

Real Numbers and Polynomials

Mathematics · Class 10 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Rough work may be done on the blank space at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- The HCF of 12 and 18 is _____.
 (A) 2 (B) 3
 (C) 6 (D) 36
- For any two positive integers a and b, $\text{HCF}(a, b) \times \text{LCM}(a, b)$ equals _____.
 (A) $a + b$ (B) $\frac{a}{b}$
 (C) $a - b$ (D) $a \times b$
- The decimal expansion of $\frac{13}{3125}$ is _____.
 (A) Terminating (B) Non-terminating and repeating
 (C) Non-terminating and non-repeating (D) Not defined
- The sum of the zeroes of the polynomial $x^2 - 5x + 6$ is _____.
 (A) 5 (B) -5
 (C) 6 (D) -6
- The product of the zeroes of $2x^2 + 7x + 3$ is _____.
 (A) $\frac{7}{2}$ (B) $-\frac{7}{2}$
 (C) 3 (D) $\frac{3}{2}$
- A quadratic polynomial can have at most _____ zeroes.
 (A) 2 (B) 1
 (C) 3 (D) Infinitely many
- The standard proof that $\sqrt{2}$ is irrational uses the method of _____.
 (A) Long division (B) Induction
 (C) Direct substitution (D) Contradiction

8. The LCM of 12 and 18 is _____.

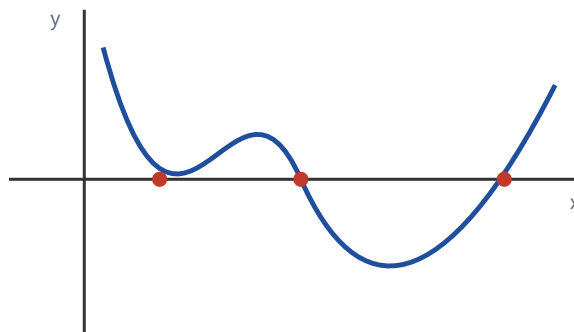
- (A) 6
(C) 36

- (B) 24
(D) 216

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

9. The graph of a polynomial $y = p(x)$ is shown below. How many zeroes does $p(x)$ have?



Graph of $y = p(x)$ crossing the x-axis

- (A) 1
(C) 3

- (B) 2
(D) 0

10. If the HCF of 96 and 404 is 4, then their LCM is _____.

- (A) 9696
(C) 38 784

- (B) 2424
(D) 404

11. The largest number that divides 70 and 125, leaving remainders 5 and 8 respectively, is _____.

- (A) 5
(C) 65

- (B) 13
(D) 875

12. A quadratic polynomial whose zeroes have sum 3 and product -10 is _____.

- (A) $x^2 + 3x - 10$
(C) $x^2 - 3x + 10$

- (B) $x^2 - 3x - 10$
(D) $x^2 - 10x + 3$

13. The prime factorisation of 156 is _____.

- (A) $2^3 \times 3 \times 13$
(C) $2^2 \times 3 \times 13$

- (B) $2 \times 3^2 \times 13$
(D) $2^2 \times 39$

14. One row of the table below is **incorrectly** matched. Which row is it?

Row	Rational number	Nature of its decimal expansion
(A)	$17/8$	Terminating
(B)	$64/455$	Terminating
(C)	$29/343$	Non-terminating, repeating
(D)	$15/1600$	Terminating

Table 1.1 — Rational numbers and their decimal expansions

- (A) (A)
(C) (C)

- (B) (B)
(D) (D)

15. Two bells toll at intervals of 12 minutes and 18 minutes. If they toll together at 9 a.m., they will next toll together at _____.
(A) 9:18 a.m. (B) 10:00 a.m.
(C) 9:30 a.m. (D) 9:36 a.m.

Achievers Section

Q16–Q18 · 3 marks each

16. If α and β are the zeroes of $x^2 - 6x + 8$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ equals _____.
(A) $\frac{3}{4}$ (B) $\frac{4}{3}$
(C) 6 (D) $\frac{1}{8}$
17. The zeroes of the cubic polynomial $x^3 - 3x^2 - x + 3$ are _____.
(A) 1, -1, -3 (B) 1, -1, 3
(C) 1, 3, -3 (D) -1, -3, 3
18. Consider the three statements below.
(i) The product of two irrational numbers is always irrational.
(ii) Every composite number can be written as a product of primes in exactly one way, apart from the order of the factors.
(iii) If a number ends in the digit 0, it must have both 2 and 5 among its prime factors.
Which of them are **true**?
(A) (i) and (ii) only (B) (ii) and (iii) only
(C) (i) and (iii) only (D) All three

Answer Key

1	C	2	D	3	A	4	A	5	D
6	A	7	D	8	C	9	C	10	A
11	B	12	B	13	C	14	B	15	D
16	A	17	B	18	B				

Solutions

1. Answer: (C) 6

Writing the prime factorisations, $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$. The HCF takes the lowest power of each common prime: $2 \times 3 = 6$. (36 is their LCM.)

2. Answer: (D) $a \times b$

Every prime appears in the HCF with its lowest power and in the LCM with its highest, and those two powers together are exactly the powers in a and b . So the product of the HCF and the LCM is $a \times b$.

3. Answer: (A) Terminating

Here $3125 = 5^5$, so the denominator has the form $2^m 5^n$ and the expansion **terminates**: $\frac{13}{3125} = 0.00416$.

4. Answer: (A) 5

For $ax^2 + bx + c$ the sum of the zeroes is $\frac{-b}{a} = \frac{5}{1} = 5$. Indeed the zeroes are 2 and 3, and $2 + 3 = 5$.

5. Answer: (D) $\frac{3}{2}$

For $ax^2 + bx + c$ the product of the zeroes is $\frac{c}{a} = \frac{3}{2}$. (The sum would be $\frac{-7}{2}$.)

6. Answer: (A) 2

A polynomial of degree n has at most n zeroes, so a quadratic has at most **2**. Graphically, a parabola can cut the x -axis in at most two points.

7. Answer: (D) Contradiction

One assumes $\sqrt{2} = \frac{p}{q}$ in lowest terms and shows that p and q must then both be even, contradicting "lowest terms".

This is proof by **contradiction**.

8. Answer: (C) 36

Using $12 = 2^2 \times 3$ and $18 = 2 \times 3^2$, the LCM takes the highest power of each prime: $2^2 \times 3^2 = 36$. Checking, $\text{HCF} \times \text{LCM} = 6 \times 36 = 216 = 12 \times 18$.

9. Answer: (C) 3

The zeroes of a polynomial are the x -coordinates of the points where its graph meets the x -axis. The curve crosses the axis at **3** points, so $p(x)$ has 3 zeroes and its degree is at least 3.

10. Answer: (A) 9696

Since $\text{HCF} \times \text{LCM} = \text{product of the numbers}$, $\text{LCM} = \frac{96 \times 404}{4} = \frac{38784}{4} = 9696$.

11. Answer: (B) 13

The required number divides $70 - 5 = 65$ and $125 - 8 = 117$ exactly, so it is $\text{HCF}(65, 117)$. Since $65 = 5 \times 13$ and $117 = 9 \times 13$, the HCF is **13**.

12. Answer: (B) $x^2 - 3x - 10$

Such a polynomial is $x^2 - (\text{sum})x + (\text{product}) = x^2 - 3x - 10$. Factorising gives $(x - 5)(x + 2)$, whose zeroes 5 and -2 do add to 3 and multiply to -10 .

13. Answer: (C) $2^2 \times 3 \times 13$

Dividing repeatedly: $156 = 2 \times 78 = 2 \times 2 \times 39 = 2^2 \times 3 \times 13$, so the factorisation is $2^2 \times 3 \times 13$. The last option is not a prime factorisation, since 39 is composite.

14. Answer: (B) (B)

An expansion terminates only when the denominator in lowest terms is of the form $2^m 5^n$. Here $455 = 5 \times 7 \times 13$ contains the primes 7 and 13, so $64/455$ does *not* terminate — row **(B)** is wrong. The others are right: $8 = 2^3$, $1600 = 2^6 \times 5^2$ and $343 = 7^3$.

15. Answer: (D) 9:36 a.m.

They coincide after a number of minutes that is a multiple of both intervals, so the first such time is $\text{LCM}(12, 18) = 36$ minutes later, that is **9:36 a.m.**

16. Answer: (A) $\frac{3}{4}$

Here $\alpha + \beta = 6$ and $\alpha\beta = 8$. Now $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{6}{8} = \frac{3}{4}$. Checking directly, the zeroes are 2 and 4, and $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$.

17. Answer: (B) 1, -1, 3

Group the terms: $x^2(x - 3) - (x - 3) = (x - 3)(x^2 - 1) = (x - 3)(x - 1)(x + 1)$. The zeroes are therefore **1, -1 and 3**, and their sum 3 matches $\frac{-b}{a} = 3$.

18. Answer: (B) (ii) and (iii) only

Statement (i) is false: $\sqrt{2} \times \sqrt{2} = 2$, a rational product of two irrationals. Statement (ii) is the Fundamental Theorem of Arithmetic and is true. Statement (iii) is true, because a number ending in 0 is divisible by $10 = 2 \times 5$. So only **(ii) and (iii)** hold.