Loyola

EC MATHS

6

TERM - I, II & III

This special guide is prepared
on the basis of New Syllabus

Loyola

Publications

Vivek Illam, No. 19, Raj Nagar, N.G.O. 'A' Colony,
Palayamkottai, Tirunelveli - 627 007.
Ph: 0462 - 2553186
Cell : 94433 81701, 94422 69810, 90474 74696
     81110 94696, 89400 02320, 89400 02321

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AUTHOR :

Mr. Orlinson M.Sc., M.Phil., B.Ed.,

St. Xavier's Hr. Sec. School

Palayam Kottai

Loyola **Publications**

நூலினுள் புகுமுன்.....

1. 6ம் வகுப்பு கணிதம் மாணவ / மாணவியர் எளிதில் புரியும் வண்ணம் எழுதப்பட்டுள்ளது.

2. ஒவ்வொரு தலைப்புகளில் உள்ள கணக்குகள் அனைத்தும் எளிய முறையில் செய்து காட்டப்பட்டுள்ளது.

3. தேவைக்கேற்ப கூடுதல் வினாக்கள் கொடுக்கப்பட்டுள்ளன.

4. 6ம் வகுப்பு முதல் 9ம் வகுப்பு வரை அனைத்து நூல்களும் அரசுத் தேர்வை நோக்கியே எழுதப்பட்டுள்ளது.

> குறிப்பு : **Loyola Ec** புத்தகங்களை 10, 11 மற்றும் 12ம் வகுப்பு மாணவ மாணவிகள் வாங்கிப் பயின்றால், அரசுத் தேர்வில் அதிக மதிப்பெண் பெற்று உச்சத்தைத் தொடலாம் என்பதை மகிழ்ச்சியுடன் தெரிவித்துக் கொள்கிறோம்.

அன்புடன்
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CONTENTS

TERM-I

UNIT 1 — NUMBERS

SUMMARY

❖ Use of commas helps us in reading and writing large numbers.
❖ Use of commas differs in the Indian and the International Systems.

Exercise 1.1

1. Fill in the blanks.

(i)   The smallest 7 digit number is _____.   **Ans: 1000000**

(ii) The largest 8 digit number is _____.   **Ans: 99999999**

(iii) The place value of 5 in 7005380 is _____.   **Ans: Five thousand**

(iv) The expanded form of the number 76,70,905 is _____.

Ans: 7000000 + 600000 + 70000 + 900 + 5

2. Say True or False.

(i)   Successor of a one digit number is always a one digit number   **Ans: False**

(ii) Predecessor of a 3-digit number is always a 3 or 4-digit number   **Ans: False**

(iii) In the Indian System of Numeration the number 67999037 is written as
6,79,99,037   **Ans: True**

(iv) $88,888 = 8 \times 10000 + 8 \times 100 + 8 \times 10 + 8 \times 1$ **Ans: False**

3. How many ten thousands are there in the smallest 6 digit number?

Ans: Smallest 6 digit number = 1,00,000

$$\frac{100000}{10000} = 10$$

1 Lakh = 10 Ten Thousands

4. Observe the commas and write down the place value of 7.
(i) 56,74,56,345   (ii) 567,456,345

Ans: (i) 70,00,000   (ii) 7,000,000

5. Write the following numbers in the International System by using commas.
(i) 347056   (ii) 7345671   (iii) 634567105   (iv) 1234567890

Ans: (i) 347,056   (ii) 7,345,671   (iii) 634,567,105   (iv) 1,234,567,890

6. **Write the largest six digit number and put commas in the Indian and the International Systems.**

   Ans: Largest 6 digit number = 9,99,999

   Indian System: 9,99,999 (Nine Lakh Ninety Nine Thousand Nine Hundred Ninety Nine)

   International System: 999,999 (Nine Hundred Ninety Nine Thousand, Nine Hundred Ninety Nine)

7. **Write the number names of the following numerals in the Indian System. (i) 75,32,105 (ii) 9,75,63,453**

   Ans: (i) Seventy five lakh thirty two thousand one hundred five

   (ii) Nine crore seventy five lakh sixty three thousand four hundred fifty three

8. **Write the number names in words using the International System. (i) 345,678 (ii) 8,343,710 (iii) 103,456,789**

   Ans: (i) Three hundred forty five thousand six hundred seventy eight

   (ii) Eight million three hundred forty three thousand seven hundred ten

   (iii) One hundred three million four hundred fifty six thousand seven hundred eighty nine

9. **Write the number name in numerals.**

   (i) Two crore thirty lakh fifty one thousand nine hundred eighty.

   (ii) Sixty six million three hundred forty five thousand twenty seven.

   (iii) Seven hundred eighty nine million, two hundred thirteen thousand four hundred fifty six.

   Ans: (i) 2,30,51,980   (ii) 66,345,027   (iii) 789,213,456

10. **Tamil Nadu has about twenty six thousand three hundred forty five square kilometre of Forest land. Write the number mentioned in the statement in Indian System and International system.**

    Ans: 26, 345

11. **The number of employees in the Indian Railways is about ten lakhs. Write this in the International System of numeration.**

    Ans: 1,000,000(one million)

Objective Type Questions

12. **The successor of 10 million is**

    (a) 1000001   (b) 10000001   (c) 9999999 (d) 100001   **Ans: (b) 10000001**

13. The difference between the successor and the predecessor of 99999 is

(a) 90000   (b) 1   (c) 2   (d) 99001   **Ans: (c) 2**

14. 1 billion is equal to

(a) 100 crore   (b) 100 million   (c) 100 lakh   (d) 10000 lakh   **Ans: (a) 100 crore**

15. The expanded form of the number 6,70,905 is

a) $6 \times 10000 + 7 \times 1000 + 9 \times 100 + 5 \times 1$

b) $6 \times 10000 + 7 \times 1000 + 0 \times 100 + 9 \times 100 + 0 \times 10 + 5 \times 1$

c) $6 \times 1000000 + 7 \times 10000 + 0 \times 1000 + 9 \times 100 + 0 \times 10 + 5 \times 1$

d) $6 \times 100000 + 7 \times 10000 + 0 \times 1000 + 9 \times 100 + 0 \times 10 + 5 \times 1$

Ans:

d) $6 \times 100000 + 7 \times 10000 + 0 \times 1000 + 9 \times 100 + 0 \times 10 + 5 \times 1$

SUMMARY

- ❖ Comparing any two numbers, the one with more digits is larger.
- ❖ Comparing any two numbers, if the digits are the same, the number that has a greater left most digit is larger.

Exercise 1.2

1. **Fill in the blanks with > or < or =.**

(i)   48792 _____ 48972   **Ans: <**

(ii) 1248654 _____ 1246854   **Ans: >**

(iii) 658794 _____ 658794   **Ans: =**

2. **Say True or False**

(i)   The difference between the smallest number of seven digits and the largest number of six digits is 10.   **Ans: False**

(ii) The largest 4-digit number formed by the digits 8,6,0,9 using each digit only once is 9086.   **Ans: False**

(iii) The total number of 4-digit numbers is 9000.   **Ans: True**

3. **Of the numbers 1386787215, 137698890, 86720560, which one is the largest? Which one is the smallest?**

Ans: Largest = 1386787215

      Smallest = 86720560

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4. **Arrange the following numbers in the descending order:**
   128435, 10835, 21354, 6348, 25840

   Ans: 128435 > 25840 > 21354 > 10835 > 6348

5. **Write any eight digit number with 6 in ten lakhs place and 9 in ten thousandth place.**

   Ans: 76594231 86493725

6. **Rajan writes a 3-digit number, using the digits 4,7 and 9. What are the possible numbers he can write?**

   Ans: 974, 947, 479, 497, 749, 794

7. **The password to access my ATM card includes the digits 9,4,6 and 8. It is the smallest 4 digit even number. Find the password of my ATM card.**

   Ans: 4698

8. **Postal Index Number consists of six digits. The first three digits are 6,3, and 1. Make the largest and the smallest Postal Index Number by using the digits 0,3 and 6, each only once.**

   Ans: Largest Postal Index Number - 631603
   Smallest Postal Index Number - 631036

9. **The heights(in metres) of the mountains in Tamil Nadu are as follows:**

SI.No	Mountains	Height(in metres)
1	Doddabetta	2637
2	Mahendragiri	1647
3	Anaimudi	2695
4	Velliangiri	1778

   (i) Which is the highest mountain listed above?
   (ii) Order the mountains from the highest to the lowest.
   (iii) What is the difference between the heights of the mountains Anaimudi and Mahendragiri?

   Ans:
   (i)   Anaimudi(2695 m)
   (ii) Anaimudi, Doddabetta, Velliangiri, Mahendragiri
   (iii) 2695 m - 1647 m = 1048 m

Objective Type Questions

10. **Which list of numbers is in order from the smallest to the largest?**
    (a) 1468, 1486, 1484   (b) 2345, 2435, 2235
    (c) 134205, 134208, 154203   (d) 383553, 383548, 383642

    Ans: (c) 134205, 134208, 154203

11. **The Arabian Sea has an area of 1491000 square miles. This area lies between which two numbers?**
    (a) 1489000 and 1492540   (b) 1489000 and 1490540
    (c) 1490000 and 1490100   (d) 1480000 and 1490000

    Ans: (a) 1489000 and 1492540

12. **The chart below shows the number of newspapers sold as per Indian Readership Survey in 2018. Which could be the missing number in the table?**

Name of the newspaper	Ranking	Sold (in Lakh)
A	1	70
B	2	50
C	3	?
D	4	10

    (a) 8   (b) 52   (c) 77   (d) 26   **Ans: (d) 26**

SUMMARY

❖ Using BIDMAS, we can avoid the common arithmetic mistakes.

❖ Large numbers are needed for various situations in our daily life.

Exercise 1.3

1. **Fill in the Blanks.**
    (i) If Arulmozhi saves ₹12 per day, then she saves ₹ _____ in 30 days.

    Ans: Rs. 360

    (ii) If a person 'A' earns ₹ 1800 in 12 days, then he earns ₹ _____ in a day.

    Ans: Rs 150

    (iii) $45 \div (7+8) - 2 = $ _____ .   **Ans: 1**

2. **Say True or False.**
    (i) $3 + 9 \times 8 = 96$ **Ans: False**
    (ii) $7 \times 20 - 4 = 136$ **Ans: True**
    (iii) $40 + (56-6) \div 2 = 45$ **Ans: False**

3. **The number of people who visited the Public Library for the past 5 months were 1200, 2000, 2450, 3060 and 3200 respectively. How many people visited the library in the last 5 months.**

    Ans: Total number of people who visited the public library for the past 5 months

    $= 1200 + 2000 + 2450 + 3060 + 3200$

    $= 11910$

4. **Cheran had a bank savings of ₹ 7,50,250. He withdrew ₹ 5,34,500 for educational purpose. Find the balance amount in his account.**

   Ans: Savings = Rs 7,50,250

   Cash withdrawn = Rs 5,34,500

   Balance amount = Rs 7,50,250 - Rs 5,34,500 = Rs 2,15,750

5. **In a cycle factory, 1560 bicycles were manufactured every day. Find the number of bicycles manufactured in 25 days.**

   Ans: Bicycles manufactured in one day = 1560

   Bicycles manufactured in 25 days = 1560 × 25

   $$= 39,000 \text{ bicycles}$$

6. **₹. 62500 was equally distributed as a New Year bonus for 25 employees of a company. How much did each receive?**

   Ans:

   Total amount = Rs 62500

   Total number of employees = 25

   Bonus amount received by each employee = Rs 62500 ÷ 25

   $$= \text{Rs } \frac{62500}{25}$$

   $$= \text{Rs } 2500$$

7. **Simplify the following numerical expressions:**

   (i) $(10+17) \div 3$

   (ii) $12 - [3 - \{6 - (5-1)\}]$

   (iii) $100 + 8 \div 2 + \{(3 \times 2) - 6 \div 2\}$

   Ans:

   (i) $(10+17) \div 3$
   $= 27 \div 3$
   $= \dfrac{27}{3}$
   $= 9$

   (ii) $12 - \left[3 - \left\{6 - (5-1)\right\}\right]$
   $= 12 - \left[3 - (6-4)\right]$
   $= 12 - \left[3 - 2\right]$
   $= 12 - 1$
   $= 11$

   (iii) $100 + 8 \div 2 + \{(3 \times 2) - 6 \div 2\}$
   $= 100 + 8 \div 2 + \{6 - 3\}$
   $= 100 + 8 \div 2 + 3$
   $= 100 + 4 + 3$
   $= 107$

Objective Type Questions

8. **The value of 3 + 5 - 7 × 1 is _____ .**

   (a) 5   (b) 7   (c) 8   (d) 1

   Ans: d) 1

9. **The value of $24 \div \{8 - (3 \times 2)\}$ is**
   (a) 0   (b) 12   (c) 3   (d) 4
   Ans: b) 12

10. **Use BIDMAS and put the correct operator in the box.**

    $2 \;\square\; 6 - 12 \div (4 + 2) = 10$

    (a) +   (b) -   (c) ×   (d) ÷

    Ans: (c) ×

SUMMARY

❖ The situations where we do not need the exact quantity give rise to estimation or approximation.

❖ Estimation is approximating a quantity to a reasonable accuracy.

❖ Rounding of a number involves in getting a quick, desired and rough estimate of it.

Exercise 1.4

1. **Fill in the blanks.**
   (i)   The nearest 100 of 843 is _____.   **Ans: 800**
   (ii) The nearest 1000 of 756 is _____.   **Ans: 1000**
   (iii) The nearest 10000 of 85654 is _____.   **Ans: 90000**

2. **Say True or False.**
   (i)   8567 is rounded off as 8600 to the nearest 10.   **Ans: False**
   (ii) 139 is rounded off as 100 to the nearest 100.   **Ans: True**
   (iii) 1,70,51,972 is rounded off as 1,70,00,000 to the nearest lakh.   **Ans: False**

3. **Round off the following to the given nearest place.**
   (i)   4,065; hundred   (ii) 44,555; thousand
   (iii) 86,943; ten thousand   (iv) 50,81,739; lakh
   (v)   33,75,98,482; ten crore
   Ans: (i) 4100   **(ii)** 45,000   **(iii)** 90,000   **(iv)** 51,00,000   **(v)** 30,00,00,000

4. **Estimate the sum of 157826 and 32469 rounded off to the nearest ten thousand.**
   Ans:

   $\begin{array}{r} 157826 \\ +\ 32469 \\ \hline 190295 \\ \hline \end{array}$

   When rounded off to nearest ten thousand = 1,90,000

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5. **Estimate by rounding off each number to the nearest hundred.**

    (i) 8074 + 4178   (ii) 1768977 + 130589

    Ans: (i) 8074 + 4178 = 12,252

    When rounded off to nearest hundred 12,300

    (ii) 1768977 + 130589 = 18,99,566

    When rounded off to nearest hundred = 18,99,600

6. **The population of a city was 43,43,645 in the year 2001 and 46,81,087 in the year 2011. Estimate the increase in population by rounding off to the nearest thousand.**

    Ans: Population in 2001 = 43,43,645

    Population in 2011 = 46,81,087

    Increase in population = 46,81,087 - 43,43,645 = 3,37,442

    When rounded off to the nearest thousand = 3,37,000

Objective Type Questions

7. **The number which on rounding off to the nearest thousand gives 11000 is**

    (a) 10345   (b) 10855   (c) 11799   (d) 10056   **Ans: (b) 10855**

8. **The estimation to the nearest hundred of 76812 is**

    (a) 77000   (b) 76000   (c) 76800   (d) 76900   **Ans: (c) 76800**

9. **The number 9785764 is rounded off to the nearest lakh as**

    (a) 9800000   (b) 9786000   (c) 9795600   (d) 9795000

    Ans: (a) 9800000

10. **The estimated difference of 167826 and 2765 rounded off to the nearest thousand is**

    (a) 180000   (b) 165000   (c) 140000   (d) 155000   **Ans: (b) 165000**

SUMMARY

❖ If zero is included in the collection of Natural numbers (N), we get the collection of Whole numbers (W), W = {0,1,2,...}.

❖ '0' is the smallest whole number.

❖ '0' and '1' are the additive and multiplicative identities of Whole numbers respectively.

❖ Whole numbers can be added or multiplied in any order and hence commutative.

❖ Multiplication of Whole numbers is both Commutative and Associative.

❖ Multiplication is Distributive over addition for Whole numbers.

❖ Division by '0' is not defined.

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Exercise 1.5

1. **Fill in the blanks.**
   (i) The difference between the smallest natural number and the smallest whole number is _____.　　**Ans: 1**
   (ii) $17 \times$ _____ $= 34 \times 17$　　**Ans: 34**
   (iii) When _____ is added to a number, it remains the same.　　**Ans: Zero**
   (iv) Division by _____ is not defined.　　**Ans:0**
   (v) Multiplication by _____ leaves a number unchanged.　　**Ans: 1**

2. **Say True or False.**
   (i) 0 is the identity for multiplication of whole numbers.　　**Ans: False**
   (ii) Sum of two whole numbers is always less than their product.　　**Ans: False**
   (iii) Both addition and multiplication are associative for whole numbers.
   　　　Ans: True
   (iv) Both addition and multiplication are commutative for whole numbers.
   　　　Ans: True
   (v) Multiplication is distributive over addition for whole numbers.　　**Ans: True**

3. **Name the property being illustrated in each of the cases given below.**
   (i) $75 + 34 = 34 + 75$　　**(Ans:Commutativity for addition)**
   (ii) $(12 \times 4) \times 8 = 12 \times (4 \times 8)$　　**Ans: Associativity for multiplication**
   (iii) $50 + 0 = 50$　　**Ans: Zero is the additive identity**
   (iv) $50 \times 1 = 50$　　**Ans: One is the multiplicative identity**
   (v) $50 \times 42 = 50 \times 40 + 50 \times 2$　　**Ans: Distributivity of multiplication over addition**

4. **Use the properties of whole numbers and simplify.**
   (i) 50×102
   (ii) $500 \times 689 - 500 \times 89$
   (iii) $4 \times 132 \times 25$
   (iv) $196 + 34 + 104$

   Ans:
   (i) $50 \times 102 = 50 \times (100 + 2) = (50 \times 100) + (50 \times 2)$
   $$= 5000 + 100 = 5100$$

   (ii) $500 \times 689 - 500 \times 89 = 500 \times (689 - 89) = 344500 - 44500$
   $$= 300000$$

   $$500 \times (689 - 89) = 500 \times 600 = 3,00000$$

(iii) $(4 \times 132) \times 25 = 4 \times (132 \times 25)$

$(4 \times 132) \times 25$

$$= 528 \times 25$$

$$= 13200$$

$$4 \times (132 \times 25)$$

$$= 4 \times 3300$$

$$= 13200$$

(iv) $(196 + 34) + 104 = 196 + (34 + 104)$

$(196 + 34) + 104 = 230 + 104 = 334$

$196 + (34 + 104) = 196 + 138 = 334$

Objective Type Questions

5. **$(53 + 49) \times 0$ is**

   a) 102   b) 0   c) 1   d) $53 + 49 \times 0$ **Ans: b) 0**

6. **$\dfrac{59}{1}$ is**

   a) 1   b) 0   c) $\dfrac{1}{59}$ d) 59   **Ans: d) 59**

7. **The product of a non-zero whole number and its successor is always**

   a) an even number   b) an odd number
   c) zero   d) none of these   **Ans: a) an even number**

8. **The whole number that does not have a predecessor is**

   a) 10   b) 0   c) 1   d) none of these   **Ans: b) 0**

9. **Which of the following expressions is not zero?**

   a) 2×0 b) $0 + 0$ c) 2/0   d) 0/2   **Ans: c) 2/0**

10. **Which of the following is not true?**

    a) $(4237 + 5498) + 3439 = 4237 + (5498 + 3439)$

    b) $(4237 \times 5498) \times 3439 = 4237 \times (5498 \times 3439)$

    c) $4237 + 5498 \times 3439 = (4237 + 5498) \times 3439$

    d) $4237 \times (5498 + 3439) = (4237 \times 5498) + (4237 \times 3439)$

    Ans: (c) $4237 + 5498 \times 3439 = (4237 + 5498) \times 3439$

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EC 6ᵗʰ Maths

Exercise 1.6

Miscellaneous Practice Problems

1. **Try to open my locked suitcase which has the biggest 5 digit odd number as the password comprising the digits 7,5,4,3 and 8. Find the password.**
   Ans: 87543

2. **As per the census of 2001, the population of four states are given below. Arrange the states in ascending and descending order of their population.**

State	Population
Tamil Nadu	72147030
Rajasthan	68548437
Madhya Pradesh	72626809
West Bengal	91276115

   Ans:
   Ascending order: 6,85,48,437 < 7,21,47,030 < 7,26,26,809 < 9,12,76,115
   Descending Order: 9,12,76,115 > 7,26,26,809 > 7,21,47,030 > 6,85,48,437

3. **Study the following table and answer the questions.**

Year	No of Tigers
1990	3500
2008	1400
2011	1706
2014	2226

   (i) How many tigers were there in 2011?   **Ans:** 1706
   (ii) How many tigers were less in 2008 than in 1990?   **Ans:** 2100
   (iii) Did the number of tigers increase or decrease between 2011 and 2014? If yes, by how much?

        Ans: Yes, 2226 - 1706 = 520 tigers increased from 2011 to 2014

4. **Mullaikodi has 25 bags of apples. In each bag there are 9 apples. She shares them equally amongst her 6 friends. How many apples do each get? Are there any apples left over?**
   Ans:
   No of apple bags = 25
   Apples in each bag = 9
   Total no of apples = 25 × 9 = 225
   Apples shared among her 6 friends = 225 ÷ 6
   So, among her 6 friends, each of them get 37 apples and 3 apples are left over.

5. **A poultry has produced 15472 eggs and fits 30 eggs in a tray. How many trays do they need?**

   Ans:

   No of eggs produced = 15472

   No of eggs fits in a tray = 30

   No of trays required = 15472 ÷ 30

   Trays required = 515 + 1 (to fit the remaining 22 eggs) = 516

   Quotient = 515

   Remainder = 22

CHALLENGING PROBLEMS

6. **Read the table and answer the following questions.**

Name of the Star	Diameter(in miles)
Sun	864730
Sirius	1556500
Canopus	25941900
Alpha Centauri	1037700
Arcturus	19888800
Vega	259400

   (i)   Write the Canopus star's diameter in words, in the Indian and the International System.

   (ii) Write the sum of the place values of 5 in Sirius star's diameter in the Indian System.

   (iii) Eight hundred sixty four million seven hundred thirty. Write in Indian System.

   (iv) Write the diameter in words of Arcturus star in the International System

   (v)   Write the difference of the diameters of Canopus and Arcturus stars in the Indian and the International Systems.

   Ans:

   (i)   2,59,41,900   25,941,900

   (i)   **Indian System:** Two crore fifty nine lakh forty one thousand nine hundred

         International System: Twenty five million nine hundred forty one thousand nine hundred

   (ii) 5,50,500

   (iii) 864,000,730(86,40,00,730)

   (iii) Eighty six crore forty lakh seven hundred thirty

   (iv) Nineteen million eight hundred eighty eight thousand eight hundred- (19,888,800)

(v)   Indian System: 60,53,100 – Sixty lakh fifty three thousand one hundred

International System: 6,053,100 – Six million fifty three thousand one hundred

7. Anbu asks Arivu Selvi to guess a five digit odd number. He gives the following hints.

> ➤ The digit in the 1000s place is less than 5
> ➤ The digit in the 100s place is greater than 6
> ➤ The digit in the 10s place is 8

What is Arivu Selvi answer? Does she give more than one answer?

Ans: 63785

53781

8. A Music concert is taking place in a stadium. A total of 7,689 chairs are to be put in rows of 90. (i) How many rows will there be? (ii) Will there be any chairs left over?

Ans:

Total no of chairs to be put = 7,689

Chairs in each row = 90

No of rows = 7689 ÷ 90

Hence, 84 + 1 = 85 rows are required to fill 7650 chairs

Chairs left over = 79 (If the no of rows = 84)

9. Round off the seven digit number 29,75,842 to the nearest lakhs and ten lakhs. Are they the same?

Ans: Yes. Both are same (30,00,000)

10. Find the 5 or 6 or 7 digit numbers from a newspaper or a magazine to get a rounded number to the nearest ten thousand.

Ans:

(i) $14276 \simeq 10000$ (ii) $1,86945 \simeq 1,90000$

❧ ✹ ❖ ❖ ❖ ✹ ☙

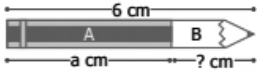# UNIT 2 INTRODUCTION TO ALGEBRA

SUMMARY

- ❖ Variables are quantities that can take any value and they are denoted by small alphabets a, b, c, ..., x, y, z.
- ❖ A variable allows us to express relations easily in all practical situations..
- ❖ Variables are used to generalise and express many common rules of Geometry and Arithmetic.

Exercise 2.1

1. **Fill in the blanks.**

   (i)   The letters a,b,c…x,y,z are used to represent _____.   **Ans: Variables**

   (ii) The algebraic statement of 'f' decreased by 5' is _____   **Ans: f - 5**

   (iii) The algebraic statement of 's' divided by 5' is _____   **Ans: $\dfrac{s}{5}$**

   (iv) If A's age is 'n' years now, 7 years ago A's age was _____   **Ans: n - 7**

   (v)   If 'p-5' gives 12 then 'p' is _____   **Ans: 17**

2. **Say True or False.**

   (i)   The length of part B in the pencil shown is 'a-6'.   **Ans: False**

   (ii) If the cost of an 🍎 is 'x' and the cost of a 🍌 is ₹ 5, then the total cost of fruits is ₹. 'x + 5'.   **Ans: True**

   (iii) 10 more to three times 'c' is '10c$^+$3'   **Ans: False**

   (iv) If the cost of 10 rice bag is ₹ 't', then the cost of 1 rice bag is ₹ $\dfrac{'t'}{10}$ **Ans: True**

   (v)   The product of 'q' and 20 is '20q'   **Ans: True**

3. **Draw the next two patterns and complete the table**
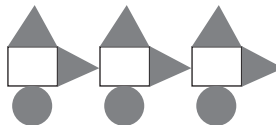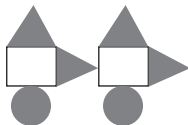
Shapes	1st Pattern	2nd Pattern	3rd Pattern	4th Pattern	5th Pattern
Squares	1	2	3		
Circles	1	2	3		
Triangles	2	4	6		

Ans:

Shapes	1st Pattern	2nd Pattern	3rd Pattern	4th Pattern	5th Pattern
Squares	1	2	3	4	5
Circles	1	2	3	4	5
Triangles	2	4	6	8	10

4. Arivazhagan is 30 years younger to his father. Write Arivazhagan's age in terms of his father's age.

   Ans: Let Arivazhagan's father's age be x years

   According to the problem,

   Arivazhagan's age = $(x - 30)$ years

5. If 'u' is an even number, how would you represent
   (i) the next even number?   (ii) the previous even number?

   Ans: (i) u + 2

   (ii) u - 2

6. Express the following verbal statement to algebraic statement.

   (i) 't' is added to 100.   **Ans:** t + 100

   (ii) 4 times 'q'.   **Ans:** 4q

   (iii) 4 less to 9 times of 'y'.   **Ans:** 9y - 4

7. Express the following algebraic statement to verbal statement.

   (i) $x \div 3$ **Ans:** x divided by 3

   (ii) $11 + 10x$ **Ans:** 11 added to 10 times x

   (iii) 70s   **Ans:** 70 times s

8. The teacher asked two students to write the algebraic statement for the verbal statement "8 more than a number". Vetri wrote '8 + x' but Maran wrote '8x'. Who gave the correct answer?

   Ans: Vetri

9. Answer the following questions.

   (i) If 'g' is equal to 300 what is the value of 'g - 1' and 'g + 1'?

   (ii) What is the value of 's', if '2s - 6' gives 30?

Ans:

(i)   g = 300

g - 1 = 300 - 1 = 299

g + 1 = 300 + 1 = 301

(ii)   2s - 6 = 30

2s = 30 + 6

2s = 36

s = 36/2

s = 18

10. Complete the table and find the value of 'k' for which 'k/3' gives 5.

k	3	6	9	12	15	18
$\dfrac{k}{3}$	1	2				

Ans:

K	3	6	9	12	15	18
$\dfrac{k}{3}$	1	2	3	4	5	6

$\dfrac{k}{3} = 5$

k = 15

Objective Type Questions

11. Variable means that it

a) can take only a few values   b) has a fixed value

c) can take different values   d) can take only 8 values

Ans: c) can take different values

12. The number of days in 'w' weeks is

a) 30+w   b) 30w   c) 7+w   d) 7w   **Ans: d) 7 w**

13. The value of 'x' in the circle is
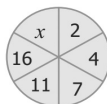
a) 6   b) 8   c) 21   d) 22   **Ans: d) 22**

14. The value of 'y' in y + 7 = 13 is

a) y = 5   b) y = 6   c) $y = 7$ d) y = 8   **Ans: b) y = 6**

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15. 6 less to 'n' gives 8 is represented as

   a) n - 6 = 8   b) 6 - n = 8   c) 8 - n = 6   d) n - 8 = 6

                                                      Ans: a) n - 6 = 8

Exercise 2.2

Miscellaneous Practice Problems

1. Complete the following pattern.

9 - 1 =	**Ans:** 9 - 1 = 8
98 - 21 =	**Ans:** 98 - 21 = 77
987 - 321 =	**Ans:** 987 - 321 = 666
9876 - 4321 =	**Ans:** 9876 - 4321 = 5555
98765 – 54321 =	**Ans:** 98765 – 54321 = 44444
What comes next ?	**Ans:** 987654 - 654321 = 333333

2. A piece of wire is '12s' cm long. What will be the length of the side, if it is formed as

   (i)   an equilateral triangle   (ii) a square

   Ans: (i)   4s   (ii)   3s

3. Identify the value of the shapes and figures in the table given below and verify their addition horizontally and vertically.

★	☺	☺	★	= 30
★	★	△	△	= 36
★	△	☺	☺	=
★	☺	△	☺	=
= 32	=	=	=	=

Ans:

8	7	7	8	= 30
8	8	10	10	= 36
8	10	7	7	= 32
8	7	10	7	= 32
= 32	= 32	= 34	= 32	= 130

4. The table given below shows the results of the matches played by 8 teams in a kabaddi championship tournament.

Teams	A	B	C	D	E	F	G	H
Total Matches played	8	7	n	a	9	10	8	y

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Matches won	5	6	4	7	b	6	x	3
Matches lost	k	m	6	2	3	c	4	6

Find the value of all the variables in the table given above.

Ans: k = 3, m = 1, n = 10, a = 9, b = 6, c = 4, x = 4, y = 9

CHALLENGING PROBLEMS

5. **Gopal is 8 years younger to Karnan. If the sum of their ages is 30, how old is Karnan?**

   Ans: Let the age of Karnan be x years

   Gopal's age = $x - 8$

   Acc to the problem,

   $x + x - 8 = 30$

   $2x - 8 = 30$

   $2x = 30 + 8$

   $2x = 38$

   $x = \dfrac{38}{2}$

   $x = 19$

   Age of Karnan = 19 years

6. **The rectangles made of identical square blocks with varying lengths but having only two square blocks as width are given below**
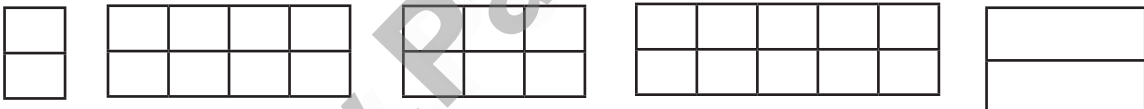
   P   Q   R   S   T

   (i) How many small size squares are there in each of the rectangles P,Q, R and S?

   (ii) Fill in the boxes.

Rectangle	P	Q	R	S	T
Number of small size squares along the breadth	2	2	?	2	2
Number of squares along the length	1	4	3	?	x
Total number of squares in rectangle	?	8	?	10	?

Ans: (i) P = 2; Q = 8; R = 6; S = 10

Rectangle	P	Q	R	S	T
Number of small size squares along the breadth	2	2	2	2	2

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Number of squares along the length	1	4	3	5	x
Total number of squares in rectangle	2	8	6	10	$2x$

7. **Find the variables from the clues given below and solve the cross-word puzzle.**

x			t		
		z			p
v			k		
			u		
		a		m	
	s				

Across	Down
$x + 40$ gives 100	x is 1005 multiplied by 6
7 reduced from t gives 31	$t \div 7 = 5$
z is 5 added 5 times	p is the predecessor of first 3 digit number
v is the whole number zero plus number of days in a Ordinary year	z is the number of weeks in a year (digits reversed)
k is 24 added to 25	k is 11 times 4
u is 2 added to two times 11 gives the number of hours in a day	u is product of 23 and 9
a is 20 more to 40	a is 4 added to the product of 12 and 5
s minus 1 gives 246 is the number of letters in Tamil language	m is the successor of 9

Ans:

x 6	0		t 3	8	
0		z 2	5		p 9
v 3	6	5		k 4	9
0			u 2	4	
		a 6	0		m 1
	s 2	4	7		0

❧✺❖❖❖✺❧

UNIT 3 — RATIO AND PROPORTION

SUMMARY

❖ A ratio is a comparison of two quantities by division.

❖ Ratios are often expressed as fractions in the simplest form.

❖ A ratio has no unit.

❖ Two quantities of a ratio should be in the same unit.

❖ Order of the terms in a ratio cannot be reversed.

Exercise 3.1

1. Fill in the blanks.

(i)   Ratio of ₹ 3 to ₹ 5 = _____.   **Ans: 3 : 5**

(ii) Ratio of 3m to 200cm = _____.   **Ans: 3 : 2**

(iii) Ratio of 5 km 400 m to 6 km = _____.   **Ans: 9 : 10**

(iv) Ratio of 75 paise to ₹ 2 = _____.   **Ans: 3 : 8**

2. Say whether the following statements are True or False.

(i)   The ratio of 130 cm to 1 m is 13 : 10.   **Ans: True**

(ii) One of the terms in a ratio cannot be 1.   **Ans: False**

3. Find the simplified form of the following ratios.

(i) 15 : 20   (ii) 32 : 24   (iii) 7 : 15   (iv) 12 : 27   (v) 75 : 100

Ans:

(i) $15 : 20 = \dfrac{15}{20} = \dfrac{3}{4} = 3:4$ **(ii)** $32 : 24 = \dfrac{32}{24} = \dfrac{4}{3} = 4 : 3$

(iii) 7 : 15

(iv) $12 : 27 = \dfrac{12}{27} = 4 : 9$ **(v)** $75 : 100 = \dfrac{75}{100} = 3 : 4$

4. Akilan walks 10 km in an hour while Selvi walks 6 km in an hour. Find the simplest ratio of the distance covered by Akilan to that of Selvi.

Ans: Ratio of the distance covered by Akilan to that of Selvi = 10 km : 6 km

$$= \dfrac{10}{6} = \dfrac{5}{3} = 5 : 3$$

5. **The cost of parking a bicycle is ₹5 and the cost of parking a scooter is ₹15. Find the simplest ratio of the parking cost of a bicycle to that of a scooter.**

   Ans: Ratio of the parking cost of a bicycle to that of a scooter = Rs 5 : Rs 15

$$= \frac{5}{15} = \frac{1}{3} = 1 : 3$$

6. **Out of 50 students in a class, 30 are boys. Find the ratio of**
    (i)   number of boys to the number of girls.
    (ii) number of girls to the total number of students.
    (iii) number of boys to the total number of students.

   Ans: Total no of students = 50
           No of boys = 30
           No of girls = 50 – 30 = 20

   (i) Ratio of boys to girls = 30 : 20 = $\frac{30}{20}$ = $\frac{3}{2}$ = 3 : 2

   (ii) Ratio of girls to the total no of students = 20 : 50 = $\frac{20}{50}$ = $\frac{2}{5}$ = 2 : 5

   (iii) Ratio of boys to the total no of students = 30 : 50 = $\frac{30}{50}$ = $\frac{3}{5}$ = 3 : 5

Objective Type Questions

7. **The ratio of ₹ 1 to 20 paise is _____**
    a) 1 : 5   b) 1 : 2   c) 2 : 1   d) 5 : 1   **Ans: d) 5 : 1**

8. **The ratio of 1 l to 50 ml is _____**
    a) 1 : 5   b) 1 : 20   c) 20 : 1   d) 5 : 1   **Ans: c) 20 : 1**

9. **The length and breadth of a window are in 1 m and 70 cm respectively. The ratio of the length to the breadth is _____**
    a) 1 : 7   b) 7 : 1   c) 7 : 10   d) 10 : 7   **Ans: d) 10 : 7**

10. **The ratio of the number of sides of a triangle to the number of sides of a rectangle is**
    a) 4 : 3   b) 3 : 4   c) 3 : 5   d) 3 : 2   **Ans: b) 3 : 4**

11. **If Azhagan is 50 years old and his son is 10 years old then the simplest ratio between the age of Azhagan to his son is**
    a) 10 : 50   b) 50 : 10   c) 5 : 1   d) 1 : 5   **Ans: c) 5 : 1**

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SUMMARY

❖ To get an equivalent ratio, multiply or divide the numerator and denominator by the same number.

Exercise 3.2

1. **Fill in the blanks for the given equivalent ratios.**

   (i) 3 : 5 = 9 : ___   (ii) 4 : 5 = ___ : 10   (iii) 6 : ___ = 1 : 2

   Ans: (i) 3 : 5 = 9 : x   **(ii) 4 : 5 = x : 10**   **(iii) 6 : ___ = 1 : 2**

   $$\frac{3}{5} = \frac{9}{x}$$ $$\frac{4}{5} = \frac{x}{10}$$

   $3 \times x = 9 \times 5$ $5 \times x = 4 \times 10$ 6 : x = 1 : 2

   $x = \dfrac{9 \times 5}{3}$ $x = \dfrac{4 \times 10}{5}$ $\dfrac{6}{x} = \dfrac{1}{2}$

   x = 15 $x = \dfrac{4 \times 10}{5}$ $1 \times x = 6 \times 2$

   3 : 5 = 9 : 15 $x = 8$ $x = 12$

                         4 : 5 = 8 : 10   6 : 12 = 1 : 2

2. **Complete the table.**

   (i)

Feet	1	2	3	?
Inch	12	24	?	72

   (ii)

Days	28	21	?	63
Weeks	4	3	2	?

   Ans: (i) 1 feet = 12 inches

        3 feet = 3×12 inches = 36 inches

      72 inches = 6×12 inches = 6 feet

   (ii) 1 week = 7 days

       2 weeks = 2×7 days = 14 days

     63 days = 9×7 days = 9 weeks

3. **Say True or False.**

   (i) 5 : 7 is equivalent to 21 : 15.   **Ans: False**

   (ii) If 40 is divided in the ratio 3 : 2, then the larger part is 24.   **Ans: True**

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4. Give two equivalent ratios for each of the following.

(i) 3 : 2   (ii) 1 : 6   (iii) 5 : 4

(i) $3 : 2 = \dfrac{3}{2} = \dfrac{3 \times 2}{2 \times 2} = \dfrac{3 \times 3}{2 \times 3}$

$$\dfrac{3}{2} = \dfrac{6}{4} = \dfrac{9}{6}$$

$$3 : 2 = 6 : 4 = 9 : 6$$

(ii) $1 : 6 = \dfrac{1}{6} = \dfrac{1 \times 2}{6 \times 2} = \dfrac{1 \times 3}{6 \times 3}$

$$\dfrac{1}{6} = \dfrac{2}{12} = \dfrac{3}{18}$$

$$1 : 6 = 2 : 12 = 3 : 18$$

(iii) $5 : 4 = \dfrac{5}{4} = \dfrac{5 \times 2}{4 \times 2} = \dfrac{5 \times 3}{4 \times 3}$

$$\dfrac{5}{4} = \dfrac{10}{8} = \dfrac{15}{12}$$

$$5 : 4 = 10 : 8 = 15 : 12$$

5. Which of the two ratios is larger?

(i) 4 : 5 or 8 : 15   (ii) 3 : 4 or 7 : 8   (iii) 1 : 2 or 2 : 1

(i) 4 : 5 (or) 8 : 15

$$4 : 5 = \dfrac{4}{5}$$

$$8 : 15 = \dfrac{8}{15}$$

$$\dfrac{4 \times 15}{5 \times 15} = \dfrac{60}{75}$$

$$\dfrac{8 \times 5}{15 \times 5} = \dfrac{40}{75}$$

$$\dfrac{60}{75} > \dfrac{40}{75}$$

$$\dfrac{4}{5} > \dfrac{8}{15} \qquad 4 : 5 > 8 : 15$$

(ii) 3 : 4 (or) 7 : 8

$$3 : 4 = \dfrac{3}{4}$$

$$7 : 8 = \dfrac{7}{8}$$

$$\dfrac{3 \times 8}{4 \times 8} = \dfrac{24}{32}$$

$$\dfrac{7 \times 4}{8 \times 4} = \dfrac{28}{32}$$

$$\dfrac{28}{32} > \dfrac{24}{32}$$

$$\dfrac{7}{8} > \dfrac{3}{4}$$

$$7 : 8 > 3 : 4$$

(iii) 1 : 2 (or) 2 : 1

$$1 : 2 = \dfrac{1}{2}$$

$$2 : 1 = \dfrac{2}{1}$$

$$= 2$$

$$\dfrac{2}{1} > \dfrac{1}{2}$$

$$2 : 1 > 1 : 2$$

6. Divide the numbers given below in the required ratio.

(i) 20 in the ratio 3 : 2   (ii) 27 in the ratio 4 : 5   (iii) 40 in the ratio 6 : 14

(i) Ratio = 3 : 2

Sum of the ratio = 3 + 2 = 5

5 parts = 20

1 part = $\frac{20}{5}$ = 4

3 parts = 3×4 = 12

2 parts = 2×4 = 8

20 can be divided in the form as 12, 8

(ii) Ratio = 4 : 5

Sum of the ratio = 4 + 5 = 9

9 parts = 27

1 part = $\frac{27}{9}$ = 3

4 parts = 4×3 = 12

5 parts = 5×3 = 15

27 can be divided in the form as 12, 15

(iii) 40 in the ratio 6 : 14

Ratio = 6 : 14

Sum of the ratio = 6 + 14 = 20

20 parts = 40

1 part = $\frac{40}{20}$ = 2

6 parts = 2×6 = 12

14 parts = 2×14 = 28

40 can be divided in the form as 12, 28

7. **In a family, the amount spent in a month for buying Provisions and Vegetables are in the ratio 3 : 2. If the allotted amount is ₹ 4000, then what will be the amount spent for (i) Provisions and (ii) Vegetables?**

Ans: Allotted amount = Rs 4000

Ratio = 3 : 2

Sum of the ratio = 3 + 2 = 5

5 parts = Rs 4000

1 part = Rs $\frac{4000}{5}$ = Rs 800

Provisions : Vegetables = 3 : 2

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3 parts = $3 \times$ Rs 800 = Rs 2400

2 parts = $2 \times$ Rs 800 = Rs 1600

Amount spent for provisions = Rs 2400

Amount spent for vegetables = Rs 1600

8. A line segment 63 cm long is to be divided into two parts in the ratio 3 : 4. Find the length of each part.

Ans: Total length = 63 cm

Ratio = 3 : 4

Sum of the ratio = 3 + 4 = 7

7 parts = 63 cm

1 part = $\dfrac{63}{7}$ = 9 cm

3 parts = 3×9 cm = 27 cm

4 parts = 4×9 cm = 36 cm

∴ 63 cm can be divided into the parts as 27 cm and 36 cm.

Objective Type Questions

9. If 2 : 3 and 4 : --- are equivalent ratios, then the missing term is

a) 6   b) 2   c) 4   d) 3   **Ans: a) 6**

10. An equivalent ratio of 4 : 7 is

a) 1 : 3   b) 8 : 15   c) 14 : 8   d) 12 : 21   **Ans: d) 12 : 21**

11. Which is not an equivalent ratio of $\dfrac{16}{24}$?

a) $\dfrac{6}{9}$ b) $\dfrac{12}{18}$ c) $\dfrac{10}{15}$ d) $\dfrac{20}{28}$ **Ans: d) $\dfrac{20}{28}$**

12. If ₹ 1600 is divided among A and B in the ratio 3 : 5 then, B's share is _____.

a) ₹480   b) ₹800   c) ₹1000   d) ₹200   **Ans: c) ₹1000**

SUMMARY

❖ When two ratios are equal, they are said to be in proportion.

❖ The proportionality law states that the product of the extremes is equal to the product of the means.

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Exercise 3.3

1. Fill in the boxes.

(i)　3 : 5 : : ☐ : 20　　　　　　　　　　　　　　　　　**Ans: 12**

(ii)　☐ : 24 : : 3 : 8　　　　　　　　　　　　　　　　　**Ans: 9**

(iii)　5 : ☐ : :10 : 8 : : 15 : ☐　　　　　　　　　　　　**Ans: 4, 12**

(iv)　12 : ☐ = ☐ : 4 = 8 : 16　　　　　　　　　　　　**Ans: 24, 2**

2.　Say True or False.

(i)　7 Persons is to 49 Persons as 11 kg is to 88 kg　　　　**Ans: False**

(ii)　10 books is to 15 books as 3 books is to 15 books　　**Ans: False**

(iii)　If the weight of 40 books is 8 kg, then the weight of 15 books is 3 kg.　**Ans: True**

(iv)　A car travels 90 km in 3 hours with constant speed. It will travel 140 km in 5 hours at the same speed.　　　　　　　　　　　　　　　　　**Ans: False**

3.　Fill in the blanks.

(i)　If the cost of 3 pens is ₹ 18, then the cost of 5 pens is_____.　**Ans: ₹. 30**

(ii)　If Karkuzhali earns ₹ 1800 in 15 days, then she earns ₹ 3000 in __days.　**Ans: 25**

4.　Find whether 12, 24, 18, 36 are in order that can be expressed as two ratios that are in proportion.

Ans: Yes, they are in proportion

12 : 24 = 18 : 36

$\dfrac{12}{24} = \dfrac{1}{2}$　Product of means = 24×18 = 432

$\dfrac{18}{36} = \dfrac{1}{2}$　Product of extremes = 12×36 = 432

Hence $a×d = b×c$

5.　Write the mean and extreme terms in the following ratios and check whether they are in proportion.

(i)　78 litre is to 130 litre and 12 bottles is to 20 bottles

(ii)　400 gm is to 50 gm and 25 rupees is to 625 rupees

Ans:　**(i) 78 : 130, 12 : 20**

Product of the means = 78×20 = 1560

Product of the extremes = 130×12 = 1560

$a×d = b×c$ ∴ They are in proportion

(ii) 400 : 50, 25 : 625

Product of the extremes $= 400 \times 625 = 250000$

Product of the means $= 50 \times 25 = 1250$

$a \times d \neq b \times c$ ∴ They are not in proportion

6. **The America's famous Golden Gate bridge is 6480 ft long with 756 ft tall towers. A model of this bridge exhibited in a fair is 60 ft long with 7 ft tall towers. Is the model in proportion to the original bridge?**

   Ans:

   6480 : 756, 60 : 7

   Product of the means $= 756 \times 60 = 45360$

   Product of the extremes $= 6480 \times 7 = 45360$

   ad = bc

   ∴ They are in proportion

7. **If a person reads 20 pages of a book in 2 hours, how many pages will he read in 8 hours at the same speed?**

   Ans: In 2 hours, pages read = 20

   In 1 hour, pages read $= \dfrac{20}{2} = 10$

   In 8 hours, pages read $= 10 \times 8 = 80$ pages

8. **Cholan walks 6 km in 1 hour at constant speed. Find the distance covered by him in 20 minutes at the same speed.**

   Ans: In 1 hour (60 minutes), distance covered = 6 km

   In 1 minute, distance covered $= \dfrac{6 \text{ km}}{60 \text{ min}} = \dfrac{6000m}{60} = 100\text{m}$

   In 20 minutes, distance covered $= 20 \times 100m = 2000\text{m} = 2$ km

9. **The number of correct answers given by Kaarmugilan and Kavitha in a quiz competition are in the ratio 10 : 11. If they had scored a total of 84 points in the competition, then how many points did Kavitha get?**

   Ans: Total points scored = 84

   Ratio = 10 : 11

   Sum of the ratio = 10 + 11 = 21

   21 parts = 84 points

   1 part $= \dfrac{84}{21} = 4$ points

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Kavitha = 11 parts

Kaarmugilan = 10 parts

Points scored by Kavitha = 11 parts = 11×4 points = 44 points

10. **Karmegan made 54 runs in 9 overs and Asif made 77 runs in 11 overs. Whose run rate is better? (run rate = ratio of runs to overs)**

    Ans: Karmegam

    Runs made in 9 overs = 54

    Runs made in 1 over = $\dfrac{54}{9}$ = 6 runs

    Asif

    Runs made in 11 overs = 77

    Runs made in 1 over = $\dfrac{77}{11}$ = 7 runs

    ∴ Asif's run rate is better than Karmegam

11. **You purchase 6 apples for ₹ 90 and your friend purchases 5 apples for ₹ 70. Whose purchase is better?**

    Ans: Myself

    Cost of 6 apples = Rs 90

    Cost of 1 apple = $\dfrac{Rs\ 90}{6}$ = Rs 15

    Friend's purchase

    Cost of 5 apples = Rs 70

    Cost of 1 apple = $\dfrac{70}{5}$ = Rs 14

    ∴ Friend's purchase is better than myself

Objective Type Questions

12. **Which of the following ratios are in proportion?**
    a) 3 : 5, 6 : 11   b) 2 : 3, 9 : 6   c) 2 : 5, 10 : 25   d) 3 : 1, 1 : 3   **Ans: c) 2 : 5, 10 : 25**

13. **If the ratios formed using the numbers 2, 5, x, 20 in the same order are in proportion, then 'x' is**
    a) 50   b) 4   c) 10   d) 8   **Ans: d) 8**

14. **If 7 : 5 is in proportion to x : 25, then 'x' is**
    a) 27   b) 49   c) 35   d) 14   **Ans: c) 35**

15. **If a Barbie doll costs ₹ 90, then the cost of 3 such dolls is ₹ _____.**
    a) 260   b) 270   c) 30   d) 93   **Ans: b) 270**

16. **If a man walks 2 km in 15 minutes, then he will walk _____ km in 45 minutes.**

    a) 10   b) 8   c) 6   d) 12   **Ans: c) 6**

Exercise 3.4

MISCELLANEOUS PRACTICE PROBLEMS

1. **The maximum speed of some of the animals are given below:**
the Elephant = 20 km/h; the Lion = 80 km/h; the Cheetah = 100 km/h

Find the following ratios of their speeds in simplified form and find which ratio is the least?

(i) the Elephant and the Lion   (ii) the Lion and the Cheetah

(iii) the Elephant and the Cheetah

Ans: (i) The Elephant : the Lion

$$= 20 : 80 = \frac{20}{80} = \frac{1}{4} = 1 : 4$$

(ii) the Lion : the Cheetah

$$= 80 : 100 = \frac{80}{100} = \frac{4}{5} = 4 : 5$$

(iii) the Elephant : the Cheetah

$$= 20 : 100 = \frac{20}{100} = \frac{1}{5} = 1 : 5$$

The ratio of Elephant to Cheetah is the least

2. **A particular high school has 1500 students 50 teachers and 5 administrators. If the school grows to 1800 students and the ratios are maintained, then find the number of teachers and administrators.**

Ans:

Administrators : teachers : students

    = 5 : 50 : 1500 = 1 : 10 : 300

If the school grows to 1800 students then 10 parts = teachers

1 part = administrators

300 parts = 1800

$$1 \text{ part} = \frac{1800}{300} = 6$$

10 parts = $6 \times 10 = 60$

So, if the school grows to 1800 students the new ratio is administrators : teachers : students 6 : 60 : 1800

3. **I have a box which has 3 green, 9 blue, 4 yellow, 8 orange coloured cubes in it.**

   (a)   What is the ratio of orange to yellow cubes?

   (b)   What is the ratio of green to blue cubes?

   (c)   How many different ratios can be formed, when you compare each colour to anyone of the other colours?
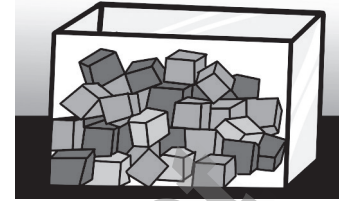
Ans:

(i)   orange : Yellow = 8 : 4 = 2 : 1

(ii)   green : blue = 3 : 9 = 1 : 3

(iii) green : orange = 3 : 8   orange : green = 8 : 3

        blue : orange = 9 : 8   orange : blue = 8 : 9

        green : yellow = 3 : 4   yellow : green = 4 : 3

        blue : yellow = 9 : 4   yellow : blue = 4 : 9

        green : blue = 3 : 9 = 1 : 3   blue : green = 9 : 3 = 3 : 1

        yellow : orange = 4 : 8 = 1 : 2   orange : yellow = 8 : 4 = 2 : 1

4. **A gets double of what B gets and B gets double of what C gets. Find A : B and B : C and verify whether the result is in proportion or not.**

   Ans:

A : B = 2 : 1

B : C = 2 : 1

They are in proportion

5. **The ingredients required for the preparation of Ragi Kali, a healthy dish of Tamilnadu is given below.**

Ingredients	Quantity
Ragi flour	4 cups
Raw rice broken	1 cup
Water	8 cups
Sesame oil	15 ml
Salt	10 mg

   (a)   If one cup of ragi flour is used then, what would be the amount of raw rice required?

   (b)   If 16 cups of water is used, then how much of ragi flour should be used?

(c) Which of these ingredients cannot be expressed as a ratio? Why?

Ans: (i) $\frac{1}{4}$ cup

(ii) 8 cups

(iii) Ragi flour, Raw rice and water are in one unit. Sesame oil and salt are in different units. These different units cannot be compared and cannot be expressed as a ratio because the two quantities of a ratio should be in the same unit.

CHALLENGING PROBLEMS

6. **Antony brushes his teeth in the morning and night on all days in a week. Shabeen brushes her teeth only in the morning. What is the ratio of the number of times they brush their teeth in a week?**

   Ans: Number of times = 14 : 7 = 2 : 1

7. **Thirumagal's mother wears a bracelet made of 35 red beads and 30 blue beads. Thirumagal wants to make smaller bracelets using the same two coloured beads in the same ratio. In how many different ways can she make the bracelets?**

   Ans: Red : blue = 35 : 30 = 7 : 6

   Different ways (i) 7 : 6

   (ii) 14 : 12; (iii) 21 : 18; (iv) 28 : 24

8. **Team A wins 26 matches out of 52 matches. Team B wins three-fourth of 52 matches played. Which team has a better winning record?**

   Ans:

   Team A = $\frac{26}{52}$ = $\frac{1}{2}$

   Team B = $\frac{3}{4} \times 52$ = $\frac{3}{4} \times 52$ = 39

   Team B has a better winning record

9. **In a school excursion, 6 teachers and 12 students from 6th standard and 9 teachers and 27 students from 7th standard, 4 teachers and 16 students from 8th standard took part. Which class has the least teacher to student ratio?**

   Ans: *Std VI* - teachers : students = 6 : 12 = 1 : 2

   ***Std VII* -** teachers : students = 9 : 27 = 1 : 3

   ***Std VIII* -** teachers : students = 4 : 16 = 1 : 4

   Std VIII has the least ratio

10. Fill the boxes using any set of suitable numbers 6 : ☐ : : ☐ : 15.

    Ans: $6 : \_\_\_\_ = \_\_\_\_ : 15$

        Product of the extremes $= 6 \times 15 = 90$

        Set of suitable numbers

        1 and 90, 2 and 45, 3 and 30, 5 and 18, 6 and 15

11. From your school diary, write the ratio of the number of holidays to the number of working days in the current academic year.

    Ans: Number of holidays $= 145$

        Number of working days $= 220$

        Holidays : working days $= 145 : 220 = \dfrac{145}{220} = \dfrac{29}{44} = 29 : 44$

12. If the ratio of Green, Yellow and Black balls in a bag is 4 : 3 : 5, then

    (a)   Which is the most likely ball that you can choose from the bag?

    (b)   How many balls in total are there in the bag if you have 40 black balls in it?

    (c)   Find the number of green and yellow balls in the bag.

    Ans: Green : Yellow : Black $= 4 : 3 : 5$

    (i)   Black balls;   **(ii)** 96 balls (32+24+40);   **(iii)** green balls = 32

    yellow balls = 24

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