

Learning objectives

6.1 Pictograph

6.2 Bar Graph

6.1 PICTOGRAPH

A given information can be represented using pictures or symbols known as pictorial representation of data or pictographs. By reading them, we can get a clear and quick grasp of the information. Here are few examples of the type of data that can be collected:

- Number of vehicles in a parking lot.
- Number of books in a library.
- Number of different types of fruits in a shop.
- Number of different colours of candies in a box.
- Number of trees planted in a city.
- Number of students in different schools.

After collecting the data, the pictograph can be drawn by actual pictures of the objects or any convenient picture symbols.

**Olympiad Bite**

- Each picture in a pictograph can represent 1, 2, 3, 4, 5, 10, 20 or any convenient number of objects.
- The pictograph may be drawn horizontally or vertically.

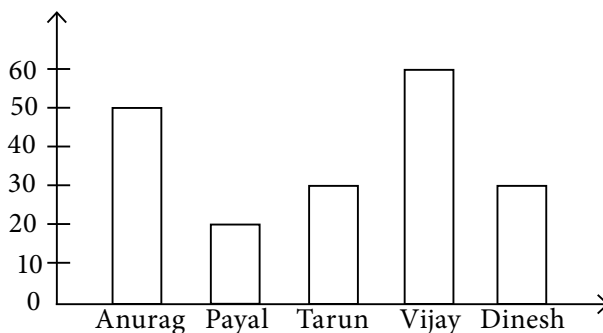
6.2 BAR GRAPH

A bar graph is another graphical method to represent the data. In bar graph, bars are used to show comparisons and how large each value is.

For example : The given bar graph shows the number of plants planted by 5 children.

**Olympiad Bite**

The bars can be horizontal or vertical.



From the given graph we can tell the number of plants planted. Also, we compare who planted maximum and minimum plants.

EXERCISE

Direction (1-3) : The given pictograph shows the record of the sale of mangoes during a week by a fruit seller. Study the graph carefully and answer the following questions.

Days	Number of mangoes sold
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Each represents 4 mangoes.	

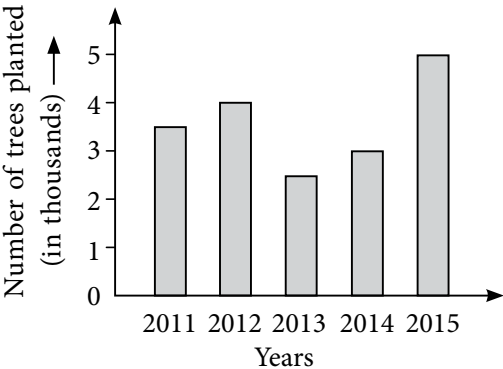
1. How many more mangoes were sold on Wednesday than on Thursday?

(A) 1 (B) 4
(C) 8 (D) 12
2. What fraction of the mangoes were sold on Friday to the total number of mangoes sold?

(A) $\frac{3}{26}$ (B) $\frac{7}{26}$
(C) $\frac{5}{54}$ (D) $\frac{7}{29}$
3. If the cost of each mango is ₹ 8, then how much did the fruit seller earned in the whole week?

(A) ₹ 152 (B) ₹ 250
(C) ₹ 208 (D) ₹ 832

Direction (4-6) : The given bar graph represent the number of trees planted in a city in the given five years. Study it carefully and answer the following questions.



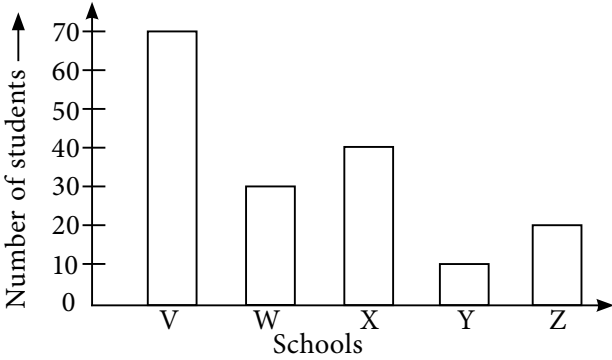
4. In which year the maximum number of trees planted ?

(A) 2013 (B) 2015
(C) 2012 (D) 2014
5. Number of trees planted in the year 2012 and 2015 together is _____.

(A) 900 (B) 5000
(C) 9000 (D) 8000
6. It was found that number of trees planted in the year 2012 and 2013 were interchanged while making the bar graph, if correct bar graph will be formed, then _____.

(A) Number of trees planted in 2013 is decrease by 1000.
(B) Number of trees planted in 2012 is increased by 1000.
(C) Number of trees planted in 2013 is increased by 1500.
(D) Number of trees planted in 2012 is decreased by 2000.

Direction (7-8) : Study the given graph showing the number of students who took part in swimming competition from different schools and answer the following questions.









7. How many more students will take part in the competition from school X to make it equal to the number of students who took part from school V.

- (A) 30 (B) 26
(C) 27 (D) 40

8. Which school has least number of students who took part in swimming competition?

- (A) W (B) X
(C) Y (D) Z

Direction (9-11) : The given pictograph shows the different types of vehicles in a society. Study the graph and answer the following questions.

Vehicles	Number of vehicles
Car	
Bus	
Motorcycle	
Scooter	
Bicycle	
Each  represents 20 vehicles.	

9. There are _____ fewer scooters than cars in the society.

- (A) 0 (B) 20
(C) 40 (D) 60

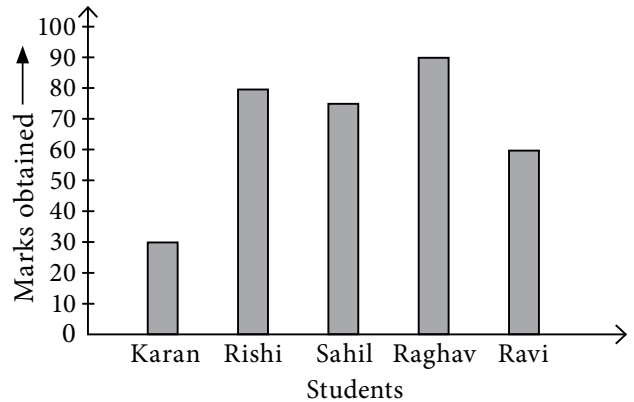
10. The number of buses are _____ the number of bicycles in the society.

- (A) Half (B) Twice
(C) Same as (D) Thrice

11. What is the difference between the number of motorcycles and bicycles together and the number of buses in the society?

- (A) 150 (B) 200
(C) 300 (D) 60

Direction (12-15) : The given bar graph shows the number of marks obtained by five students (out of 100) in Mathematics. Study it carefully and answer the following questions.



12. How many more marks Rishi obtained than Ravi?

- (A) 80 (B) 20
(C) 60 (D) 50

13. If passing marks were 40, then how much more marks Karan have to obtain to pass the examination?

- (A) 50 (B) 20
(C) 30 (D) 10

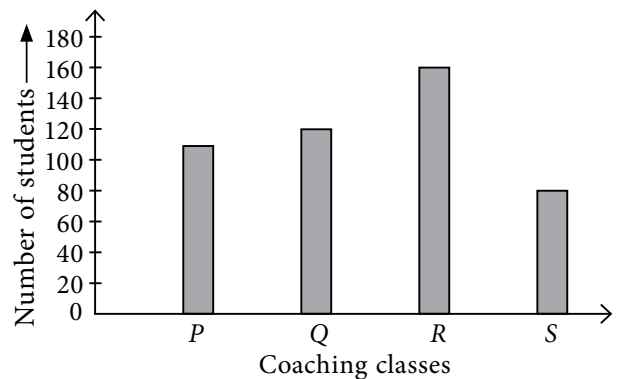
14. Who obtained $1\frac{1}{2}$ times the marks obtained by Ravi?

- (A) Rishi (B) Karan
(C) Raghav (D) Sahil

15. How many students obtained more than 70 marks?

- (A) 2 (B) 3
(C) 4 (D) 1

Direction (16-18) : The given graph shows the number of students enrolled in four coaching classes. Study it carefully and answer the following questions.



16. Which coaching class has the highest enrollment of students?

- (A) P (B) Q
(C) R (D) S





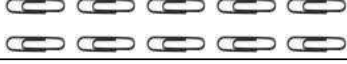

17. What would be the total number of students at coaching class P, if another 50 students enrolled in it?

- (A) 160 (B) 180
(C) 200 (D) 210

18. Find the fraction of number of students enrolled in coaching class Q to coaching class S.

- (A) $\frac{2}{3}$ (B) $\frac{3}{2}$
(C) $\frac{1}{2}$ (D) $\frac{3}{4}$

Direction (19-21) : Consider the given pictograph showing different items sold at a stationery shop in a day. Study it carefully and answer the following questions.

Items	Quantities sold
Pencil	
Eraser	
Notebook	
Ruler	
Pen	
Each  represents 5 items.	

19. Which item was sold the most?

- (A) Eraser (B) Pen
(C) Pencil (D) Notebook

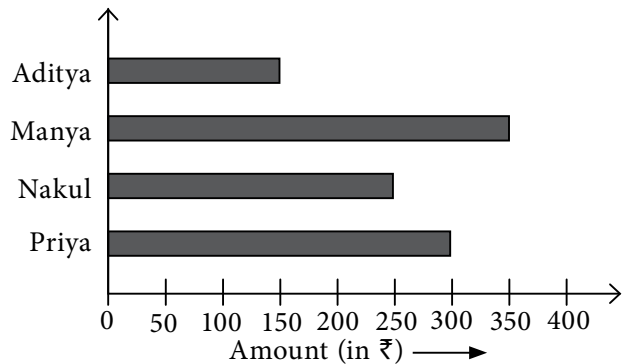
20. How many more pencils and notebooks altogether were sold than erasers and rulers altogether?

- (A) 40 (B) 80
(C) 30 (D) 50

21. If cost of 1 notebook, 1 eraser and 1 pen are ₹ 20, ₹ 5 and ₹ 10 respectively, then the total amount earned from the sale of these items is _____.

- (A) ₹ 1650 (B) ₹ 1820
(C) ₹ 1200 (D) ₹ 1525

Direction (22-24) : The given bar graph shows the savings of four friends. Study the graph carefully and answer the following questions.



22. How much less money did Nakul saved than Manya?

- (A) ₹ 100 (B) ₹ 150
(C) ₹ 200 (D) ₹ 50







23. If Priya gave ₹ 50 from her saving to Aditya, then how much money Aditya had now?

- (A) ₹ 150 (B) ₹ 250
(C) ₹ 300 (D) ₹ 200

24. What is the total amount of money did all the four friends saved?

- (A) ₹ 900 (B) ₹ 1050
(C) ₹ 850 (D) ₹ 1200

Direction (25-27) : The given pictograph shows the number of different animals in a zoo. Study the pictograph carefully and answer the following questions.

Animals	Number of animals
Tiger	
Horse	
Monkey	
Deer	
Elephant	
Each  represents 7 animals.	

25. Find the total number of legs of all the given animals.

- (A) 266 (B) 416
(C) 532 (D) 370

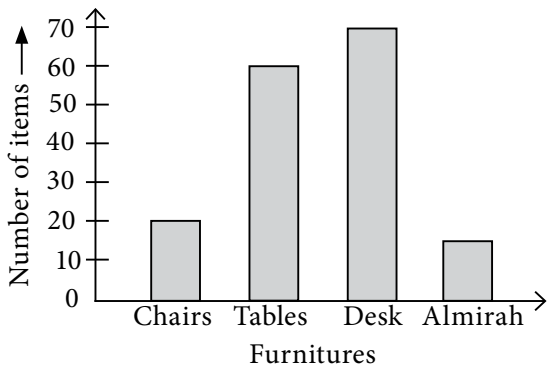
26. How many less monkeys were there than the elephants?

- (A) 15 (B) 8
(C) 1 (D) 7

27. Find the total number of Horses and Deer together.

- (A) 35 (B) 30
(C) 28 (D) 42

Direction (28-30) : The given bar graph shows the number of different types of furnitures a school have. Study it carefully and answer the following questions.



28. If a table costs ₹ 350, then find the total cost of all the tables.

- (A) ₹ 20000 (B) ₹ 15000
(C) ₹ 21000 (D) ₹ 30000

29. The weight of a chair is 3500 g. Find the weight of all chairs, if each chair has equal weight.

- (A) 70 kg (B) 50 kg
(C) 45 kg 500 g (D) 60 kg 500 g

30. How many more desks are there than the almirahs?

- (A) 50 (B) 45
(C) 55 (D) 35

Achievers Section (HOTS)

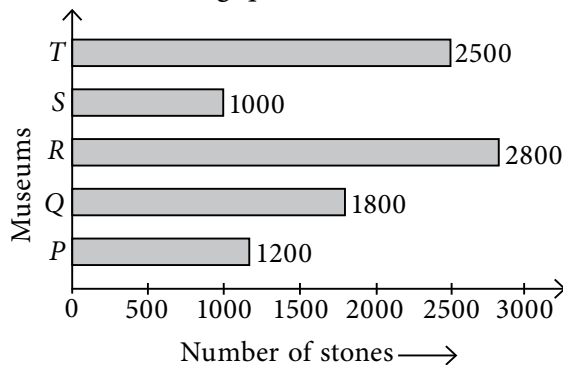
31. The given pictograph shows the number of bolts produced by a factory in four days.

Days	Number of bolts produced
Monday	
Tuesday	
Wednesday	
Thursday	
Each represents 1500 bolts.	

If the total number of bolts produced in four days is 18000, then find the number of for Thursday.

- (A) 3 (B) 5
(C) 4 (D) 2

32. The bar graph given below shows the number of stones 5 museums have. Study it carefully and answer the following questions.



- (i) What fraction of stones Museum R has to the total number of stones?
(ii) The difference between the total number of stones Museum S and T together have and Museum P and Q together have is _____.

- (i) (ii)
(A) $\frac{28}{93}$ 500
(B) $\frac{5}{41}$ 500
(C) $\frac{26}{93}$ 200
(D) $\frac{28}{93}$ 250







33. The given pictograph shows the hobby of some children of class IV. Study it carefully and answer the question that follows.

Hobbies of children	
Reading	
Painting	
Stamp collection	
Art and craft	
Each represents 2 children.	

- (i) Which of the following hobbies is the hobby of 6 children?
 (ii) How many children have art and craft as a hobby?

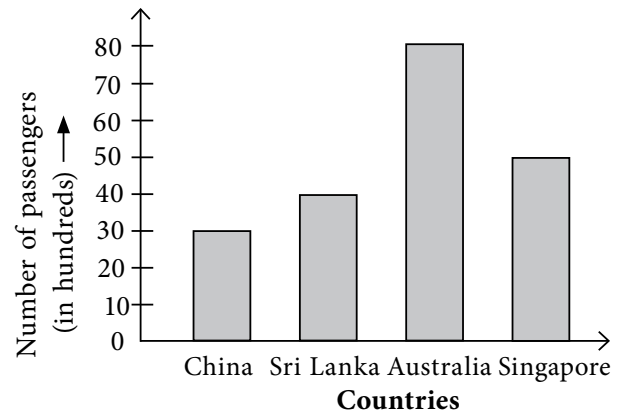
	(i)	(ii)
(A) Reading		8
(B) Painting		12
(C) Stamp collection	8	
(D) Art and Craft	6	

34. The given pictograph shows the number of cakes baked by a bakery on the given five days. Study it carefully and answer the following questions.

Days	Number of cakes
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Each  represents 10 cakes.	

- (i) How many less cakes were baked on Thursday than on Monday and Wednesday together?
 (ii) If $\left(\frac{1}{5}\right)$ of the total cakes baked on all the given five days were sold, then how many cakes were left?
- | | |
|--------|------|
| (i) | (ii) |
| (A) 70 | 290 |
| (B) 56 | 264 |
| (C) 70 | 256 |
| (D) 56 | 270 |

35. Consider the given graph showing the number of passengers boarded plane to travel to different countries in a year and answer the following question.

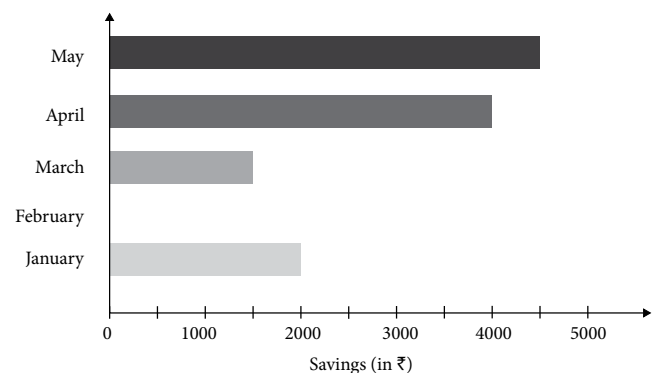


Which of the following options is CORRECT?

- (A) Total passengers travelled to Singapore and China together were 6000.
 (B) Number of passengers travelled to Australia were 2000 less than that to Singapore.
 (C) The fraction of passengers travelled to Sri Lanka to the total number of passengers travelled is $\frac{1}{5}$.
 (D) None of these

SOF IMO 2019 QUESTIONS

Direction (1-2) : The given bar graph shows Ravi's savings from January to May. Study the graph carefully and answer the following questions.



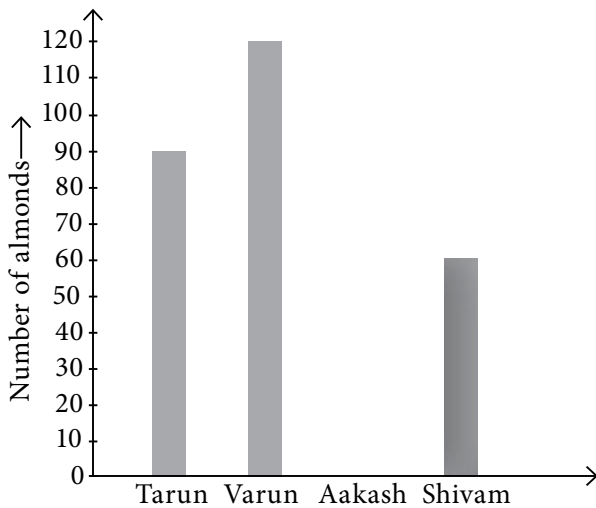
1. If Ravi saved a total of ₹ 15000 from January to May, then how much did he save in February?
 (A) ₹ 2500 (B) ₹ 2000
 (C) ₹ 3000 (D) ₹ 4500 (Level-1)

2. If Ravi spent $\left(\frac{1}{5}\right)^{\text{th}}$ of the amount of money he saved in April, then how much did he earn in that month?

- (A) ₹ 3200
- (B) ₹ 800
- (C) ₹ 4800
- (D) ₹ 4000

(Level-1)

3. The given bar graph shows the number of almonds eaten by four friends. Study the graph carefully and answer the following questions.



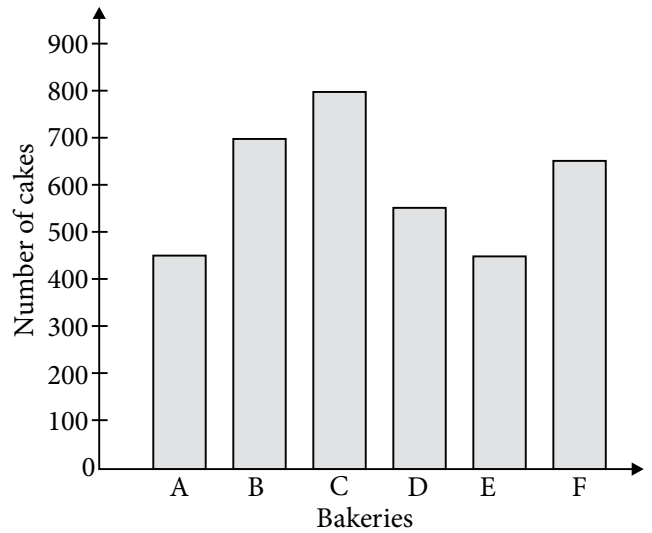
- (i) If total 300 almonds were eaten by four friends, then find the number of almonds eaten by Aakash.
- (ii) What fraction of the total almonds was eaten by Varun?

- (i)
- (A) 30
- (B) 25
- (C) 25
- (D) 30

- (ii)
- $\frac{3}{5}$
- $\frac{2}{5}$
- $\frac{1}{5}$
- $\frac{2}{5}$

(Level-1)

Direction (4-5): The given graph shows the number of cakes sold by 6 bakeries in November. Study the graph carefully and answer the following questions.



- 4. Which bakery sold 250 more cakes than Bakery A?
 - (A) B
 - (B) C
 - (C) D
 - (D) F

(Level-2)
- 5. How many more cakes did Bakery B sell than Bakery F?
 - (A) 50
 - (B) 100
 - (C) 150
 - (D) 200

(Level-2)

HINTS & EXPLANATIONS

SELF TEST - 1

(1-3):

Days	Number of apples
Monday	$4 \times 50 = 200$
Tuesday	$2 \times 50 = 100$
Wednesday	$6 \times 50 = 300$
Thursday	$6 \times 50 = 300$
Friday	$4 \times 50 = 200$
Saturday	$3 \times 50 = 150$
Sunday	$8 \times 50 = 400$

1. (B) : Number of apples sold on Friday = 200
 Number of apples sold on Tuesday = 100
 $\therefore 200 - 100 = 100$ more apples were sold on Friday than on Tuesday.

2. (A) : On Sunday, the sale was maximum.

3. (D) : Days on which sale was less than 200 were Tuesday and Saturday.

So, number of days on which the sale was less than 200 = 2

(4-5) :

Subjects	Number of students
Science	15
English	5
Mathematics	20
Hindi	10

4. (C) : Number of students who like Hindi = 10
 Number of students who like Mathematics = 20
 $\therefore 20 - 10 = 10$ less students like Hindi than Mathematics.

5. (B) : Number of students who like English = 5
 Total number of students = $15 + 5 + 20 + 10 = 50$

\therefore Required fraction = $\frac{5}{50} = \frac{1}{10}$

EXERCISE

(1-3) :

Days	Number of mangoes sold
Monday	$4 \times 4 = 16$
Tuesday	$6 \times 4 = 24$

Wednesday	$3 \times 4 = 12$
Thursday	$2 \times 4 = 8$
Friday	$7 \times 4 = 28$
Saturday	$3 \times 4 = 12$
Sunday	$1 \times 4 = 4$

1. (B) : $12 - 8 = 4$ more mangoes were sold on Wednesday than on Thursday.

2. (B) : Total number of mangoes sold = $16 + 24 + 12 + 8 + 28 + 12 + 4 = 104$

\therefore Required fraction = $\frac{28}{104} = \frac{7}{26}$

3. (D) : Cost of 1 mango = ₹ 8

\therefore Cost of 104 mangoes = ₹ $(8 \times 104) = ₹ 832$

4. (B) : The maximum number of trees were planted in 2015.

5. (C) : Number of trees planted in 2012 = 4000
 Number of trees planted in 2015 = 5000

\therefore Number of trees planted in the year 2012 and 2015 together = $4000 + 5000 = 9000$

6. (C) : Number of trees planted in wrong pictograph in 2012 = 4000

Number of trees planted in correct pictograph in 2012 = 2500

Number of trees planted in wrong pictograph in 2013 = 2500

Number of trees planted in correct pictograph in 2013 = 4000

So, in the correct pictograph number of trees planted in 2013 is increased by $4000 - 2500 = 1500$

(7-8) :

School	Number of students participated
V	70
W	30
X	40
Y	10
Z	20

7. (A) : $70 - 40 = 30$ more students will take part from school X to make it equal to school V.

8. (C)

(9-11):

Vehicles	Number of vehicles
Car	$4 \times 20 = 80$
Bus	$3 \times 20 = 60$
Motorcycle	$5 \times 20 = 100$
Scooter	$2 \times 20 = 40$
Bicycle	$1 \times 20 = 20$

9. (C) : There are $(80 - 40) = 40$ fewer scooters than cars in the society.

10. (D) : Since, $60 = 3 \times 20$

So, number of buses are thrice the number of bicycles in the society.

11. (D) : Number of motorcycles and bicycles together = $100 + 20 = 120$

So, required difference = $120 - 60 = 60$

(12-15) :

Students	Marks obtained
Karan	30
Rishi	80
Sahil	75
Raghav	90
Ravi	60

12. (B) : Rishi obtained $80 - 60 = 20$ more marks than Ravi.

13. (D) : More marks Karan have to obtain to pass the examination = $40 - 30 = 10$

14. (C) : Marks obtained by Ravi = 60

Now, $\left(1\frac{1}{2} \text{ of } 60\right) = \frac{3}{2} \times 60 = 90$

From the graph, we can see that

Marks obtained by Raghav = 90

15. (B) : Rishi, Sahil and Raghav obtained more than 70 marks.

16. (C)

17. (A) : Number of students enrolled in coaching class P = 110

After enrollment of another 50 students, number of students enrolled in coaching class P

$$= 110 + 50 = 160$$

18. (B) : Number of students enrolled in coaching class Q = 120

Number of students enrolled in coaching class S = 80

$$\therefore \text{Required fraction} = \frac{120}{80} = \frac{3}{2}$$

(19-21):

Items	Quantities sold
Pencil	$10 \times 5 = 50$
Eraser	$5 \times 5 = 25$
Notebook	$8 \times 5 = 40$
Ruler	$5 \times 5 = 25$
Pen	$12 \times 5 = 60$

19. (B) : Pen was sold the most.

20. (A) : Total quantity of pencils and notebooks sold together = $50 + 40 = 90$

Total quantity of erasers and rulers sold together = $25 + 25 = 50$

\therefore Required difference = $90 - 50 = 40$

21. (D) : Cost of 1 notebook = ₹ 20

\therefore Cost of 40 notebooks = ₹ $(20 \times 40) = ₹ 800$

Cost of 1 eraser = ₹ 5

\therefore Cost of 25 erasers = ₹ $(5 \times 25) = ₹ 125$

Cost of 1 pen = ₹ 10

\therefore Cost of 60 pens = ₹ $(10 \times 60) = ₹ 600$

So, total amount earned = ₹ $(800 + 125 + 600) = ₹ 1525$

22. (A) : Amount of money saved by Nakul = ₹ 250

Amount of money saved by Manya = ₹ 350

\therefore Nakul saved ₹ $(350 - 250) = ₹ 100$ less than Manya.

23. (D) : Amount of money Aditya saved = ₹ 150

After receiving ₹ 50 from Priya, amount of money he had now = ₹ $(150 + 50) = ₹ 200$

24. (B) : Total amount of money saved

= ₹ $(150 + 350 + 250 + 300) = ₹ 1050$

(25-27) :

Animals	Number of animals
Tiger	$5 \times 7 = 35$
Horse	$2 \times 7 = 14$
Monkey	$4 \times 7 = 28$
Deer	$3 \times 7 = 21$
Elephant	$5 \times 7 = 35$

25. (C) : Total number of animals = $35 + 14 + 28 + 21 + 35 = 133$

\therefore Total number of legs of all the animals
 $= 133 \times 4 = 532$

26. (D) : There were $35 - 28 = 7$ less monkeys than elephants.

27. (A) : Total number of horses and deer together
 $= 14 + 21 = 35$

28. (C) : Number of tables = 60

Cost of one table = ₹ 350

\therefore Cost of 60 tables = ₹ $350 \times 60 = ₹ 21000$

29. (A) : Number of chairs = 20

Weight of 1 chair = 3500 g

\therefore Weight of 20 chairs = (3500×20) g
 $= 70000$ g = 70 kg

30. (C) : Number of desks = 70

Number of almirahs = 15

\therefore There are $70 - 15 = 55$ more desks than the almirahs.

31. (D) :


Days	Number of bolts produced
Monday	$4 \times 1500 = 6000$
Tuesday	$3 \times 1500 = 4500$
Wednesday	$3 \times 1500 = 4500$
Thursday	

Since, total number of bolts produced = 18000

So, number of bolts produced on Thursday

$= 18000 - (6000 + 4500 + 4500)$

$= 18000 - 15000 = 3000$

As, each  stands for 1500 bolts.

So, number of  for Thursday = $3000 \div 1500 = 2$

32. (A) : Total number of stones = $1200 + 1800 + 2800 + 1000 + 2500 = 9300$

(i) Required fraction = $\frac{2800}{9300} = \frac{28}{93}$

(ii) Total number of stones Museum S and T together have = $1000 + 2500 = 3500$

Total number of stones Museum P and Q together have = $1200 + 1800 = 3000$

So, required difference = $3500 - 3000 = 500$

33. (C) :

Hobbies	Number of children
Reading	$6 \times 2 = 12$
Painting	$4 \times 2 = 8$
Stamp collection	$3 \times 2 = 6$
Art and craft	$4 \times 2 = 8$

(i) Stamp collection is the hobby of 6 children.

(ii) 8 children have art and craft as a hobby.

34. (C) :

Days	Number of cakes baked
Monday	$8 \times 10 = 80$
Tuesday	$3 \times 10 = 30$
Wednesday	$7 \times 10 = 70$
Thursday	$8 \times 10 = 80$
Friday	$6 \times 10 = 60$
Total	320

(i) Total number of cakes baked on Monday and Wednesday together = $80 + 70 = 150$

Number of cakes baked on Thursday = 80

\therefore Required difference = $150 - 80 = 70$

(ii) Total number of cakes baked on the given five days = 320

Now, $\frac{1}{5}$ of 320 = $320 \div 5 = 64$

So, 64 cakes were sold.

\therefore Number of cakes left = $320 - 64 = 256$

35. (C) :

Countries	Number of passengers travelled
China	$30 \times 100 = 3000$
Sri Lanka	$40 \times 100 = 4000$
Australia	$80 \times 100 = 8000$
Singapore	$50 \times 100 = 5000$
Total	20000

(A) Total passengers travelled to Singapore and China together = $5000 + 3000 = 8000$

(B) Number of passengers travelled to Australia were $8000 - 5000 = 3000$ less than that to Singapore.

(C) Fraction of passengers travelled Sri Lanka to

total number of passengers = $\frac{4000}{20000} = \frac{1}{5}$

SOF IMO 2019 QUESTIONS

1. (C): Total amount of money Ravi saved = ₹ 15000

Amount of money saved in January, March, April and May = ₹ (2000 + 1500 + 4000 + 4500) = ₹ 12000

So, amount of money Ravi saved in February = ₹ (15000 - 12000) = ₹ 3000

2. (C): Amount of money saved in April = ₹ 4000

Amount of money spent = $\left(\frac{1}{5}\right)^{\text{th}}$ of ₹ 4000

$$= ₹ \left(\frac{1}{5} \times 4000\right) = ₹ 800$$

So, earnings in April = ₹ (4000 + 800) = ₹ 4800

3. (D): (i) Total number of almonds eaten by four friends = 300

Number of almonds eaten by Tarun, Varun and Shivam = 90 + 120 + 60 = 270

∴ Number of almonds eaten by Aakash

$$= 300 - 270 = 30$$

(ii) Number of almonds eaten by Varun = 120

$$\therefore \text{Required fraction} = \frac{120}{300} = \frac{2}{5}$$

4. (A): Number of cakes sold by bakery A = 450

Now, 450 + 250 = 700

Number of cakes sold by bakery B = 700

5. (A): Number of cakes sold by bakery B = 700

Number of cakes sold by bakery F = 650

∴ Bakery B sold 700 - 650 = 50 more cakes than bakery F.