D) 4×45
3. Which number has prime factorisation $2^3 \times 3 \times 5$? (A) 60 (B) 90 (C) 120 (D) 150
4. Which statement is correct? (A) 1 is prime (B) Every composite number has exactly two factors (C) Prime factorisation uses only prime numbers (D) 0 has a prime factorisation
5. What is the prime factorisation of 126? (A) $2 \times 3^2 \times 7$ (B) $2 \times 3 \times 21$ (C) 6×21 (D) $2^2 \times 3 \times 7$
6. If $n = 2^2 \times 5 \times 7$, what is n? (A) 70 (B) 140 (C) 280 (D) 350
7. Which is the correct prime factorisation of 72? (A) $2^3 \times 3^2$ (B) $2^2 \times 3^3$ (C) $2 \times 3 \times 12$ (D) 8×9
8. The prime factorisation of 225 is: (A) $3^2 \times 5^2$ (B) 3×5^3 (C) $3^3 \times 5$ (D) $15^2 \times 1$
9. Which number has exactly three different prime factors? (A) 24 (B) 30 (C) 36 (D) 49
10. Which expression is the prime factorisation of 360? (A) $2^3 \times 3^2 \times 5$ (B) $2^2 \times 3^3 \times 5$ (C) $2^3 \times 3 \times 5^2$ (D) $2 \times 3^2 \times 5^2$

2. Find the Prime Factors by Division Method (5)

1. Find the prime factorisation of 252 using repeated division by prime numbers.
2. Find the prime factorisation of 378 using repeated division by prime numbers.
3. Find the prime factorisation of 462 using repeated division by prime numbers.
4. Find the prime factorisation of 540 using repeated division by prime numbers.

5. Find the prime factorisation of 792 using repeated division by prime numbers.

3. Find the Prime Factors by Factor Method (5)

1. Find the prime factorisation of 96 using suitable factor pairs.
2. Find the prime factorisation of 150 using suitable factor pairs.
3. Find the prime factorisation of 216 using suitable factor pairs.
4. Find the prime factorisation of 294 using suitable factor pairs.
5. Find the prime factorisation of 450 using suitable factor pairs.

4. Find the Prime Factors by Factor Tree Method (5)

1. Draw a factor tree for 168 and write its prime factorisation.
2. Draw a factor tree for 252 and write its prime factorisation.
3. Draw a factor tree for 360 and write its prime factorisation.
4. Draw a factor tree for 420 and write its prime factorisation.
5. Draw a factor tree for 630 and write its prime factorisation.

5. Using Prime Factorisation, Check Whether the Pair is Co-prime (5)

1. Use prime factorisation to check whether 42 and 55 are co-prime. Show the common prime factors, if any.
2. Use prime factorisation to check whether 72 and 91 are co-prime. Show the common prime factors, if any.
3. Use prime factorisation to check whether 105 and 128 are co-prime. Show the common prime factors, if any.
4. Use prime factorisation to check whether 84 and 126 are co-prime. Show the common prime factors, if any.
5. Use prime factorisation to check whether 143 and 221 are co-prime. Show the common prime factors, if any.

Answer Key with Solving Steps

1. MCQ Answers

1. B
2. A
3. C
4. C
5. A
6. B
7. A
8. A
9. B
10. A

2. Division Method – Answers

252: $252 \div 2 = 126 \rightarrow 126 \div 2 = 63 \rightarrow 63 \div 3 = 21 \rightarrow 21 \div 3 = 7 \rightarrow 7 \div 7 = 1$

Prime factorisation: $2^2 \times 3^2 \times 7$

378: $378 \div 2 = 189 \rightarrow 189 \div 3 = 63 \rightarrow 63 \div 3 = 21 \rightarrow 21 \div 3 = 7 \rightarrow 7 \div 7 = 1$

Prime factorisation: $2 \times 3^3 \times 7$

462: $462 \div 2 = 231 \rightarrow 231 \div 3 = 77 \rightarrow 77 \div 7 = 11 \rightarrow 11 \div 11 = 1$

Prime factorisation: $2 \times 3 \times 7 \times 11$

540: $540 \div 2 = 270 \rightarrow 270 \div 2 = 135 \rightarrow 135 \div 3 = 45 \rightarrow 45 \div 3 = 15 \rightarrow 15 \div 3 = 5 \rightarrow 5 \div 5 = 1$

Prime factorisation: $2^2 \times 3^3 \times 5$

792: $792 \div 2 = 396 \rightarrow 396 \div 2 = 198 \rightarrow 198 \div 2 = 99 \rightarrow 99 \div 3 = 33 \rightarrow 33 \div 3 = 11 \rightarrow 11 \div 11 = 1$

Prime factorisation: $2^3 \times 3^2 \times 11$

3. Factor Method – Answers

$96 = 12 \times 8 = (3 \times 4) \times (2 \times 4) = 2^5 \times 3$

$150 = 15 \times 10 = (3 \times 5) \times (2 \times 5) = 2 \times 3 \times 5^2$

$216 = 6 \times 36 = (2 \times 3) \times (6 \times 6) = 2^3 \times 3^3$

$294 = 14 \times 21 = (2 \times 7) \times (3 \times 7) = 2 \times 3 \times 7^2$

$450 = 45 \times 10 = (3 \times 15) \times (2 \times 5) = 2 \times 3^2 \times 5^2$

4. Factor Tree Method – Answers

168: $168 \rightarrow 12 \times 14 \rightarrow (3 \times 4) \times (2 \times 7) \rightarrow 3 \times (2 \times 2) \times 2 \times 7 = 2^3 \times 3 \times 7$

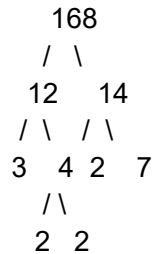
252: $252 \rightarrow 14 \times 18 \rightarrow (2 \times 7) \times (2 \times 9) \rightarrow 2 \times 7 \times 2 \times 3 \times 3 = 2^2 \times 3^2 \times 7$

$$360: 360 \rightarrow 36 \times 10 \rightarrow (6 \times 6) \times (2 \times 5) \rightarrow 2^3 \times 3^2 \times 5$$

$$420: 420 \rightarrow 42 \times 10 \rightarrow (6 \times 7) \times (2 \times 5) \rightarrow 2^2 \times 3 \times 5 \times 7$$

$$630: 630 \rightarrow 63 \times 10 \rightarrow (7 \times 9) \times (2 \times 5) \rightarrow 2 \times 3^2 \times 5 \times 7$$

Example factor tree for 168:



5. Co-prime – Answers with Steps

$$42 = 2 \times 3 \times 7$$

$$55 = 5 \times 11$$

Common prime factors: None.

Conclusion: They are co-prime.

$$72 = 2^3 \times 3^2$$

$$91 = 7 \times 13$$

Common prime factors: None.

Conclusion: They are co-prime.

$$105 = 3 \times 5 \times 7$$

$$128 = 2^7$$

Common prime factors: None.

Conclusion: They are co-prime.

$$84 = 2^2 \times 3 \times 7$$

$$126 = 2 \times 3^2 \times 7$$

Common prime factors: 2, 3, 7.

Conclusion: They are not co-prime.

$$143 = 11 \times 13$$

$$221 = 13 \times 17$$

Common prime factors: 13.

Conclusion: They are not co-prime.

Quick Reminder

Two numbers are co-prime when their only common factor is 1. Equivalently, their prime factorisations have no common prime factor.