

Real numbers

Support the reasoning, not only the choice

This pack contains answers to the learner questions and both online final-check sets. Keep it separate from the learner pack until the learner has attempted the work.

Suggested lesson routine

Ask for a prediction. Read and explain one concept. Use the interactive steps or the diagram. Let the learner attempt the three questions, offer a hint if needed, and ask why the corrected answer works. Use the final check after all three lessons.

What to listen for

Prime factors must all be prime and retain repeats. HCF divides each number; LCM is divisible by each. The irrationality proof begins in lowest terms and finishes with a shared prime factor, creating a contradiction.

Starting check answers

1. Which number is prime?

Answer: B - 13

13 has only 1 and 13 as positive factors. $21 = 3 \times 7$; 1 has only one positive factor.

2. Which number divides both 18 and 30?

Answer: C - 6

$18 \div 6 = 3$ and $30 \div 6 = 5$, with no remainder.

3. Which pair is in lowest terms?

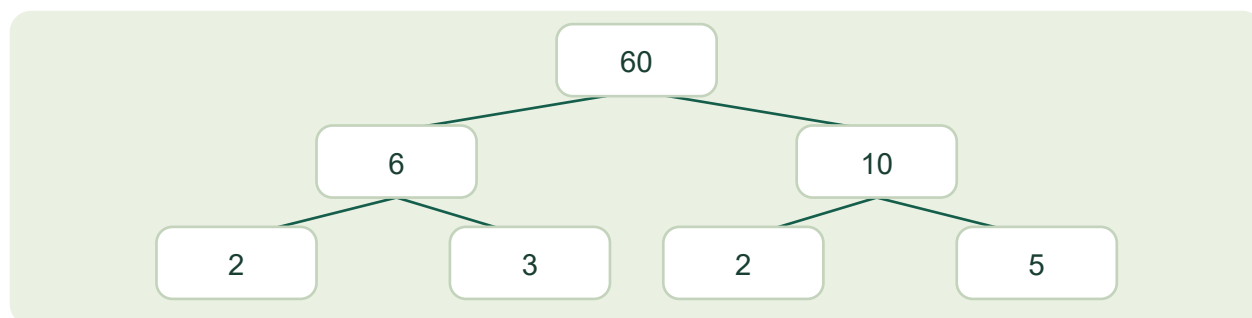
Answer: B - $\frac{3}{4}$

3 and 4 share no factor greater than 1. Both other pairs have a common divisor.

Coverage and sources

Original companion to topics in the CBSE Class 10 mathematics syllabus 2026-27 and NCERT Real Numbers, reprint 2026-27. Not an official publication or complete textbook solution bank. Source links are on the online chapter.

Build numbers from primes



1. Which is a prime factorisation of 72?

Answer: B - $2 \times 2 \times 2 \times 3 \times 3$

$72 = 8 \times 9 = 2 \times 2 \times 2 \times 3 \times 3$. Every factor in the final list is prime.

2. Why is 1 not a prime number?

Answer: A - It has only one positive factor

The only positive factor of 1 is 1. A prime must have exactly two distinct positive factors.

3. Two correct factor trees for 90 must finish with...

Answer: C - the same primes, including repetitions

Both trees finish with $2 \times 3 \times 3 \times 5$, possibly in a different order. The branches may look different.

Discussion model

$90 = 9 \times 10 = 3 \times 3 \times 2 \times 5$. The first product still contains two composite factors. Rearranging the primes gives $2 \times 3^2 \times 5$, and multiplying checks the result.

Accept another correct explanation. Ask the learner to name the assumption, method and check. Do not mark a written proof as verified merely because an online multiple-choice answer was correct.

Choose HCF or LCM

$$18 = 2 \times 3 \times 3$$

$$30 = 2 \times 3 \times 5$$

$$\text{HCF} = 2 \times 3 = 6$$

$$\text{LCM} = 2 \times 3 \times 3 \times 5 = 90$$

$$\text{Check: } 6 \times 90 = 18 \times 30 = 540$$

1. What is HCF(24, 36)?

Answer: B - 12

$24 = 2^3 \times 3$ and $36 = 2^2 \times 3^2$. The shared lower powers give $2^2 \times 3 = 12$.

2. Two bells ring now, then every 8 and 12 minutes. When will they next ring together?

Answer: C - 24 minutes

The first positive time divisible by both 8 and 12 is 24 minutes. This is an LCM problem.

3. For 12 and 20, the HCF is 4. What is the LCM?

Answer: A - 60

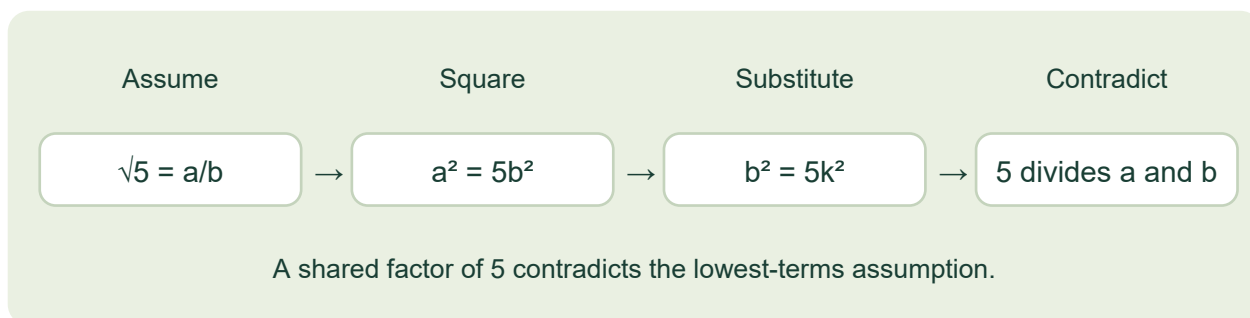
For two positive integers, $\text{LCM} = (12 \times 20) \div 4 = 60$. Both 12 and 20 divide 60.

Discussion model

Equal groups: 12 red and 20 blue counters can make 4 identical bags, each with 3 red and 5 blue counters. Shared repeats: events repeating every 12 and 20 minutes next coincide after 60 minutes. The first uses HCF; the second uses LCM.

Accept another correct explanation. Ask the learner to name the assumption, method and check. Do not mark a written proof as verified merely because an online multiple-choice answer was correct.

Explain why a root is irrational



1. Why begin with a/b in lowest terms?

Answer: B - To ensure a and b have no shared factor greater than 1

Lowest terms means a and b are coprime. Showing a shared prime factor then contradicts the assumption.

2. If $a^2 = 3b^2$ and $a = 3k$, what follows?

Answer: A - $b^2 = 3k^2$

Substitute: $9k^2 = 3b^2$. Divide by 3 to obtain $b^2 = 3k^2$. This shows 3 divides b^2 and therefore b.

3. Which statement is correct?

Answer: C - $\sqrt{5}$ is irrational, but $\sqrt{25}$ is rational

The square root of a prime such as 5 is irrational. $\sqrt{25} = 5$, so it is rational. A decimal display is not a proof.

Discussion model

Assume $\sqrt{5} = a/b$ in lowest terms. Then $a^2 = 5b^2$. Since 5 is prime, $a = 5k$ for an integer k. Substitution gives $25k^2 = 5b^2$ and $b^2 = 5k^2$, so 5 divides b too. This contradicts a and b being coprime; therefore $\sqrt{5}$ is irrational.

Accept another correct explanation. Ask the learner to name the assumption, method and check. Do not mark a written proof as verified merely because an online multiple-choice answer was correct.

Answers with reasons

1. Which is a prime factorisation of 150?

Answer: A - $2 \times 3 \times 5 \times 5$

$150 = 2 \times 3 \times 5^2$. In the other lists, 10, 15 or 25 are not prime.

2. Can two correct prime factorisations of the same number use different primes?

Answer: C - No; only the order can change

Prime factorisation is unique up to the order of its factors. Repeated primes must also match.

3. What is the greatest number of identical packs from 18 pencils and 24 erasers, with none left?

Answer: A - 6 packs

The number of packs must divide 18 and 24. $\text{HCF}(18, 24) = 6$; each pack has 3 pencils and 4 erasers.

4. Two signals repeat every 6 and 15 seconds. After a shared signal, the next shared one is after...

Answer: C - 30 seconds

$\text{LCM}(6, 15) = 2 \times 3 \times 5 = 30$ seconds.

5. In a proof for $\sqrt{5}$, which conclusion contradicts a/b being in lowest terms?

Answer: B - Both a and b are divisible by 5

If 5 divides both a and b , the fraction has a common factor and was not in lowest terms.

6. If $r = 2 + \sqrt{5}$ were rational, then $\sqrt{5} = r - 2$ would be...

Answer: A - rational, creating a contradiction

The difference of rational numbers is rational, contradicting the already proved irrationality of $\sqrt{5}$.

After checking

For a missed question, revisit its lesson, explain the correction and try the alternate question set online. Two sets alternate; repeated exposure is practice rather than an independent exam.

Answers with reasons

1. Which is a prime factorisation of 98?

Answer: B - $2 \times 7 \times 7$

$98 = 2 \times 49 = 2 \times 7 \times 7$, all prime factors.

2. A factor tree ends with 2, 5 and 9. What should you do?

Answer: C - Split 9 into 3×3

9 is composite. The final leaves must all be prime, so replace 9 with two 3s.

3. Find HCF(32, 48).

Answer: B - 16

$32 = 2^5$ and $48 = 2^4 \times 3$. Their shared lower power is $2^4 = 16$.

4. Find LCM(9, 12).

Answer: C - 36

$9 = 3^2$ and $12 = 2^2 \times 3$. The highest powers give $2^2 \times 3^2 = 36$.

5. In the proof for $\sqrt{3}$, why does 3 dividing a^2 imply 3 divides a ?

Answer: A - Because 3 is prime and a square repeats its prime factors

A prime in a^2 must occur among the prime factors of a . The statement does not hold for every composite divisor: 4 divides 2^2 but not 2.

6. Why is $7 - \sqrt{2}$ irrational?

Answer: C - If it were rational, subtracting it from 7 would make $\sqrt{2}$ rational

Assume $r = 7 - \sqrt{2}$ is rational. Then $\sqrt{2} = 7 - r$ is rational, contradicting the irrationality of $\sqrt{2}$.

After checking

For a missed question, revisit its lesson, explain the correction and try the alternate question set online. Two sets alternate; repeated exposure is practice rather than an independent exam.