



Class 9 Maths – Ganita Manjari



Chapter 3: The World of Numbers



End-of-Chapter Exercises – Solutions

These are based on the **new Ganita Manjari Grade 9 Part I textbook**, Exercises 1–14.



Q1. Convert into Decimal Form

(i) $\frac{3}{50}$

$$3 \div 50 = 0.06$$



Answer: **0.06** — terminating decimal

(ii) $\frac{2}{9}$

$$2 \div 9 = 0.2222\ldots$$



Answer: **0.222...** — non-terminating repeating decimal



Q2. Prove that $\sqrt{5}$ is an Irrational Number

Assume that $\sqrt{5}$ is rational.

Then:

$$\sqrt{5} = \frac{p}{q}$$

where p and q are integers, $q \neq 0$, and $\frac{p}{q}$ is in lowest form.

Squaring both sides:

$$5 = \frac{p^2}{q^2}$$

Therefore:

$$p^2 = 5q^2$$

So, p^2 is divisible by 5.

Therefore, p is divisible by 5.

Let:

$$p = 5k$$

Substituting:

$$25k^2 = 5q^2$$

$$q^2 = 5k^2$$

Therefore, q is also divisible by 5.

So, both p and q are divisible by 5.

✗ This contradicts the fact that p/q is in lowest form.

Therefore:

✓ $\sqrt{5}$ is irrational.

Q3. Convert the Decimal Numbers into p/q

(i) 12.6

$$12.6 = 126/10$$

$$= \mathbf{63/5}$$

✓ Answer: **63/5**

(ii) 0.0120

$$0.0120 = 120/10000$$

$$= \mathbf{3/250}$$

✓ Answer: **3/250**

(iii) $3.0\overline{52}$

Here the repeating part is **52**.

Let:

$$x = 3.05252525\ldots$$

$$10x = 30.525252\ldots$$

$$1000x = 3052.525252\ldots$$

Subtract:

$$1000x - 10x = 3052.525252\ldots - 30.525252\ldots$$

$$990x = 3022$$

$$x = 3022/990$$

$$x = \mathbf{1511/495}$$

✓ Answer: **1511/495**

(iv) $1.2\overline{35}$

Here the repeating part is **35** after 1.2.

Let:

$$x = 1.2353535\ldots$$

$$10x = 12.353535\ldots$$

$$1000x = 1235.353535\ldots$$

Subtract:

$$990x = 1223$$

$$x = \mathbf{1223/990}$$

✓ Answer: **1223/990**

(v) $0.2\overline{3}$

$$x = 0.232323\dots$$

$$100x = 23.232323\dots$$

Subtract:

$$99x = 23$$

$$x = \mathbf{23/99}$$

✓ Answer: **23/99**

(vi) $2.\overline{05}$

$$x = 2.05555\dots$$

$$10x = 20.5555\dots$$

$$100x = 205.5555\dots$$

Subtract:

$$90x = 185$$

$$x = 185/90$$

$$x = \mathbf{37/18}$$

✓ Answer: **37/18**

(vii) $2.1\overline{25}$

$$x = 2.125555\dots$$

$$100x = 212.5555\dots$$

$$1000x = 2125.5555\dots$$

Subtract:

$$900x = 1913$$

$$x = \mathbf{1913/900}$$

✓ Answer: **1913/900**

(viii) $3.1\overline{25}$

$$x = 3.125555\dots$$

$$100x = 312.5555\dots$$

$$1000x = 3125.5555\dots$$

Subtract:

$$900x = 2813$$

$$x = \mathbf{2813/900}$$

✓ Answer: **2813/900**

(ix) $2.\overline{1625}$

The repeating block is **1625**.

$$x = 2.162516251625\dots$$

$$10000x = 21625.16251625\dots$$

Subtract x:

$$9999x = 21623$$

$$x = \mathbf{21623/9999}$$

✓ Answer: **21623/9999** ([Tiwari Academy](#))

Q4. Locate the Rational Numbers on the Number Line

(i) 0.532

0.532 lies between **0** and **1**.

More precisely:

$$0.5 < 0.532 < 0.6$$

Then divide the interval further to locate **0.532**.

✓ Answer: **Mark 0.532 between 0.53 and 0.54.**

(ii) $1.\overline{15}$

1.15555... lies between:

1.15 and 1.16

✓ Answer: **Mark the point slightly greater than 1.15 and less than 1.16.**

Q5. Find 6 Rational Numbers Between 3 and 4

Write:

$$3 = 21/7$$

$$4 = 28/7$$

Numbers between $21/7$ and $28/7$ are:

$22/7, 23/7, 24/7, 25/7, 26/7, 27/7$

✓ Answer:

$22/7, 23/7, 24/7, 25/7, 26/7, 27/7$

Q6. Find 5 Rational Numbers Between $2/5$ and $3/5$

Multiply by $6/6$:

$$2/5 = 12/30$$

$$3/5 = 18/30$$

Numbers between them:

22/30, 14/30, 15/30, 16/30, 17/30

Using five consecutive numerators:

✓ Answer:

13/30, 14/30, 15/30, 16/30, 17/30

Q7. Find 5 Rational Numbers Between $\frac{1}{6}$ and $\frac{2}{5}$

LCM of 6 and 5 = 30

$$\frac{1}{6} = \frac{5}{30}$$

$$\frac{2}{5} = \frac{12}{30}$$

Choose numbers between $\frac{5}{30}$ and $\frac{12}{30}$:

$\frac{6}{30}$, $\frac{7}{30}$, $\frac{8}{30}$, $\frac{9}{30}$, $\frac{10}{30}$

Simplifying:

$$\frac{6}{30} = \frac{1}{5}$$

$$\frac{8}{30} = \frac{4}{15}$$

$$\frac{9}{30} = \frac{3}{10}$$

$$\frac{10}{30} = \frac{1}{3}$$

✓ Answer:

$\frac{1}{5}$, $\frac{7}{30}$, $\frac{4}{15}$, $\frac{3}{10}$, $\frac{1}{3}$

Q8. Find the Rational Number x

Given:

$$\frac{x}{3} + \frac{x}{5} = \frac{16}{15}$$

$$\text{LCM} = 15$$

$$5x/15 + 3x/15 = 16/15$$

$$8x/15 = 16/15$$

$$8x = 16$$

$$x = 2$$

✓ Answer: $x = 2$

Q9. Determine Whether ab is Positive or Negative

Given:

$$a + 1/b = 0$$

Therefore:

$$a = -1/b$$

Multiplying by b :

$$ab = -1$$

Since -1 is negative:

✓ Answer: ab is negative.

Q10. Terminating Decimal – Fourth Decimal Place

The last non-zero digit occurs in the **4th decimal place**.

Therefore, the number can be written as:

$$p/10^4$$

where p is an integer not divisible by 10.

Now:

$$10^4 = 2^4 \times 5^4$$

Since p is not divisible by 10, p cannot contain both factors 2 and 5 simultaneously.

After reducing the fraction, at least one of the full factors **2^4 or 5^4** must remain.

✓ **Answer:** Yes, the denominator in lowest form must be divisible by **2^4 or 5^4** .

Q11. Decimal Expansion of 18/125

$$125 = 5^3$$

The denominator contains only the prime factor 5.

Therefore, the decimal expansion is terminating.

$$125 \times 8 = 1000$$

$$18/125 = 144/1000$$

$$= \mathbf{0.144}$$

✓ **Answer:**

Terminating decimal

Number of decimal places = 3

Q12. Denominator = $2^3 \times 5$

The denominator is:

$$2^3 \times 5^1$$

The highest power is **3**.

To make a power of 10:

$$2^3 \times 5^3 = 10^3$$

Therefore, the decimal expansion will have:

✓ **3 decimal places**

★ Q13. Five Rational Numbers Between $\frac{7}{12}$ and $\frac{5}{6}$

Given:

$$a = \frac{7}{12}$$

$$b = \frac{5}{6}$$

Convert b to denominator 12:

$$\frac{5}{6} = \frac{10}{12}$$

The difference between numerators is only:

$$10 - 7 = 3$$

We need a difference greater than 6.

Multiply numerator and denominator by 3:

$$\frac{7}{12} = \frac{21}{36}$$

$$\frac{5}{6} = \frac{30}{36}$$

Now:

$$30 - 21 = 9 > 6$$

Five rational numbers between them are:

$\frac{22}{36}, \frac{23}{36}, \frac{24}{36}, \frac{25}{36}, \frac{26}{36}$

So:

$$22/36 = 11/18$$

$$23/36$$

$$24/36 = 2/3$$

$$25/36$$

$$26/36 = 13/18$$

✓ Answer:

11/18, 23/36, 2/3, 25/36, 13/18

📌 **Important note:** The textbook states the condition $k_2 - k_1 > n + 1$. Strictly mathematically, to have n integers strictly between k_1 and k_2 , the condition is $k_2 - k_1 \geq n + 1$. The textbook's $>$ condition is sufficient but is not strictly necessary.

★ Q14. Prove $x = y = z = 0$

Given:

$$x + y + z = 0$$

and

$$xy + yz + zx = 0$$

Square the first equation:

$$(x + y + z)^2 = 0$$

Expanding:

$$x^2 + y^2 + z^2 + 2xy + 2yz + 2zx = 0$$

But:

$$xy + yz + zx = 0$$

Therefore:

$$x^2 + y^2 + z^2 = 0$$

For rational numbers:

$$x^2 \geq 0$$

$$y^2 \geq 0$$

$$z^2 \geq 0$$

The sum of three non-negative numbers can be zero only when each is zero.

Therefore:

$$x^2 = 0$$

$$y^2 = 0$$

$$z^2 = 0$$

Hence:

✓ $x = 0, y = 0, z = 0$



QUICK ANSWER KEY

1. (i) **0.06**, terminating
(ii) **0.222...**, repeating
2. **$\sqrt{5}$ is irrational**
- 3.

- (i) **63/5**
- (ii) **3/250**
- (iii) **1511/495**
- (iv) **1223/990**
- (v) **23/99**
- (vi) **37/18**
- (vii) **1913/900**
- (viii) **2813/900**
- (ix) **21623/9999**

4. (i) **0.532** on the number line
(ii) **1.1555...** on the number line
5. **22/7, 23/7, 24/7, 25/7, 26/7, 27/7**
6. **13/30, 14/30, 15/30, 16/30, 17/30**
7. **1/5, 7/30, 4/15, 3/10, 1/3**
8. **$x = 2$**
9. **ab is negative**
10. **$p/10^4$; denominator in lowest form divisible by 2^4 or 5^4**
11. **Terminating; 3 decimal places**

12. **3 decimal places**

13. **$11/18$, $23/36$, $2/3$, $25/36$, $13/18$**

14. **$x = y = z = 0$**