

Mathematics

0580

Paper - 2.

Number.

Exercise. (M-19; M-18; S-19; S-18; W-18)

(with answers)

Suresh Goel,
(Director)
Alliance World School,
Noida, Delhi - NCR.
INDIA.

ContentsPage No.

- | | |
|---|-------|
| 1. Prime number, HCF, LCM, Natural no.
Integers, Rational and real numbers. | 1-2 |
| 2. Time, distance and speed, Four basic
operations (+, -, \times , \div) | 3-5 |
| 3. Vulgar and decimal fractions. | 6 |
| 4. Indices, | 7 |
| 5. Accuracy. | 8-9 |
| 6. Simple and compound interest, Exponential growth,
Increase and decrease percentage. | 10-11 |
| 7. Sets and Venn-diagrams. | 12-14 |
| <u>Answers.</u> | 15-16 |

Exercise - 1 (N, Z, Q, R)

1. Calculate. $3\sqrt{8.1^2 - 1.3^2} \cdot 8$ [S-19/21/Q3] --- [1]

2. 27, 28, 29, 30, 31, 32, 33

From the list of numbers, write down

(a) a multiple of 7. --- [1]

(b) a cube number. --- [1]

(c) a prime number. [S-19/21/Q12] --- [1]

3. Write down a prime number between 50 and 60. --- [1]
[S-19/22/Q17]

4. Find the highest common factor (HCF) of 90 and 48. --- [2]
[S-19/22/Q9]

5. Here is a list of numbers.

21, $\frac{2}{3}$, $\sqrt{13}$, 31, $\sqrt{121}$, 51, 0.7

From this list write down.

(a) a prime number. --- [1]

(b) an irrational number. [S-19/23/Q7] --- [1]

6. Without using your calculator, work out $\frac{7}{8} + \frac{1}{6}$.

You must show all your working and give your answer as a mixed number in its simplest form. [M-18/22/Q12] [3]

7. Write down a prime number between 20 and 30. [S-18/21/Q1] --- [1]

8. 22, 17, 25, 41, 39, 4.

Work out the difference between the two prime numbers in the list above. [S-18/22/Q5] --- [2]

9. Complete the list of factors of 36. [S-18/23/Q4]

1, 2, -----, 36. --- [2]

10 (a) Write 56 as a product of its prime factors. --- [2]

(b) Find the lowest common multiple (LCM) of 56 and 42. [W-18/22/Q23] --- [2]

11(a) Write the number five million, two hundred and seven in figures. --(1)

(b) Write 0.00813 in standard form. [W-18/23/Q6] --(1)

12. Explain why $\sqrt{3}$ is irrational. [SP-20/02/Q10] --(1)

Exercise - 2. (Four rules of calculations)

1. The temperature at 0700 is -3°C .
This temperature is 11° higher than the temperature at 0100.
Find the temperature at 0100. [M-19/22/Q1] 0e -- [1]
2. Jodi swims 22 lengths of a swimming pool to raise money for charity. She receives \$15 for each length she swims. [M-19/22/Q2]
Calculate how much money Jodi raises for charity. -- \$ --- [1]
3. Without using a calculator, work out $3\frac{1}{8} \div \frac{5}{12}$
you must show all your working and give your answer as a mixed number in its simplest form. [M-19/22/Q21] -- [4]
4. Without using a calculator, work out $\frac{5}{6} + \frac{2}{3}$ --- [3]
you must show all your working and give your answer as a mixed number in its simplest form. [S-19/21/Q14]
5. The distance between Prague and Vienna is 254 kilometres.
The local time in Prague is the same as the local time in Vienna.
A train leaves Prague at 1520 and arrives in Vienna at 1950
the same day. Calculate the average speed of the train. [S-19/22/Q5] -- [2]
6. Without using a calculator, work out $2\frac{1}{4} \div \frac{3}{7}$. --- [3]
You must show all your working and give your answer as a mixed number in its simplest form. [S-19/22/Q13]
7. Giulio's reaction times are measured in two games.
In the first game his reaction time is $\frac{1}{3}$ of a second.
In the second game his reaction time is $\frac{1}{8}$ of a second. --- [1]
Find the difference between the two reaction times. [S-19/23/Q3]
8. Calculate: (a) $-12 \div -2$ -- [1]
(b) $\sqrt[3]{27} + 2$ -- [1]
[S-19/23/Q6]

EX-2 (Money, four rules of cal. +, x, ÷)

9. Without using a calculator, work out $\frac{12}{35} \times \frac{7}{9}$.
You must show all your working and give your answer as a fraction in its simplest form. [S-19/23/Q9] --- [2]
10. (a) Calculate $\sqrt{2.38 + 6.4^2}$, write down your fully calculator display. [S-18/21/Q10] --- [1]
(b) Write your answer to part (a) correct to 4 decimal places. --- [1]
11. Without using your calculator, work out $1\frac{3}{4} \times \frac{6}{35}$.
You must show all your working and give your answer as a fraction in its simplest form. [S-18/21/Q13] --- [3]
12. One morning, Marica works from 0820 to 1115.
Find how long she works for. --- [1]
Give your answer in hours and minutes. [S-18/22/Q1] --- [1]
13. Without using your calculator, work out $\frac{2}{3} - \frac{1}{12}$. You must show all your working and give your answer as a fraction in its lowest form. [S-18/22/Q6] --- [2]
14. One day in Chamonix the temperature at noon was 6°C , at mid-night the temperature was 11°C lower. --- [1]
Write down the temperature at mid-night. [S-18/23/Q1] --- [1]
15. Liz takes 65 seconds to run 400m.
Calculate her average speed. [S-18/23/Q3] --- [1]
16. Without using a calculator, work out $\frac{2}{3} \div 1\frac{1}{5}$.
You must show all your working and give your answer as a fraction in its simplest form. [S-18/23/Q15] --- [3]
17. Carlos starts work at 2120 and finishes at 0615 the next day. Calculate how long Carlos is at work. [W-18/21/Q1] --- [1]
18. Without using your calculator, work out $\frac{3}{8} \div 2\frac{1}{4}$.
You must show all your working and give your answer as a fraction in its simplest form. [W-18/21/Q14] --- [3]

EX-2 (Money, for operation +, -, x, ÷)

19. Without using a calculator, work out $\frac{1}{15} + \frac{2}{5}$. --- [2]
 Write down all the steps of your working and give your answer as a fraction in its simplest form. [W-18/22/Q5]

20. Work out $\frac{7}{11}$ of 198 kg. [W-18/23/Q1] --- [1]

21. Calculate: $\frac{5.39 - 0.98}{0.743 - 0.0743}$ --- [1]
 [W-18/23/Q4]

22. Without using a calculator, work out $\frac{1}{4} \div \frac{2}{3}$,
 you must show all your working, and give your answer as a fraction. --- [2]
 [W-18/23/Q9]

23. A car travels at 108 km/h for 20 seconds. [W-18/23/Q15]
 Calculate the distance the car travels, give your answer in metres. --- [3]

24. A train leaves Zurich at 22:40 and arrives in Vienna at 07:32 the next day. Work out the time the train takes. [SP-20/02/Q1] --- [1]

25. Without using a calculator, work out $1\frac{7}{12} + \frac{13}{20}$.
 You must show all your working and give your answer as a mixed number in its simplest form. [SP-20/02/Q14] --- [3]

26. Use a calculator to find the decimal value of:

$$\frac{\sqrt{29 - 3 \times 32^{0.4}}}{3}$$

--- [1]
[SP-20/02/Q19]

1. Write the recurring decimal $0.\dot{2}\dot{3}$ as a fraction. ---[1]
[M-19/22/Q3]

2. Write the recurring decimal $0.4\dot{7}$ as a fraction.
Show all your working. [S-19/21/Q9] ---[2]

3. Write the recurring decimal $0.\dot{7}$ as a fraction. [S-19/22/Q3] ---[1]

4. Write the recurring decimal $0.\dot{8}$ as a fraction. [M-18/22/Q4] ---[1]

5. Write the recurring decimal $0.\dot{6}\dot{3}$ as a fraction. [S-18/21/Q3] ---[1]

6. Change the recurring decimal $0.\dot{1}\dot{8}$ to a fraction.
You must show all your working. [W-18/23/Q13] ---[2]

7. Here is a list of numbers.

Put a ring around the number with the largest value. ---[1]

0.3030 $\frac{1}{3}$ 0.0330 $\frac{3}{10}$ 33% 33%

[SP-20/12/Q3]

8. Write the recurring decimal $0.3\dot{2}$ as a fraction.
You must show all your working. [SP-20/02/Q20] ---[2]

1. (a) Find the value of n , when $5^n = \frac{1}{125}$ --- [1]

(b) Simplify $(\frac{64}{m^3})^{-\frac{1}{3}}$ --- [2]

2. Calculate $\sqrt{17.8} - 1.3^{2.5}$ [M-18/22/Q3] --- [1]

3. $2^p = \frac{1}{84}$, find the value of p . [M-18/22/Q9] --- [2]

4. Find the value of q . $3^{-q} \times \frac{1}{27} = 81$. [S-18/21/Q9] --- [2]

5. Find the exact value of $8^{\frac{2}{3}} \times 49^{-\frac{1}{2}}$ [S-18/21/Q11] --- [2]

6. (a) Find the value of $(\frac{1}{81})^{-\frac{3}{4}}$ --- [1]

(b) Simplify $\sqrt[3]{27t^{27}}$ [S-18/23/Q18] --- [2]

7. Calculate. $0.125^{-\frac{2}{3}}$ [W-18/22/Q3] --- [1]

8. Work out $(\frac{125}{27})^{-\frac{2}{3}}$ [W-18/23/Q5] --- [1]

rounding off, lower and upper bounds,

"Exercise 5"Standard form; correct to decimal places.

1. (a) Write 0.046875 correct to 2 significant figures: -- [1]
 (b) Write 2760000 in standard form. [M-19/22/Q4] -- [1]
2. A tourist changes \$500 to euros (€) when the exchange rate is €1 = \$1.0697. Calculate how many euros she receives. --- [2]
 [M-19/22/Q5]
3. An equilateral triangle has sides of length 15cm, correct to the nearest centimetre. Calculate the upper bound of the perimeter of this triangle. [S-19/21/Q4] - [1]
4. (a) Write 0.047883 correct to 2 significant figures. -- [1]
 (b) Write 0.00527 in standard form. [S-19/22/Q8] -- [1]
5. Write 1.8972 correct to 2 decimal places. [S-19/23/Q1] [1]
6. $A = b \times h$
 $A = 10$, correct to ² the nearest whole number.
 $h = 4$, correct to the nearest whole number. --- [3]
 Work out the upper bound for the value of b . [S-19/23/Q16]
7. Write 0.0000523 in standard form. [M-18/22/Q2] -- [1]
8. Write 0.0000387 in standard form. [S-18/21/Q2] --- [1]
9. Here are some numbers in standard form:
 3.4×10^{-1} 1.36×10^6 7.9×10^0 2.4×10^5 5.2×10^{-3} 4.3×10^{-2}
 From these numbers write down,
 (a) the largest number, --- [1]
 (b) the smallest number. [S-18/22/Q8] ... [1]
10. Anna walks 31km at a speed of 5km/h.
 Both values are correct to the nearest whole number.
 Work out the upper bound of the time taken for Anna's walk. -- [2]
 [S-18/22/Q12]

11. (a) Write 209802 correct to the nearest thousand. -- [1]
 (b) Write 4123 correct to 3 significant figures. [S-18/23/Q6] -- [1]
12. (a) Write 4.82×10^{-3} as an ordinary number. -- [1]
 (b) Write 52 million in standard form. [S-18/23/Q8] -- [1]
13. (a) The length of the side of a square is 12 cm, correct to the nearest centimetres. Calculate the upper bound for the perimeter of the square. --- [2]
 (b) Jo measures the length of a rope and records her measurement correct to the nearest ten centimetres. The upper bound for her measurement is 12.35 m. Write down the measurement she records. [S-18/23/Q16] -- [1]
14. Work out $(6.4 \times 10^7) + (9.6 \times 10^6)$,
 Give your answer in standard form. [W-18/21/Q4] -- [2]
15. Safia has a barrel containing 6000 millilitres of oil, correct to the nearest 100 ml. She uses the oil to fill bottles which each hold exactly 50 ml.
 Calculate the upper bound for the number of bottles she can fill. [W-18/21/Q8] -- [2]
16. Write 23000 in standard form. [W-18/22/Q1] -- [1]
17. A equilateral triangle has side 12 cm, correct to the nearest centimetre. Find the lower bound and the upper bound of the perimeter of the triangle. [W-18/22/Q11] -- [2]
18. Write these numbers correct to 2 significant figures.
 (a) 0.076499 -- [1]
 (b) 70100 [W-18/23/Q8] -- [1]
19. The area of a square is 42.5 cm^2 , correct to the nearest 0.5 cm^2 . Calculate the lower bound of the length of the side of the square. [W-18/23/Q12] -- [2]
20. The mass, m kilo-gram, of horse is 429 kg, correct to the nearest kilogram. Complete the statement: $\leq m <$ [SP-20/02/Q11] -- [2]

"Exercise - 6"

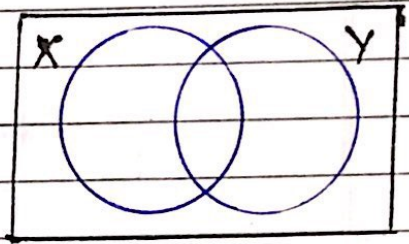
Exponential Growth, population, Increase and decrease percentage

1. The number of passengers on a train increases from 63 to 77.
Calculate the percentage increase. [M-19/22/Q11] -- [3]
2. Eric invests an amount in a bank that pays compound interest at a rate of 2.16% per year. At the end of 5 years, the value of his investment is \$6999.31.
Calculate the amount Eric invests. [M-19/22/Q14] [3]
3. Work out \$1.20 as a percentage of \$16. [S-19/21/Q1] [1]
4. Shona buys a chair in a sale for \$435.60. This is a reduction of 12% on the original price. Calculate the original price of the chair. [S-19/22/15] -- [3]
5. Newton has a population of 23000.
The population decreases exponentially at a rate of 1.4% per year.
Calculate the population of Newton after 5 years. [M-18/22/Q8] [2]
6. Dev makes 600 cakes. 18% of the 600 cakes go to a hotel and $\frac{2}{3}$ of 600 cakes to a supermarket.
Calculate how many cakes he has left. [M-18/22/Q11] -- [3]
7. Increase \$22 by 15%. [S-18/23/Q5] --- [2]
8. Jan invests \$800 at a rate of 3% per year simple interest.
Calculate the value of her investment at the end of 4 years. --- [3]
[W-18/21/Q9]
9. There are 30 000 lions in Africa.
The number of lions in Africa decreases exponentially by 2% each year.
Find the number of lions in Africa after 6 years.
Give your answer correct to the nearest hundred. --- [2]
[W-18/22/Q9]

10. Work out \$1.45 as a percentage of \$72.50. ---[1]
W-18/23/Q3

11. In a box of 80 glasses, 3 are broken. [SP-20/02/Q2]
Work out the percentage of broken glasses in the box. -- [1]

1.(a) In the Venn diagram, shade $X \cap Y$,

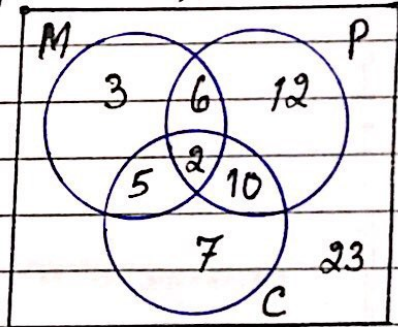


(b) The Venn diagram below shows information about the number of gardeners who grow melons (M), potatoes (P) and carrots (C)

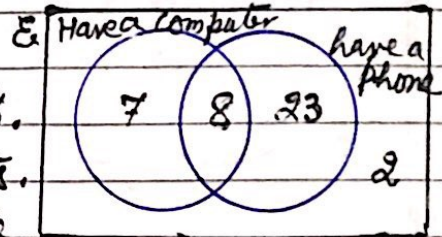
(i) A gardener is chosen at random from the gardeners who grow melons. Find the probability that this gardener does not grow carrots. ---[2]

(ii) Find $n((M \cap P) \cup C')$ ---[1]

[S-19/22/Q21]



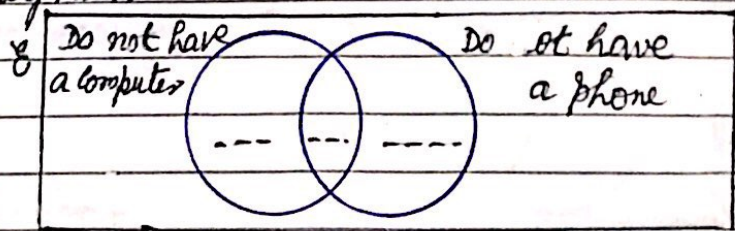
2.(a) 40 children were asked if they have a computer or a phone or both. The Venn diagram shows the results.



(i) A child is chosen at random from the children who have a computer. ---[1]

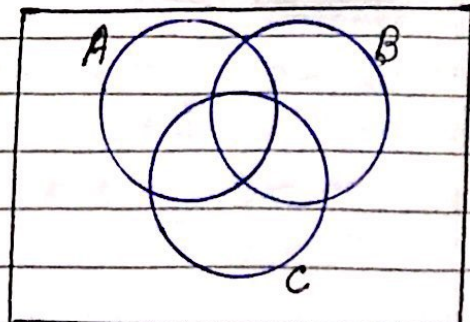
Write down the probability that this child also has a phone. ---[1]

(ii) Complete the Venn diagram.



---[2]

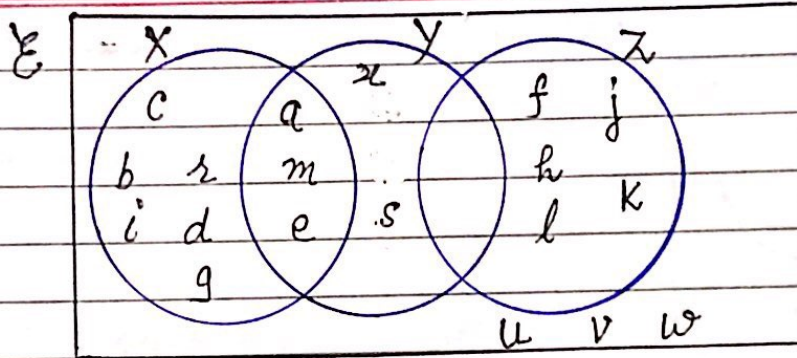
(b) In this Venn diagram, shade the region, $(A \cup B)' \cap C$



---[1]

[S-19/23/Q20]

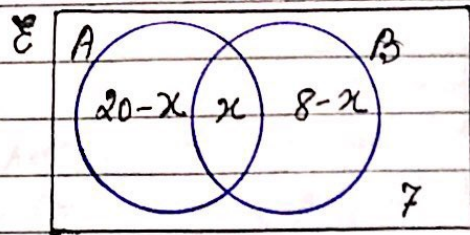
3.



- (a) Use set notation to complete the statements for the Venn diagram above.
- (i) $c \in X$ --- [1]
 - (ii) $\{a, m, e\} = X \cap Y$ --- [1]
 - (iii) $Y \cap Z = \{s\}$ --- [1]
- (b) List the elements of $(X \cup Y \cup Z)'$ --- [1]
- (c) Find $n(X' \cap Z)$ --- [1]

[M-18/22/Q19]

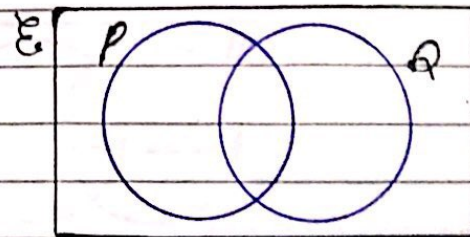
4. The Venn diagram shows information about the number of elements in sets A, B and E.



- (a) $n(A \cup B) = 23$
Find the value of x . --- [3]
- (b) An element is chosen at random from E.
Find the prob. that this element is in $(A \cup B)'$. --- [2]

[S-18/22/Q23]

5. $n(E) = 20, n(P) = 10, n(Q) = 13$.
and $n(P \cap Q) = 5$
work out $n(P \cap Q)$.



You may use Venn diagram to help you.

[S-18/23/Q12]

6. $C = \{x : x \text{ is an integer and } 5 < x < 12\}, D = \{5, 10\}$

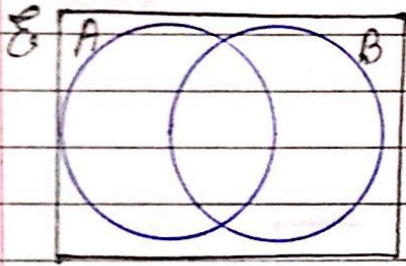
- (a) Put a ring around the correct statement from the list below.
- $D = \emptyset$ $C \cap D = \{10\}$ $6 \in D$ $D \subset C$ --- [1]
- (b) Find $n(C \cup D)$ --- [1]

[W-18/22/Q7]

Exercise 7

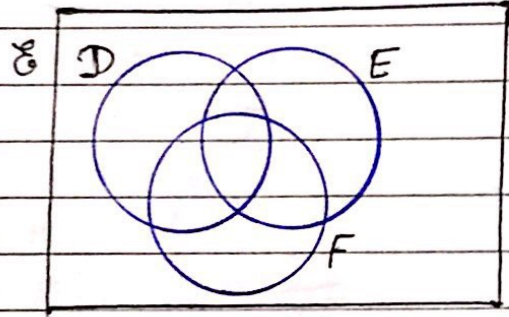
7. Shade the region in each of the Venn diagrams below:

(a)



$A' \cup B$ --- [1]

(b)



$(D \cap E)' \cap F$ --- [1]

[SP-20/02/Q18]

Exercise-1

Answers

1. 4.01
2. (a) 28 (b) 27 (c) 29 or 31
3. 53 or 59
4. 6
5. (a) 31 or $\sqrt{121}$
(b) $\sqrt{13}$
6. $1\frac{1}{24}$
7. 23 or 29
8. 24 (41-17)
9. 3, 4, 6, 9, 12, 18
- 10(a) $2^3 \times 7$ or $2 \times 2 \times 2 \times 7$
(b) 168
- 11(a) 5000207
(b) 8.13×10^{-3}
12. Cannot be written as a fraction.

Exercise-2

1. -14
2. 330
3. $\frac{25}{8}$
4. $1\frac{1}{2}$
5. 56.4
6. $5\frac{1}{4}$
7. $\frac{5}{24}$
- 8(a) 6 (b) 2.15
9. $\frac{4}{75}$
10. (a) 6.58331 (b) 6.5833
11. $\frac{3}{10}$
12. 2 hr 55 min.
13. $\frac{7}{12}$

14. -5
15. $6\frac{2}{13}$ or 6.15
16. $\frac{5}{9}$
17. 8 hr 55 min.
18. $\frac{1}{6}$
19. $\frac{7}{15}$
20. 126
21. 6.59
22. $\frac{3}{8}$
23. 600
24. 8 hr 52 min.
25. $2\frac{7}{30}$
26. 1.37

Exercise-3

1. $\frac{23}{99}$
2. $\frac{43}{90}$
3. $\frac{7}{9}$
4. $\frac{8}{9}$
5. $\frac{7}{11}$
6. $\frac{17}{90}$
7. $\frac{1}{3}$
8. $\frac{29}{90}$

Ex-4

- 1(a) -3 (b) $\frac{m}{4}$
2. 2.29
3. -12
4. -7
5. $\frac{4}{7}$
- 6(a) 27 (b) $3t^9$
7. 4
- Q(8). $\frac{9}{25}$

Exercise-5

Answers

Ex-6

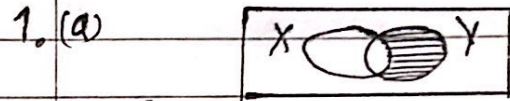
- 1(a) 0.047 (b) 2.76×10^6
2. 467.42 or 467.
3. 46.5
- 4(a) 0.048 (b) 5.27×10^{-3}
5. 1.90
6. 6
7. 5.23×10^{-5}
8. 3.87×10^{-5}
- 9(a) 1.36×10^6 (b) 5.21×10^{-3}
10. 7
11. (a) 210000 (b) 4/20
- 12(a) 0.00482 (b) 5.2×10^7
- 13(a) 50 (b) 12.3
14. 7.36×10^7
15. 121
16. 2.3×10^4
17. 34.5 and 37.5
18. (a) 0.076 (b) 10000
19. 6.5
20. 428.5 ; 429.5

Exercise-6

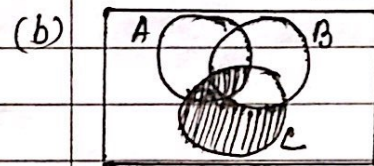
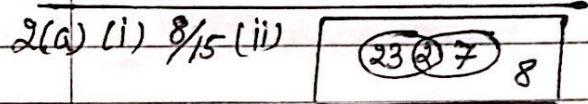
1. $22\frac{2}{9}$ or $22.22\dots$
2. 6290
3. 7.5
4. 495
5. 21400
6. 92
7. 25.3
8. 896
9. 26600
10. 2

11. 3.75

Exercise-7



(b) (i) $\frac{9}{16}$ (ii) 46



- 3 (a) (i) E
(ii) $X \cap Y$
(iii) ϕ

(b) U, V, W

(c) 5

4 (a) 5

(b) $\frac{7}{30}$

5. 8

6. (a) $C \cap D = \{10\}$

(b) 7

