∴ The side of the largest square is 34 cm

$$\begin{array}{r} 374\overline{)\,544\,(1} \\ \underline{374} \\ 170\overline{)\,374\,(2} \\ \underline{340} \\ 34\overline{)\,170\,(5} \\ \underline{170} \\ 0 \end{array}$$

5. Ans: [a]

10 – 4 = 6, 15 – 9 = 6, 21 – 15 = 6, 28 – 22 = 6

LCM of 10, 15, 21 and 28 = 420

The greatest 4 digit number is 9999.

9999 ÷ 420 = Q + R339

∴ The greatest 4 digit number divisible by 420

→ 9999 – 339 = 9660

∴ The required number = 9660 – 6 = 9654

2	10, 15, 21, 28
5	5, 15, 21, 14
3	1, 3, 21, 14
7	1, 1, 7, 14
	1, 1, 1, 2

$$\begin{array}{r} 420\overline{)\,9999\,(23} \\ \underline{840} \\ 1599 \\ \underline{1260} \\ 339 \end{array}$$

6. Ans: [a]

The interval of time is the LCM of the numbers 36, 45, 72, 81 and 108.

LCM = 3240

∴ They will keep on tolling together after every interval of 3240 secs.

2	36, 45, 72, 81, 108
2	18, 45, 36, 81, 54
3	9, 45, 18, 81, 27
3	3, 15, 6, 27, 9
3	1, 5, 2, 9, 3
	1, 5, 2, 3, 1

7. Ans: [d]

LCM of 3, 4, 5, 6, 8 = 120

120 = 2 × 2 × 2 × 3 × 5

To make it a perfect square, it should be multiplied by 2 × 3 × 5 = 30

∴ The required number is 120 × 30 → 3600

2	3, 4, 5, 6, 8
2	3, 2, 5, 3, 4
3	3, 1, 5, 3, 2
	1, 1, 5, 1, 2

8. Ans: [d]

HCF = 11, LCM = 693, One number = 77

HCF × LCM = Product of the two numbers

∴ Other number = $\frac{11 \times 693}{77}$ = 99

9. Ans: [d]

HCF + LCM = 680

LCM = 84 × HCF

∴ HCF + 84 × HCF = 680

⇒ 85 × HCF = 680

⇒ HCF = 8

LCM = 84 × 8 = 672

One number = 56

∴ Other number = $\frac{672 \times 8}{56}$ = 96

10. Ans: [d]

Let the numbers be 3x and 4x.

∴ HCF = x = 4

⇒ The numbers are 12 and 16.

∴ LCM = $\frac{12 \times 16}{4}$ = 48

11. Ans: [c]

They will meet again at the starting point after running for the time equal to the LCM of 18 secs, 22 secs and 30 secs.

LCM = 990 secs = 16 min 30 secs

∴ The time is 16 min 30 secs

2	18, 30, 22
3	9, 15, 11
	3, 5, 11

12. Ans: [d]

The LCM should be a multiple of the HCF.

⇒ LCM should be a multiple of 8.

24 = 8 × 3, 48 = 8 × 6, 56 = 8 × 7

But 60 is not a multiple of 8.

∴ The required number is 60.

13. Ans: [c]

Since the 3 numbers are co-prime, they contain only 1 as a common factor. Also the two products have the middle number common.

So middle number = HCF of 551 and 1073 = 29

∴ First number = 551 /29 = 19

Third number = 1073/29 = 37

∴ Sum of the three numbers = 19 + 29 + 37 = 85

$$\begin{array}{r} 551\overline{)\,1073\,(1} \\ \underline{551} \\ 522\overline{)\,551\,(1} \\ \underline{522} \\ 29\overline{)\,522\,(18} \\ \underline{29} \\ 232 \\ \underline{232} \\ 0 \end{array}$$

14. Ans: [a]

Let the two numbers be 27x and 27y.

∴ Their sum = 27x + 27y = 27(x + y) = 216 ⇒ x + y = 8

Co-primes with sum 8 are (1, 7) and (3, 5).

∴ The required numbers are (27 × 1, 27 × 7) or (27 × 3, 27 × 5).

⇒ The numbers are (27, 189) or (81, 135).

Out of these, the matching choice is 27, 189.

∴ The numbers are 27 and 189.

15. Ans: [a]

$3240 = 2^3 \times 3^4 \times 5$

$3600 = 2^4 \times 3^2 \times 5^2$

HCF = $36 = 2^2 \times 3^2$

Since HCF is the product of the lowest powers of common factors, the third number must have $(2^2 \times 3^2)$ as its factor.

Since LCM is the product of the highest powers of common prime factors, the third number must have 3^5 and 7^2 as its factors.

∴ Third number = $2^2 \times 3^5 \times 7^2$

16. Ans: [b]

HCF = 33, LCM = 264

First number = 2 × 33 = 66

∴ Second number = $\frac{\text{HCF} \times \text{LCM}}{\text{First number}} = \frac{33 \times 264}{66} = 132$

17. Ans: [c]

The greatest possible rate can be obtained by finding the HCF of 51 and 85.

HCF of 51 and 85 = 17

∴ The required possible speed is 17 km/min

$$51\overline{)85}(1$$
$$\underline{51}$$
$$34\overline{)51}(1$$
$$\underline{34}$$
$$17\overline{)34}(2$$
$$\underline{34}$$
$$0$$

18. Ans: [b]

LCM of 8 and 9 = 72

The largest five digit multiple of 72 = 99936

∴ The required number = 99936 + 5 = 99941

19. Ans: [a]

HCF of 34 and 85 = 17

$34 = 2 \times 17$

∴ The greatest length of the rope = 17

$85 = 5 \times 17$

Number of equal parts to be measured = $\frac{34 \times 3}{17} + \frac{85 \times 3}{17}$

$= (2 \times 3) + (5 \times 3) = 6 + 15 = 21$

20. Ans: [d]

Let the numbers be 33x and 33y.

∴ 33x + 33y = 33 (x + y) = =528

⇒ x + y = 16

The number of possible pairs are (1, 15), (3, 13), (5, 11), (7, 9).

∴ The numbers with sum 528 are (33 × 1, 33 × 15), (33 × 3, 33 × 13), (33 × 5, 33 × 11) and (33 × 7, 33 × 9).

So, there are 4 such pairs.

SESSION – 9

NUMBER PROPERTIES FRACTIONS & DECIMALS

1. Ans: [d]

Option 1: 0.4, 0.6, 0.33, 0.5, 0.8 --- (wrong)

Option 2: 0.3, 0.4, 0.6, 0.8, 0.5 --- (wrong)

Option 3: 0.3, 0.4, 0.8 , 0.5, 0.6 --- (wrong)

Option 4: 0.33, 0.4, 0.5, 0.6, 0.8 --- (correct)

0.33 < 0.4 < 0.5 < 0.6 < 0.8 ---- (Ascending order)

2. Ans: [b]

Option 1: 0.8, 0.5, 0.4, 0.6, 0.33--- (wrong)

Option 2: 0.8, 0.6, 0.5, 0.4, 0.3 --- (correct)

Option 3: 0.5, 0.3, 0.4 , 0.8, 0.6 --- (wrong)

Option 4: 0.33, 0.4, 0.5, 0.6, 0.8 --- (wrong)

0.8 > 0.6 > 0.5 > 0.4 > 0.3 ---- (Descending order)

3. Ans: [a]

In a decimal fraction, if there are n numbers of repeated numbers after a decimal point, then just write one repeated number in the numerator and in denominator take n number of nines equal to repeated numbers you observe after the decimal point.

0.737373... is written as $0.\overline{73}$

Numerator = 73 ---- (one repeated number)

Denominator = 99 ---- (73 is the number which is repeated)

Vulgar fraction = $\frac{73}{99}$

4. Ans: [c]

Numerator = (All digits after decimal point) Repeated digits only once – (Non-repetitive digit after decimal point)

Denominator = Take 9 as many times the repetitive digit, followed by zeros equal to number of non-repetitive digits.

$0.6\overline{7}$ is a mixed recurring fraction.

Numerator = $\frac{67 - 6}{90} = \frac{61}{90}$

5. Ans: [b]

$5.\overline{46} = 5 + 0.\overline{46} = 5 + \frac{46}{99} = \frac{495+46}{99} = \frac{541}{99}$

Convert $0.\overline{46}$ into fraction and then add 5 to the fraction obtained.

6. Ans: [a]

$0.2\overline{343} + 0.1\overline{888}$ are mixed recurring decimal

$0.2\overline{343} = \frac{2343-23}{9900} = \frac{2320}{9900}$

$0.1\overline{888} = \frac{1888-18}{9900} = \frac{1870}{9900}$

$0.2\overline{343} + 0.1\overline{888}$

$\frac{2320}{9900} + \frac{1870}{9900} = \frac{2320+1870}{9900} = \frac{4190}{9900} = 0.4\overline{232}$

7. Ans: [b]

$3.\overline{23} - 2.\overline{03} + 1.\overline{55}$

Step 1: $(3 + 0.\overline{23}) + (1 + 0.\overline{55}) - (2 + 0.\overline{33})$

Step 2: $(4 + (0.23 + 0.\overline{55})] - (2 + 0.\overline{03})$

Step 3: Convert decimal numbers into vulgar fractions

$0.\overline{23} = \frac{23}{99}$

$0.\overline{55} = \frac{55}{99}$

$0.\overline{03} = \frac{9}{99}$

Step 4: Substituting the values, we get

$= \left[4 + \left(\frac{23}{99} + \frac{55}{99}\right)\right] - \left[2 + \frac{3}{99}\right]$

$= \left[2 + \left(\frac{23}{99} + \frac{55}{99} - \frac{3}{99}\right)\right]$

$= \left[2 + \frac{75}{99}\right] = 2.\overline{75}$

8. Ans: [c]

$0.09 = \frac{9}{99}$

$7.3 = 7 + \frac{3}{9} = \frac{66}{9}$

$\frac{9}{99} \times \frac{66}{9} = \frac{2}{3} = \frac{6}{9}$

$\frac{6}{9}$ can be easily converted into decimal form $= 0.\overline{6}$

9. Ans: [c]

Given: $\frac{347.624}{0.0089} = a$

The value of $\frac{347624}{0.0089} \div 1000 = a \div 1000 = \frac{a}{1000}$

10. Ans: [b]

The given numerical is in the form

$\frac{(a^2 - ab + b^2)}{(a^3 + b^3)} = \frac{(a^2 - ab + b^2)}{(a+b)(a^2 - ab + b^2)} = \frac{1}{(a+b)}$

$\frac{(0.555^2) - (0.555 \times 0.020) + (0.20^2)}{(0.555^3) + 0.020^3}$

$= \frac{1}{(0.555 + 0.020)} = 1.74$

This type of numerical can be easily solved, if all basic formulae are known.

11. Ans: [b]

Given Expression

$= \frac{a^2 - b^2}{a - b} = \frac{(a+b)(a-b)}{(a-b)} = (a+b) = (2.39 + 1.61) = 4.$

12. Ans: [c]

Required decimal $= \frac{1}{60 \times 60} = \frac{1}{3600} = 0.00027$

13. Ans: [a]

Given expression $= \frac{(0.96)^3 - (0.1)^3}{(0.96)^2 + (0.96 \times 0.1) + (0.1)^2}$

$= \left(\frac{a^3 - b^3}{a^2 + ab + b^2}\right)$

$= (a - b)$

$= (0.96 - 0.1)$

$= 0.86$

14. Ans: [b]

Given expression $= \frac{(0.1)^3 + (0.02)^3}{2^3[(0.1)^3 + (0.02)^3]} = \frac{1}{8} = 0.125$

15. Ans: [c]

$\frac{29.94}{1.45} = \frac{299.4}{14.5}$

$= \left(\frac{2994}{14.5} \times \frac{1}{10}\right)$ [Here, substitute 172 in the place of 2994/14.5]

$= \frac{172}{10}$

$= 17.2$