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IG. Maths
0580

Number

Exercise: Paper-4.

SP-20; M-19, M-18,
S-19, S-18,
W-18.

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Maths-0580

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Exercise - Paper 4.

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1.(a) Kristian and Stephanie share some money in the ratio 3:2. Kristian receives $72.
(i) Work out how much Stephanie receives. ---[2]
(ii) Kristian spends 45% of his $72 on a computer game.
Calculate the price of a computer game. ---[1]
(iii) Kristian also buys a meal for $8.40.
Calculate the fraction of the $72 Kristian has left after buying the computer game and the meal.
Give your answer in its lowest form. ---[2]
(iv) Stephanie buys a book in a sale for $19.20.
The sale price is after a reduction of 20%.
Calculate the original price of the book. ---[3]
(b) Boris invests $550 at a rate of 2% per year simple interest.
Calculate the value of the investment at the end of 10 years ---[3]
(c) Marlene invests $550 at a rate of 1.9% per year compound interest. Calculate the value of the investment at the end of 10 years. --[2]
(d) Hans invests $550 at a rate of x% per year compound interest.
At the end of 10 years, the value of the investment is $638.30, correct to the nearest cent. Find the value of x. ---[3]
SP-20/04/Q1

2. Amol and Priya deliver 645 parcels in the ratio,
Amol : Priya = 11:4
(a) Calculate the number of parcels Amol delivers. ---[2]
(b) Amol drives his truck at an average speed of 50 km/h.
He leaves at 0700 and arrives at 1115.
Calculate the distance he drives. ---[2]
(c) Priya drives her van a distance of 54 km.
She leaves at 1055 and arrives at 12.38.
Calculate her average speed. ---[3]

(Continued →)

2(d) Priya has 50 identical parcels.
Each parcel has a mass of 17 kg, correct to the nearest kg.
Find the upper bound for the total mass of the 50 parcels. --[1]

(e) 67 of the 645 parcels are damaged of the journey.
Calculate the percentage of parcels that are damaged. ---[1]

(f)(i) 29 parcels each have a value of $68.
By writing each of these numbers correct to 1 significant figure, find an estimate for the total value of these 29 parcels. --[1]

(ii) Without doing any calculation, complete the statement.
The actual total value of these 29 parcels is less than the answer to part (f) (i). because ---- [M-19|42|Q1] [1]

3(a) A shop sells dress fabric for $2.97 per metre.
(i) A customer buys 9 metres of this fabric.
Calculate the change he receives from $50. ---[2]

(ii) The selling price of $2.97 per metre is an increase of 8% on the cost price. Calculate the cost price. --[3]

(b) A dressmaker charges $35 or 2300 rupees to make a dress.
Calculate the difference in price when the exchange rate is 1 Rupee = $0.0153, Give your answer in rupees. --[2]

(c) The dressmaker measures a length of fabric as 600 m, correct to the nearest 5 metres. He cuts this into dress lengths of 9m, correct to the nearest metre.
Calculate the largest number of complete dress lengths he could cut. [M-18|42|Q1] --[3]

4(a) The price of a book increases from $2.50 to $2.65.
Calculate the percentage increase. ---[3]

(b) Scott invests $500 for 7 years at a rate of 1.5% per year simple interest. Calculate the value of his investment at the end of 7 years. --[3]

(continued→)

(Continued →)

4(c) In a city the population is increasing exponentially at a rate of 1·6% per year. ---[2]
Find the overall percentage increase at the end of 20 years.

(d) The population of a village is 6400. The population is decreasing exponentially at a rate of r% per year. After 22 years, the population will be 2607. Find the value of r. ---[3]
S-19|41|Q8

5(a) The price of a newspaper increased from $0.97 to $1.13.
Calculate the percentage increase. ---[3]

(b) One day, the newspaper had 60 pages of news and advertisement.
The ratio; number of pages of news : number of pages of advertisement = 5 : 7
(i) Calculate the number of pages of advertisment. ---[2]
(ii) Write the number of pages of advertisement as a percentage of the number of pages of news. ---[1]

(c) On holiday Maria paid 2·25 euros for the newspaper when the exchange rate was $1 = 0·946 euros.
At home Maria paid $1·13 for the newspaper.
Calculate the difference in price.
Give your answer in dollars, correct to the nearest cent. ---[3]

(d) The number of newspapers sold decreases exponentially by x% each year. Over a period of 21 years the number of newspapers sold decreases from 1763000 to 58000.
Calculate the value of x. ---[3]

(e) Every page of the newspaper is a rectangle measuring 43 cm by 28 cm, both correct to the nearest centimetre.
Calculate the upper bound of the area of a page. ---[2]
S-19|42|Q1

6(b) The fares for the train journey are shown in the table below.

From London to Marseille	Standard fare	Premier fare
Adult	$84	$140
Child	$60	$96

(i) For the standard fare, write the ratio, in its simplest form
adult fare : child fare, ---[1]

(ii) For an adult, find the percentage increase in the cost of the standard fare to the premier fare. ---[3]

(iii) For one journey from London to Marseille, the ratio
number of adults : number of children = 11 : 2
There were 220 adults in total on this journey.
All the children and 70% of the adults paid the standard fare.
The remaining adults paid the premier fare.
Calculate the total of the fares paid by the adults and the children. --[5]

(c) There were 3.08×10^5 passengers that made this journey in 2018.
This was a 12% decrease in the number of passengers that made this journey in 2017.
Find the number of passengers that made this journey in 2017.
Give your answer in standard form. [S-19|43|Q7] ---[3]

7. Adele, Barbara and Collette share $680 in the ratio 9:7:4

(a) Show that Adele receives $306. ---[1]

(b) Calculate the amount that Barbara and Collette each receive ---[3]

(c) Adele changes her $306 into euros (€) when the exchange rate is €1 = $1.125. Calculate the number of euros she receives. --[2]

(d) Barbara spends a total of $17.56 on 5 kg apples and 3 kg of bananas. Apples cost $2.69 per kg.
Calculate the cost per kg. of bananas. --[3]

(e) Collete spends half of her share on clothes and $\frac{1}{5}$ of her share on books. Calculate the amount she has left. --[3]
[S-18|41|Q7]

8.(a) The price of a house decreased from $82500 to $77500. Calculate the percentage decrease. ---[3]

(b) Roland invests $12000 in an account that pays compound interest at a rate of 2·2% per year. Calculate the value of his investment at the end of 6 years. Give your answer correct to the nearest dollar. ---[3]

[5-18|41|Q 3]

9(a) In 2017, the membership fee for a sports club was $79·50. This was an increase of 6% on the fee in 2016. Calculate the fee in 2016. ---[3]

(b) On one day, the number of members using the exercise machines was 40, correct to nearest 10. Each member used a machine for 30 minutes, correct to the nearest 5 minutes. Calculate the lower bound for the number of minutes the exercise machines were used on this day. [5-18|41|Q10(a)(b)] --[2]

10(a) Here is a list of ingredients to make 20 biscuits.

260 g of butter
500 g of sugar
650 g of flour
425 g of rice

(i) Find the mass of rice as a percentage of mass of sugar. --[1]

(ii) Find the mass of butter needed to make 35 of these biscuits. --[2]

(iii) Michel has 2 kg of each ingredient. Work out the greatest number of these biscuits that he can make. --[3]

(b) A company makes these biscuits at a cost of $1·35 per packet. These biscuits are sold for $1·89 per packet.

(i) Calculate the percentage profit the company makes on each packet. [3]

(ii) The selling price of $1·89 has increased by 8% from last year. Calculate the selling price last year. --[3]

(Continued→)

10(c) Over a period of 3 years, the company's sale of biscuits increased from 15.6 million packets to 20.8 million packets. The sales increased exponentially by the same percentage each year. Calculate the percentage increase each year. -[3]

(d) The people who work for the company are in the following age groups.

Group A	Group B	Group C
Under 30 years	30 to 50 years	over 50 years

The ratio of the number in group A to the number in group B is 7:10

The ratio of the number Group B to the number in group C is 4:3

(i) Find the ratio of the number in group A to the number in group C. Give your answer in its simplest form. --[3]

(ii) There are 45 people in group C. Find the total number of people who work for the company. --[3]

[5-18|43|21]

11(a) Rowena buys and sells clothes.

(i) She buys a jacket for $40 and sells it for $45.40. Calculate the percentage profit. ---[3]

(ii) She sells a dress for $42.60 after making a profit of 20% on the cost price. Calculate the cost price. --[3]

(b) Sara invests $500 for 15 years at a rate of 2% per year simple interest. Calculate the total interest Sara receives. --[2]

(c) Tomas has two cars.

(i) The value, today, of one car is $21000. The value of this car decreases exponentially by 18% each year. Calculate the value of this car after 5 years. Give your answer correct to the nearest hundred dollars. --[3]

(ii) The value, today, of the other car is $15000. The value of this car increases exponentially by x% each year. After 12 years the value of the car will be $42190. Calculate the value of x. [5-18|43|21] ---[3]

12 Marianne sells photos.

(a) The selling price of each photo is $6.

(i) The selling price of each photo is made up of two parts, printing cost and profit. For each photo the ratio,
printing cost : profit = 5 : 3
Calculate the profit she makes on each photo. ---[2]

(ii) Calculate her profit as a percentage of the selling price. ---[1]

(iii) Calculate the selling price of a photo in euros (€), when the exchange rate is. €1 = $1.091. ---[2]

(b) Marianne sells two sizes of photo.
These photos are mathematically similar rectangles.
The smaller photo has length 15 cm and width 12 cm.
The larger photo has area 352.8 cm^2.
Calculate the length of the larger photo. ---[3]

(c) In a sale, Marianne buys a new camera for $483.
This a reduction of 8% on the original price.
Calculate the original price of the camera. ---[3]

[W-18/41/Q1]

13 (a) The Muller family are on holiday in New Zealand.

(i) They change some euros (€) and receive $1962 (New Zealand dollars). The exchange rate is €1 = $1.635.
Calculate the number of euros they change. ---[2]

(ii) The family spend 15% of their New Zealand dollars on a tour. Calculate the number of dollars they have left. ---[2]

(iii) The family visit two waterfalls, the Humboldt fall and the Bridal Veil Falls. The ratio of the heights,
Humboldt Falls : Bridal Veil Falls = 5 : 1
The Humboldt Falls are 220 m higher than Bridal Veil Falls.
Calculate the height of the Humboldt Falls. ---[2]

(b) (i) Water flows over the Browne Falls at a rate of 3680 litres per seconds. After rain, this rate increases to 9752 litres per seconds. Calculate the percent increase in this rate. ---[3]

(Continued →)

13(b) (ii) After rain, water flows over the Sutherland Falls at a rate of 74240 litres per seconds. This is an increase of 45% on the rate before the rain.
Calculate rate before the rain. [W-18/42/Q1] ---[3]

14(a) A school has 240 students.
The ratio girls : boys = 25 : 23
(i) Show that the number of boys is 115. --- [1]
(ii) One day, there are 15 girls absent and 15 boys absent.
Find the ratio girls : boys in school on this day.
Give your answer in its simplest form. ---[2]
(iii) Next year, the number of students will increase by 15%.
Calculate the number of students next year. --[2]
(iv) Since the school was opened, the number students has increased by 60%. There are now 240 students.
Calculate the number of students when the school was opened. --[3]

(b) The population of a city is increasing exponentially at a rate of 2% each year. The population now is 256000.
Calculate the population after 30 years.
Give your answer correct to the nearest thousand. --[3]

(c) A bacteria population increases exponentially at a rate of r% each day. After 32 days, the population has increased by 309%.
Find the value of r. [W-18/43/Q2] ---[3]

1. Brad travelled from his home in New York to Chamonix.
   - He left his home at 1630 and travelled by taxi to the airport in New York. His journey took 55 minutes and an average speed of 18 Km/h.
   - He then travelled by plane to Geneva, departing from New York at 2215. The flight path can be taken as an arc of a circle of radius 6400 Km with a sector angle of 55.5°. The local time in Geneva is 6 hours ahead of the local time in New York. Brad arrived in Geneva at 1125 the next day.
   - To complete his journey, Brad travelled by bus from Geneva to Chamonix. This journey started at 1300 and took 1 hour 36 min. The average speed was 65 Km/h.

   The local time in Chamonix is the same as the local time in Geneva.
   Find the overall average speed of Brad's journey from his home in New York to Chamonix. Show all your working and give your answer in Km/h. [11]

S-19 | 41 | Q 11

2. Here is part of a train timetable for a journey from London to Marseille. All time given are in local time.
   The local time in Marseille is 1 hour ahead of the local time in London.

London	0719
Ashford	0755
Lyon	1300
Avignon	1408
Marseille	1446

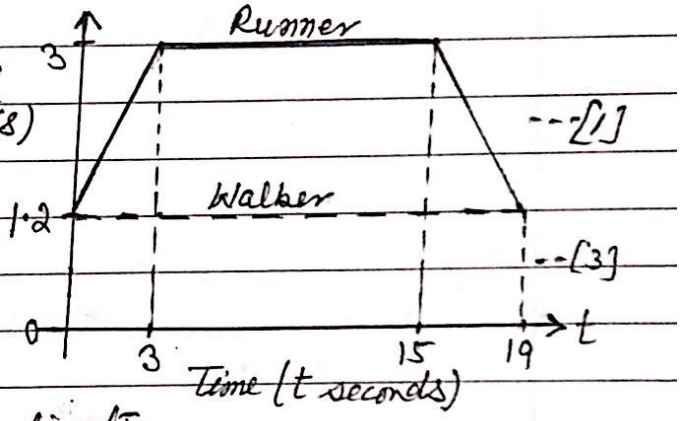
(a) (i) Work out the total journey time from London to Marseille. Give your answer in hours and minutes. [2]

(ii) The distance from London to Ashford is 90 Km. The local time in London is same as the local time in Ashford. Work out the average speed in Km/h, of the train between London and Ashford. [3]

(iii) During the journey, the train takes 35 seconds to completely cross a bridge. The average speed of the train during this crossing is 90 Km/h. The length of the train is 95 meters. Calculate the length, in metres, of this bridge. [4]

S-19 | 43 | Q 1(a)

3. The diagram shows the speed-time graph for part of a journey for two people, a runner and a walker.



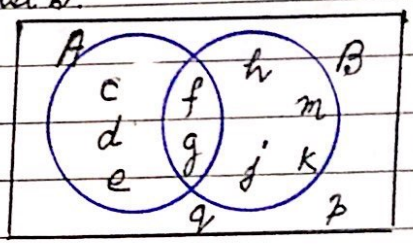
(a) Calculate the acceleration of the runner for the first three seconds. ---[1]

(b) Calculate the total distance travelled by the runner in the 19 seconds. ---[3]

(c) The runner and the walker are travelling in the same direction along the same path. When $t = 0$, the runner is 10 metres behind the walker. ---[3]
Find how far the runner is ahead of the walker when $t = 19$.

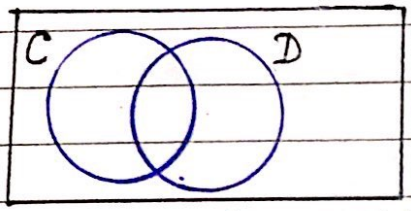
W-18/42/Q6

1. (a) The Venn diagram shows two sets, A and B.

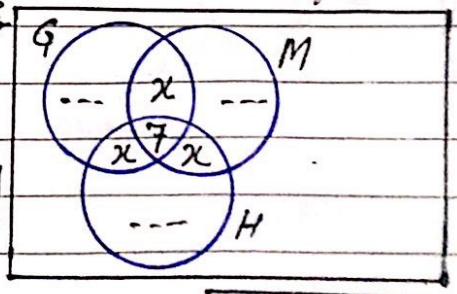


(i) Use set notation to complete the statement.
(a) d ---- A
(b) $\{f, g\} =$ ------
(ii) Complete the statement.
$n(\text{----}) = 6$

(b) In the Venn diagram below, shade $C \cap D'$

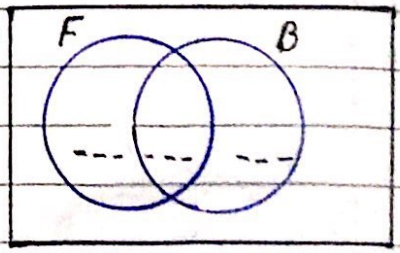


(c) 50 students study at least one of the subjects geography (G), mathematics (M) and history (H).
18 study only mathematics.
19 study two or three of these subjects.
23 study geography.
The Venn diagram below is to be used to show this information.
(i) Show that $x = 4$ ---[2]
(ii) Complete the Venn diagram. ---[2]
(iii) Use set notation to complete this statement $(G \cup M \cup H)' =$ ----[1]
(iv) Find $n(G \cap (M \cup H))$ --[1]



[M-19|42|Q9]

2. $\mathcal{E} = \{$ Students in a school$\}$
$F = \{$ Students who play football$\}$
$B = \{$ Students who play baseball$\}$
There are 240 students in the school.
- 120 students play football
- 40 students play baseball
- 90 students play football but not baseball.



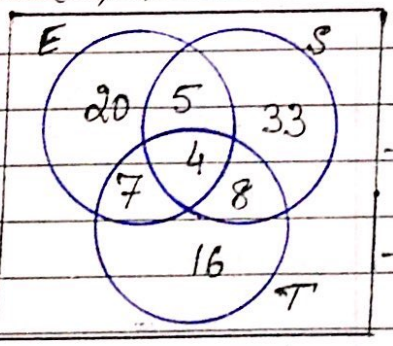
(a) Complete the Venn-diagram to show this information. ---[2]
(b) Find $n(F' \cap B')$. ---[1] (Continued →)

(Continued →)

2 (c) A student in the school is chosen at random. --[1]
Find the prob. that this student plays baseball but not football.

(d) Two students who play baseball are chosen at random. --[3]
Find the prob. that they both also play football. [S-19/41/Q6]

3. One day, the number of members using the exercise machine (E), the swimming pool (S) and the tennis courts (T) is shown on the Venn diagram.



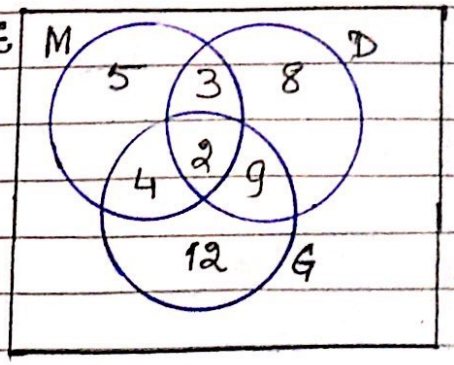
(i) Find the number of members using only tennis courts. --[1]

(ii) Find the number of members using the swimming pool. --[1]

(iii) A member using the swimming pool is chosen at random. Find the prob. that this member also uses the tennis courts and the exercise machines. --[2]

(iv) Find $n[T \cap (E \cup S)]$ [S-18/41/Q10(c)] -[1]

4 (a) The Venn-diagram shows information about the number of students who study Music (M), Drama (D) and Geography (G).



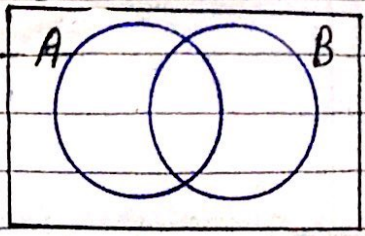
(i) How many students study music? --[1]

(ii) How many students study exactly two subjects? --[1]

(iii) Two students are chosen at random from those who study Drama. Calculate the prob. that they both also study Music. --[3]

(iv) In the Venn-diagram above, shade $M \cap D'$ --[1]

(b) (i) $\varepsilon = \{x : x \text{ is an integer and } 1 \leq x \leq 10\}$
$A = \{x : x \text{ is even}\}$
$4 \in A \cap B \quad ; \quad n(A \cap B) = 1$
$(A \cup B)' = \{1, 7, 9\}$



--[4]

Complete the Venn-diagram using this information. (Continued →)

(continued →)

4(b) (ii) Use your Venn-diagram to complete the statement.

$B = \{ \ldots\ldots\ldots \}$ [1]

[W-18/41/Q6]

Answers

Exercise - 1

1 (a) (i) 48 (ii) 32.4 (iii) $\frac{13}{30}$ (iv) 24
(b) 660 (c) 663.9 (d) 1.5

2. (a) 473 (b) 212.5 (c) 31.5
(d) 875 (e) 10.4 f(i) 2100
f(ii) both numbers rounded up.

3 (a) (i) 23.27 (ii) 2.75
(b) 12.4 (c) 70

4. (a) 6 % (b) 552.5 (c) 37.4 (d) 4.

5. (a) 16.5 (b) (i) 35 (ii) 140
(c) $1.26 (d) 15 (e) 1239.75

6. (b) (i) 7:5 (ii) 66.7 (iii) 24576
(c) 3.5×10^5

7. (a) $\frac{9}{9+7+4} \times 680 = 306$ ✓
(b) 238, 136
(c) 272 (d) 1.37 (e) 40.8

8. (a) 6.06 (b) 13674

9 (a) 75 (b) 962.5

10 (a) (i) 85 (ii) 455 (iii) 61
(b) (i) 40 (ii) 1.75
(c) 10.1 (d) (i) 14:15 (ii) 147

11 (a) (i) 13.5 (ii) 35.5
(b) 150 (c) (i) 7800 (ii) 9.00

12. (a) (i) 2.25 (ii) 37.5 (iii) 5.5
(b) 21 (c) 525

13 (a) (i) 1200 (ii) 1667.7 (iii) 275
(b) (i) 165 (ii) 51200

Exercise 1

14 (a) (i) $\frac{23}{(23+25)} \times 240$
(ii) 11 : 10 (iii) 276 (iv) 150
(b) 464000 (c) 4.50

Exercise - 2

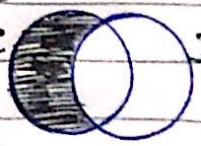
1 Total time = 16 h 6 min = 16.1 h ✓
Distance to airport New York = 16.5
arc length = 6200
Distance Geneva to Chamonix = 104
Total distance = 16.5 + 6200 + 104
= 6320.5
∴ overall average Speed = $\frac{6320.5}{16.1}$
= 392.58
= 392 to 393 ✓

2. (a) (i) 6 h 27 mins (ii) 150 km/h
(iii) 780

3 (a) 0.6 (b) 50.7 (c) 17.9

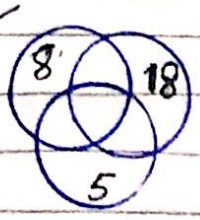
Exercise - 3

1 (a) (i) (a) ξ (i) (b) $A \cap B$
(b)



(c) (i) $3x + 7 = 19$
$\rightarrow x = 4$ ✓

(ii)

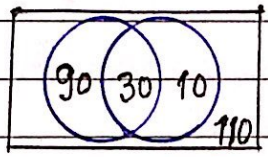


(iii) ϕ or $\{\}$
(iv) 15

Answers

Exercise-3

2 (a)



(b) 110

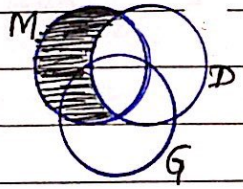
(c) 10 / 240

(d) 870 / 1560

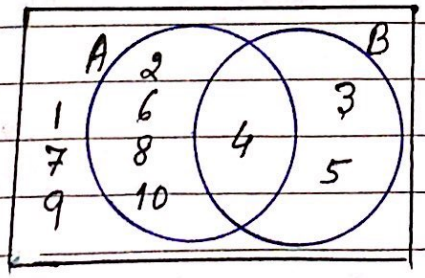
3. (i) 16 (ii) 50 (iii) $\frac{4}{50}$ (iv) 19

4 (a) (i) 6 (ii) 16 (iii) $\frac{20}{462}$

(iv)



(b) (i)



(ii) 3, 4, 5