CBSE Board
Class VIII Mathematics
Term I
Sample Paper 1

Time: 2 ½ hours   Total Marks: 80

General Instructions:

1. **All** questions are **compulsory**.
2. **Section A** comprises of **12** questions carrying 1 mark each.
3. **Section B** comprises of **12** questions carrying 2 marks each.
4. **Section C** comprises of **8** questions carrying 3 marks each.
5. **Section D** comprises of **5** questions carrying 4 marks each.

Section A
(Questions 1 to 12 carry 1 mark each)

1. On a number line, 2.5 will lie
   A. to the left of 2
   B. in between 2.6 and 2.7
   C. in between 2.4 and 2.7
   D. to the left of 0

2. 20% of x stands for _____.
   A. $\dfrac{x}{3}$
   B. $\dfrac{x}{5}$
   C. $\dfrac{x}{6}$
   D. 0.02x

3. A pentagon has _____ vertices.
   A. 5
   B. 6
   C. 7
   D. 8

4. The tally mark $\cancel{||||}\,\cancel{||||}\,|||$ represents the frequency
   A. 10
   B. 11
   C. 13
   D. 14

5. Which of the following numbers is a square as well as a triangular number?

    A. 1
    B. 6
    C. 10
    D. 28

6. Cube root of (-8) × (-343) × (125) is

    A. -70
    B. 70
    C. -35
    D. 35

7. Multiplicative inverse of $2\frac{2}{3}$ is _____ .

    A. $\frac{8}{3}$

    B. $-\frac{8}{3}$

    C. $\frac{3}{8}$

    D. 1

8. The equation $\frac{4}{x-1} = \frac{3}{x+7}$ can also be written as _____ .

    A. x + 30 = 0
    B. x - 31 = 0
    C. x + 31 = 0
    D. x - 30 = 0

9. In a rhombus, if one angle is 70º, then its opposite angle will be _____ .

    A. 70º
    B. 110º
    C. 90º
    D. 180º

10. A sector is drawn as 1/4th part of a circle. The central angle made by it is

    A. 90º
    B. 55º
    C. 45º
    D. 40º

11. The square root of a number whose prime factorisation is 2 × 2 × 3 × 3 × 3 × 3 × 5 × 5 is
    A. 80
    B. 45
    C. 90
    D. 180

12. If C.P. of an article is Rs. 900, overhead expenses are Rs. 200 and S.P. is Rs. 1200, then profit percent is
    A. $9\dfrac{3}{11}\%$
    B. $9\dfrac{4}{11}\%$
    C. $9\dfrac{2}{11}\%$
    D. $9\dfrac{1}{11}\%$

Section B
(Questions 13 to 24 carry 2 marks each)

13. Solve the following expression using properties of rational numbers:

$$\frac{2}{5}\times\frac{-3}{7}-\frac{1}{14}-\frac{3}{7}\times\frac{3}{5}$$

14. Divide 64 into two parts such that three times the greater part will be equal to five times the smaller one.

15. Find x and y in the given parallelogram.
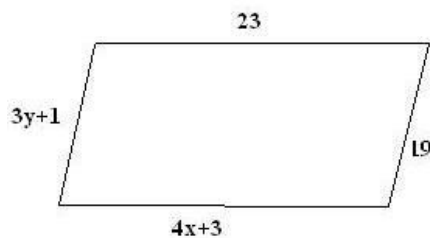
16. In an auditorium, the number of rows is equal to the number of chairs in each row. If the capacity of the auditorium is to accommodate 1764 chairs, find the number of chairs in each row.

17. In a collection of 35 lotteries, there are 10 prizes and 25 blanks. A lottery is drawn at random. What is the probability of getting a prize?

18. The following quadrilateral is an isosceles trapezoidal. Find its perimeter.
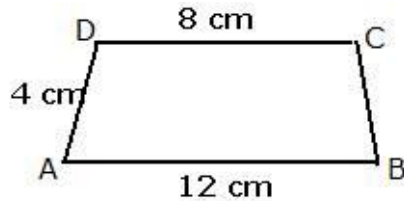
19. Three candidates contested in an election and received 1136, 7636 and 11628 votes respectively. What percentage of the total votes did the winning candidate get?

20. In the given rectangle, find the value of x and y.
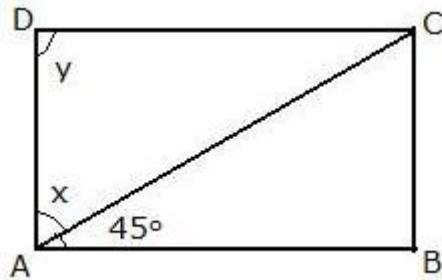
21. Observe the following pattern and write the missing numbers.
$1^2 = 1$
$11^2 = 121$
$111^2 = 12321$
$1111^2 = \underline{\hspace{1cm}}$
$11111^2 = \underline{\hspace{1cm}}$

22. Solve for x:
$$\frac{3x-1}{4} = \frac{2x+5}{3}$$

23. $\frac{-2}{3} + \left[\frac{5}{6} + \left(\frac{-4}{7}\right)\right] = \underline{\hspace{1cm}}$.

24. The sum of two numbers is 80 and their ratio is 3 : 5. Find the greatest amongst the two numbers.

Section C
(Questions 25 to 32 carry 3 marks each)

25. The following data shows the number of adult visitors and child visitors to a park. Construct a double bar graph for the given data.

Month	April	May	June
Number of adult visitors	300	500	700
Number of child visitors	200	600	600

26. What is the smallest number by which 3087 must be multiplied so that the product is a perfect cube?

27. Represent $\frac{1}{2}$ and $\frac{-1}{2}$ on the number line.

28. In a two-digit number, unit's digit is 3 more than the ten's digit. The number formed by interchanging the digits and the original number are in the ratio 7 : 4. Find the number.

29. The following pie-chart shows the percentage distribution of the expenditure incurred in publishing a book. Study the pie-chart and the answer the questions based on it.
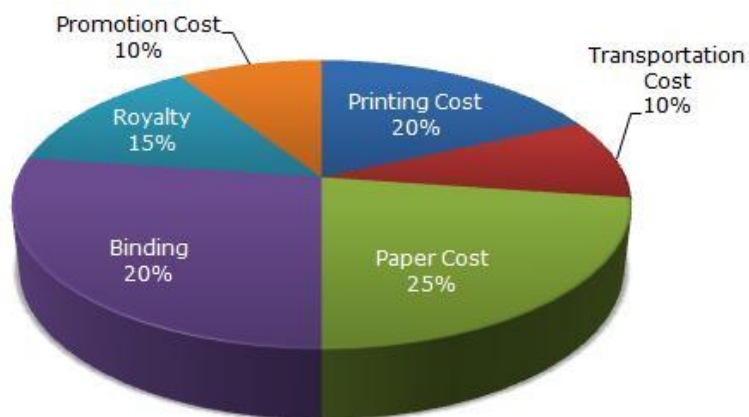
i) If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, than what will be amount of royalty to be paid for these books?

ii) What is the central angle of the sector corresponding to the expenditure incurred on Royalty?

30. Construct a rectangle PQRS in which QR = 3.5 cm and diagonal is 5.5 cm. Write the steps of construction.

31. The population of a town 2 years ago was 62500. Due to migration to cities it decreases every year at the rate of 4% per annum. Find its present population.

32. Find 5 rational numbers between $-\frac{1}{3}$ and $\frac{1}{2}$.

Section D
(Questions 33 to 37 carry 4 marks each)

33. Construct a quadrilateral ABCD in which AB = 5.5 cm, BC = 3.5 cm, CD = 4 cm, AD = 5 cm, and ∠A = 45°.

34. The table below shows the grades achieved by 30 pupils in their end-of-year exam.

Grade	A	B	C	D	E
Frequency	7	11	6	4	2

Represent above data by a pie chart.

35. The measures of two adjacent angles of a parallelogram are in the ratio 3:2. Find the measure of each of the angles of the parallelogram.

36. In what time will Rs. 1000 amount to Rs. 1331 at 10% per annum, compounded annually?

37. 36562 plants are to be planted in a garden in such a way that each row contains as many plants as the number of rows. How many plants would be left out in this arrangement?

Time: 2 ½ hours   Total Marks: 80

Section A

1.   Correct answer: C
     2.5 is greater than 2.4 and less than 2.6 and 2.7.
     Hence, on a number line, 2.5 will lie between 2.4 and 2.7.

2.   Correct answer: B
     20% of x

     $= \dfrac{20}{100} x$

     $= \dfrac{x}{5}$

3.   Correct answer: A 5

4.   Correct answer: C
     $\bcancel{||||}\,\bcancel{||||}\,|||$ = 5 + 5 + 3 = 13

5.   Correct answer: A
     1 is a square as well as a triangular number.

6.   Correct answer: B
     Cube root of (-8) x (-343) x (125) = (-2) x (-7) x 5 = 70

7.   Correct answer: C
     $2\dfrac{2}{3} = \dfrac{8}{3}$

     Thus, the multiplicative inverse of $2\dfrac{2}{3}$ is $\dfrac{3}{8}$.

8.   Correct answer: C
     $\dfrac{4}{x-1} = \dfrac{3}{x+7}$

     On cross multiplying, we get 4x + 28 = 3x - 3
     4x - 3x = - 3 - 28
     x = -31
     x + 31 = 0

9. Correct answer: A

In a rhombus, if one angle is 70º, then its opposite angle will be 70º.
(Since, opposite angles of a rhombus are equal)

10. Correct answer: A

$$\text{Central angle} = \frac{\text{Value of component}}{\text{Total value}} \times 360° = \frac{1}{4} \times 360° = 90°$$

11. Correct answer: C

Square root = 2 × 3 × 3 × 5 = 90

12. Correct answer: D

Actual C.P. = C.P. + Overhead expenses = Rs. (900 + 200) = Rs. 1100
Profit = S.P. – C.P. = Rs. 1200 – Rs. 1100 = Rs. 100

$$\text{Profit percent} = \frac{100}{1100} \times 100 = 9\frac{1}{11}\%$$

Section B

13. $\frac{2}{5} \times \frac{-3}{7} - \frac{1}{14} - \frac{3}{7} \times \frac{3}{5} = \frac{2}{5} \times \frac{-3}{7} - \frac{3}{7} \times \frac{3}{5} - \frac{1}{14}$

(by commutativity)

$= \frac{2}{5} \times \frac{-3}{7} + \left(\frac{-3}{7}\right) \times \frac{3}{5} - \frac{1}{14}$

$= \frac{-3}{7}\left(\frac{2}{5} + \frac{3}{5}\right) - \frac{1}{14}$

(by distributivity)

$= \frac{-3}{7} \times 1 - \frac{1}{14} = \frac{-6 - 1}{14} = \frac{-7}{14} = \frac{-1}{2}$

14. Let x be the greater part.
Then, 64 - x is the smaller part.
Then 3x = 5(64 - x)
3x = 320 - 5x
3x + 5x = 320
8x = 320
x = 40
So, the two parts are 40 and 24.

15. Opposite sides are equal in a parallelogram

Therefore, $3y + 1 = 19$

Or, $3y = 19 - 1$

Or, $3y = 18$

Or, $y = 6$

Also, $4x + 3 = 23$

Or, $4x = 23 - 3$

Or, $4x = 20$

Or, $x = 5$

Hence $x = 5$ and $y = 6$.

16. Let the number of chairs in each row be x.

Then, the number of rows = x.

Total number of chairs in the auditorium $= (x \times x) = x^2$

But the number of chairs that the auditorium can accommodate = 1764 (given)

2	1764
2	882
3	441
3	147
7	49
7	7
	1

$\therefore x^2 = 1764$

$= \underline{2 \times 2} \times \underline{3 \times 3} \times \underline{7 \times 7}$

$\Rightarrow x = (2 \times 3 \times 7)$

$= 42$

Hence, the number of chairs in each row is 42.

17. Here,

Total number of outcomes = 10 + 25 = 35

Let E be the event of getting a prize.

Number of outcomes favourable to event E = 10

$P(E) = \dfrac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \dfrac{10}{35} = \dfrac{2}{7}$

Probability of getting a prize $= \dfrac{2}{7}$

18. Since ABCD is an isosceles trapezoidal, we have AD = BC

Therefore, AD = BC = 4 cm.

Now the perimeter of given trapezium

= AB + BC + CD + DA

= 12 + 4 + 8 + 4

= 28

Hence, the perimeter of the given trapezium is 28 cm.

19. Total number of votes = (1136 + 7636 + 11628) = 20400.

Therefore, required percentage $= \left(\dfrac{11628}{20400} \times 100\right)\% = 57\%$

20. Since, the measure of each angle of rectangle is 90°.

Therefore, $\angle ADC = y = 90^{\circ}$

Also, $\angle BAD = 90^{\circ}$

This gives, $x + 45^{\circ} = 90^{\circ}$

$x = 90^{\circ} - 45^{\circ} = 45^{\circ}$

Hence, $x = 45^{\circ}$ and $y = 90^{\circ}$.

21. It can be observed that the squares of the given numbers can be found by first writing the counting number up to the number of 1's and then writing the   reverse counting till 1.

Thus, $1111^2 = 1234321$

$11111^2 = 123454321$

22. By cross multiplication, we get,

$3(3x-1) = 4(2x+5)$

$9x-3 = 8x +20$

$9x-8x-3 = 20$ (transposing 8x to LHS)

$9x-8x = 20+3$ (transposing -3 to RHS)

$x = 23$

23.

$$\dfrac{-2}{3} + \left[\dfrac{5}{6} + \left(\dfrac{-4}{7}\right)\right]$$

$$= \dfrac{-2}{3} + \left(\dfrac{35-24}{42}\right)$$

$$= \dfrac{-2}{3} + \dfrac{11}{42}$$

$$= \dfrac{-28+11}{42}$$

$$= \dfrac{-17}{42}$$

24.

Let one number be x and the other number be (80 - x).

From the given information, we have:

$$\frac{x}{80 - x} = \frac{3}{5}$$
$$5x = 240 - 3x$$
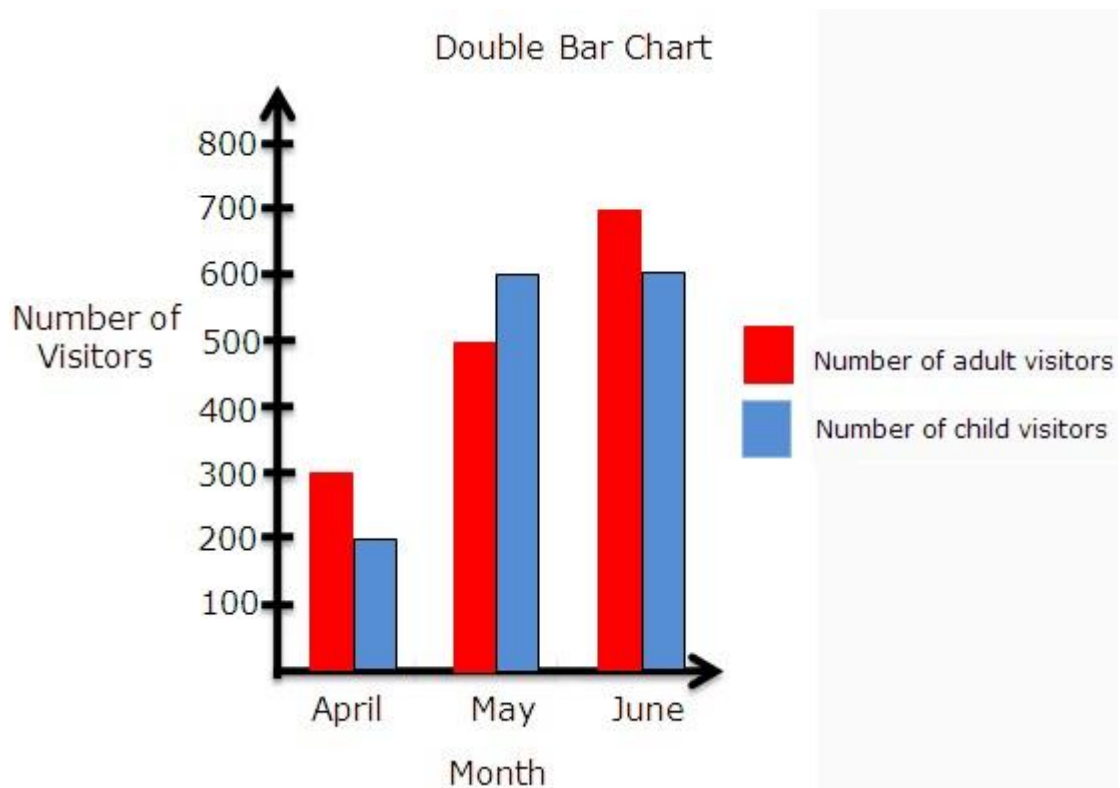$$5x + 3x = 240$$
$$8x = 240$$
$$x = \frac{240}{8} = 30$$

Thus, the two numbers are 30 and (80 - 30) = 50.

Hence, the greatest number amongst the two is 50.

Section C

25. Represent the months on the x-axis and the number of visitors on the y-axis. The double bar graph is as follows:

Double Bar Chart

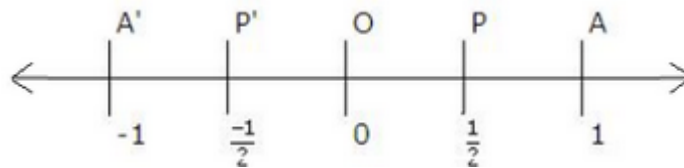**26.** The prime factorisation of 3087 is

3087 = 3 × 3 × <u>7 × 7 × 7</u>

Prime factor 3 does not appear in a group of 3.

Clearly, to make 3087 a perfect cube, it must be multiplied by 3. Then, we have:

3087 × 3 = <u>3 × 3 × 3</u> × <u>7 × 7 × 7</u> = (3 × 7)³ = 21³

27. Draw a number line. Take a point O on it to represent 0. Set off unit length OA to the right of O and OA' to the left of O.

Then, A represents the integer 1 and A' represents the integer -1.

Now, divide OA into two equal parts.

The point P represents the rational number $\dfrac{1}{2}$.

Again, divide OA' into two equal parts.

The point P' represents the rational number $\dfrac{-1}{2}$.

28. Let the digit at the ten's place be x

The digit at the unit's place = (x + 3)

The number is 10x + (x + 3)

The number formed by interchanging the digits = 10(x + 3) + x

As per the given information,

$$\frac{10(x+3)+x}{10x+(x+3)}=\frac{7}{4}$$

Cross multiplying, we get

4(10x + 30 + x) = 7(10x + x + 3)

40x + 120 + 4x = 70x + 7x + 21

44x +120 = 77x + 21

120 - 21 = 77x - 44x

99 = 33x

x = 3

So, the digit at the ten's place = 3

And the digit at the unit's place = (x + 3) = 3 + 3 = 6

Thus, the number is 36.

29.

    i) Let the amount of Royalty to be paid for these books is Rs. r.

       Then, $20 : 15 = 30600 : r$

$$\Rightarrow r = Rs\left(\frac{30600 \times 15}{20}\right) = Rs.\ 22,950$$

    ii) Central angle corresponding to Royalty = 15% of 360°

$$= \frac{15}{100} \times 360^\circ$$

$$= 54^\circ$$

30. In a rectangle both the diagonals are equal, so we have PR = QS = 5.5 cm and each angle is 90°. So $\angle Q = \angle R = 90°$.
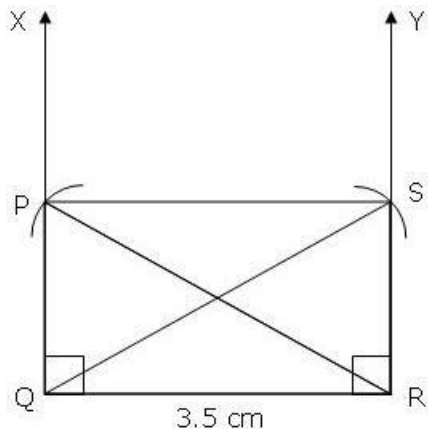
Steps of construction:

a) Draw QR = 3.5 cm.

b) Draw $\angle XQR = 90°$ and $\angle YRQ = 90°$.

c) With R as centre and radius 5.5 cm draw an arc to cut QX at P.

d) With Q as centre and radius 5.5 cm, draw an arc to cut RY at S.

e) Join PS.

PQRS is the required rectangle.

31. Population 2 years ago = 62500

Rate of decrease = 4% per annum

Therefore, present population

$$= 62500 \times \left(1 - \frac{4}{100}\right)^2$$

$$= 62500 \times \frac{24}{25} \times \frac{24}{25}$$

$$= 57600$$

Hence, the present population of the town is 57600.

32. Convert the given rational numbers to equivalent rational numbers having same denominators.

$$\frac{-1}{3} = \frac{-1 \times 4}{3 \times 4} = \frac{-4}{12}$$

$$\frac{1}{2} = \frac{1 \times 6}{2 \times 6} = \frac{6}{12}$$

The integers between -4 and 6 are -3, -2, -1, 0, 1, 2, 3, 4, 5.

Thus, any five rational numbers lying between the given rational numbers are

$$\frac{-3}{12}, \frac{-2}{12}, \frac{-1}{12}, \frac{0}{12}, \frac{1}{12}$$

Section D

33. Steps of Construction:

1) Draw AB = 5.5 cm.

2) At A, construct ∠BAK = 45°.

3) Cut off AD = 5 cm from AK.

4) With B and D as centres and radii 3.5 cm and 4 cm respectively, draw two arcs cutting each other at C.

5) Join BC and DC.

ABCD is the required quadrilateral.
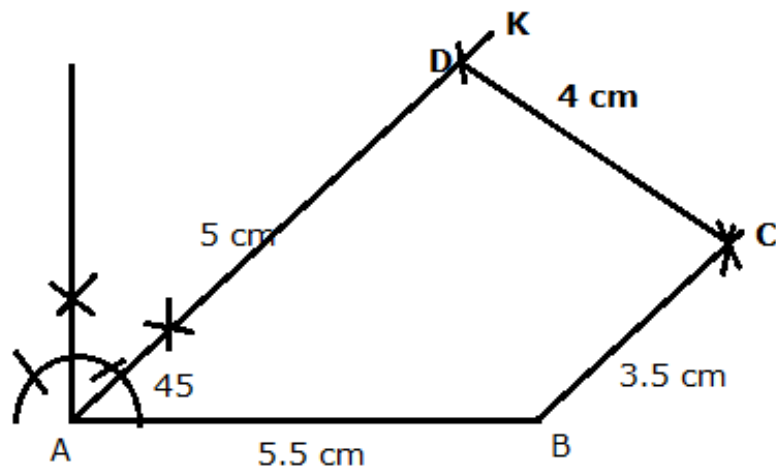
34. To show this information in a pie chart, follow the steps given below.

Work out the total number of pupils: 7 + 11 + 6 + 4 + 2 = 30

To work out the angle of each segment, work out the fraction of the total for each grade.

Fraction for grade A = $\dfrac{7}{30}$

There are 360° in a full turn, so to work out the angle, multiply the fraction by 360°:

$\dfrac{7}{30} \times 360 = 84°$

Angle made by the sector representing grade A is 84°

Repeat this process to find the angle of the sectors for the other grades

Grade	Frequency	Angle
A	7	$\dfrac{7}{30} \times 360° = 84°$
B	11	$\dfrac{11}{30} \times 360° = 132°$
C	6	$\dfrac{6}{30} \times 360° = 72°$
D	4	$\dfrac{4}{30} \times 360° = 48°$
E	2	$\dfrac{2}{30} \times 360° = 24°$

The steps to draw the pie chart are as follows:

1) Draw a line segment xy. Make an angle of 84° with xy. This sector will correspond to grade A.

2) Continue making the sectors B, C, D and E to obtain the required pie chart.

35. Let the measures of two adjacent angles, $\angle A$ and $\angle B$, of parallelogram ABCD are in the ratio of 3 : 2.
Let $\angle A = 3x$ and $\angle B = 2x$
We know that the sum of the measures of adjacent angles is 180° for a parallelogram.
$\angle A + \angle B = 180°$
$3x + 2x = 180°$
$5x = 180°$
$x = \dfrac{180°}{5} = 36°$
$\angle A = \angle C = 3x = 108°$ (Opposite angles)
$\angle B = \angle D = 2x = 72°$ (Opposite angles)
Thus, the measures of the angles of the parallelogram are 108°, 72°, 108° and 72°.

36. Let the time required be n years.
Then,
$$\text{amount} = Rs\left\{1000 \times \left(1 + \frac{10}{100}\right)^n\right\}$$
$$= Rs\left\{1000 \times \left(\frac{11}{10}\right)^n\right\}$$
but,
$$Rs\left\{1000 \times \left(\frac{11}{10}\right)^n\right\} = Rs\ 1331$$
$$\Rightarrow \left(\frac{11}{10}\right)^n = \frac{1331}{1000} = \frac{11 \times 11 \times 11}{10 \times 10 \times 10}$$
$$\Rightarrow \left(\frac{11}{10}\right)^n = \left(\frac{11}{10}\right)^3$$
$$\Rightarrow n = 3$$
Hence, the required time = 3 years.

37. It is given that 36562 plants are to be planted.
Number of rows = Number of plants in each row
The number of plants which will be left out in this arrangement has to be calculated.
That is, the number which should be subtracted from 36562 to make it a perfect square has to be calculated.
The square root of 36562 can be calculated by long division method as follows.
Number of plants left = 81