10th - Maths

SN	
1	Aadya has 143 stamps; she gives away 11 stamps and divides the remaining equally into groups. Sumit has 220 stamps; he gives away 11 stamps and divides the remaining equally into groups. They end up with the same number of groups. What is the number of stamps in Aadya's and Sumit's groups?
2	A number is multiplied by 5. Then, 40 is subtracted from the product. The result obtained is then multiplied by 2 and 50 subtracted from the product so obtained. The answer is a two-digit number. What is the largest integer that can be used to get a two-digit number as the answer?
3	Richa is an artificial jewellery seller. She buys them from a dealer at a price based on the presence or absence of stones as shown in the table below. Item / With stones / Without stones Ring / 110 / 70 Earring pair / 170 / 90 Bangle pair / 90 / 120 For every ring with stones, two rings without stones are purchased by Richa's customers. Richa buys rings accordingly from the dealer for Rs 10 000. How many rings does she buy?
4	Richa is an artificial jewellery seller. She buys them from a dealer at a price based on the presence or absence of stones as shown in the table below. Item / With stones / Without stones Ring / 110 / 70 Earring pair / 170 / 90 Bangle pair / 90 / 120 In her next visit to the dealer, Richa finds that dealer has increased the price of rings with stones by Rs 10. Richa still wants to spend Rs 10 000 on rings. What is the reduction in the number of rings she buys? ✗ (a) 10 ✓ (b) 7 ✗ (c) 14 ✗ (d) 15
5	Richa is an artificial jewellery seller. She buys them from a dealer at a price based on the presence or absence of stones as shown in the table below. Item / With stones / Without stones Ring / 110 / 70 Earring pair / 170 / 90 Bangle pair / 90 / 120 The dealer increases the price of one type of earrings. Richa buys earrings (with stones and without stones) in the ratio of 5:9 before the price hike. After the price hike, she buys earrings in the ratio of 8:13 with the same amount of money. Does she buy more earrings with stones than earrings without stones after the price hike? Give reasons.
6	

Richa is an artificial jewellery seller. She buys them from a dealer at a price based on the presence or absence of stones as shown in the table below.

Item	With stones	Without stones
Ring	110	70
Earring pair	170	90
Bangle pair	90	120

Richa purchases 37 pairs of bangles with stones and 33 pairs of bangles without stones.
She divides them into two sets. Set 1 contains 40 pairs of bangles, and set 2 contains 30 pairs of bangles.
What is the difference between the number of bangle pairs with stones in set 1 and the number of bangle pairs without stones in set 2?

✗ (a) 4

✓ (b) 7

✗ (c) 10

✗ (d) 30

7

Richa is an artificial jewellery seller. She buys them from a dealer at a price based on the presence or absence of stones as shown in the table below.

Item	With stones	Without stones
Ring	110	70
Earring pair	170	90
Bangle pair	90	120

Despite the price hike by the dealer, Richa increases the number of jewellery with stones she purchases for her customers. What could be the reason for her decision?

8

Kartik is a salesman of mobile phones. His yearly target is to sell a fixed number of mobile phones in a year. He planned to meet 6/11 of his yearly target by selling the phones during a festive month. He could only meet 6/11 of his target for the festive month. He now has to meet the remaining target for the month and sell 425 more mobile phones to meet his yearly target. Approximately what percentage of the yearly target was met during the festive month?

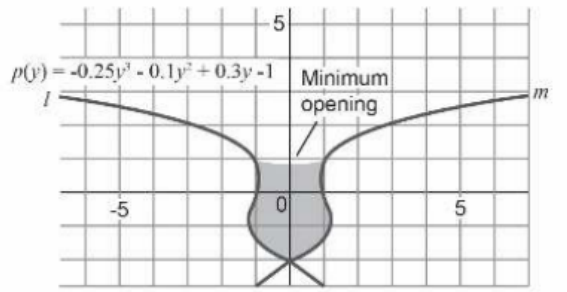
9

Kartik is a salesman of mobile phones. His yearly target is to sell a fixed number of mobile phones in a year. He planned to meet 6/11 of his yearly target by selling the phones during a festive month. He could only meet 6/11 of his target for the festive month. He now has to meet the remaining target for the month and sell 425 more mobile phones to meet his yearly target. How many units of the mobile phones did Kartik have to sell to meet his yearly target?

10

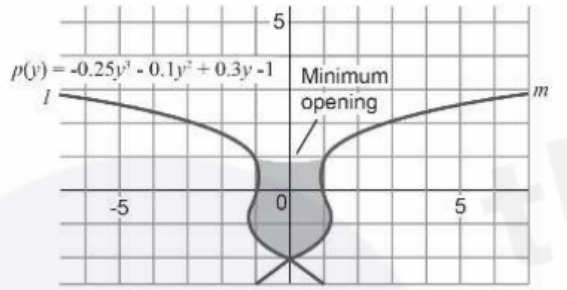
Aadya has 143 stamps. She gives away 11 stamps and divides the remaining equally into groups; Sumit has 220 stamps. He gives away 11 stamps and divides the remaining equally into groups. They end up with the same number of groups. What is the number of groups?

11



Amit designs a flower vase using a graph of polynomial equations. Equation of the curve l is given in the graph. Sara looks at the graphical model and makes an observation, “The zero of the polynomial is at the origin.” Is she correct? If not, what are the coordinates of the zero of the polynomial

12



Amit designs a flower vase using a graph of polynomial equations. Equation of the curve l is given in the graph.
The curve m is a mirror image of p(y) on the y axis. Which polynomial represents curve m?

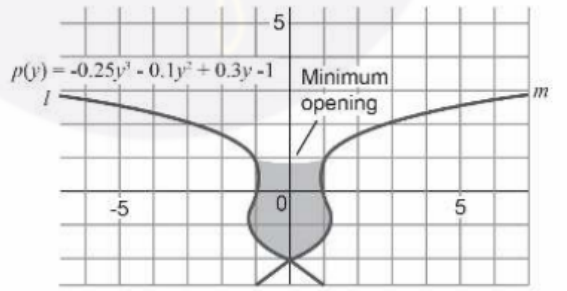
✗ (a) $-0.25y^3 - 0.1y^2 + 0.3y - 1$

✗ (b) $-0.25y^3 - 0.1y^2 - 0.3y - 1$

✓ (c) $0.25y^3 + 0.1y^2 - 0.3y + 1$

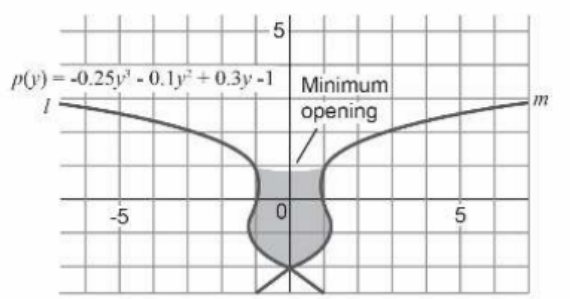
✗ (d) $-0.25y^3 + 0.1y^2 - 0.3y$

13



Amit designs a flower vase using a graph of polynomial equations. Equation of the curve l is given in the graph.
Sara changes the coefficient of y^3 in the polynomials for the curves l and m. How does it affect the shape of the flowerpot?

14



Amit designs a flower vase using a graph of polynomial equations. Equation of the curve l is given in the graph.
Amit wants to decrease the minimum opening of the flower pot. Which term of the polynomials for the curves l and m should he change?

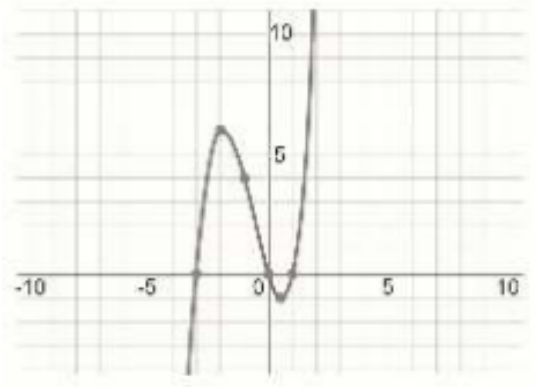
15

Ajit uses a cardboard sheet of 30 cm × 40 cm to design a box. He marks four squares of equal size with side length x cm to draw the net of the open box. Ajit folds the net to make an open box. What will be the volume of the open box?

16

Ajit uses a cardboard sheet of 30 cm × 40 cm to design a box. He marks four squares of equal size with side length x cm to draw the net of the open box.
Ajit decides that the height of the box should be lesser than its length and width. What are the possible range of values for x?

17



A graph of a cubic polynomial is plotted on a graph paper. What is the sum of the roots of the polynomial?

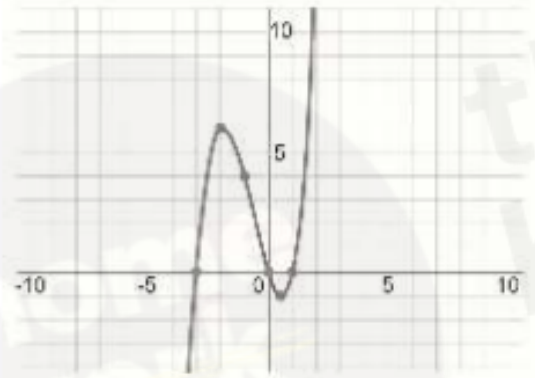
✗ (a) 3

✗ (b) 4

✓ (c) -2

✗ (d) 2

18



A graph of a cubic polynomial is plotted on a graph paper. The graph of a polynomial shows it is extended on both sides. What does it indicate about the values of the y co-ordinate?

19

A quadratic polynomial has integral roots. The sum of its roots is 7. Which of the following cannot be the constant term of the polynomial?

✗ (a) 6

✗ (b) 10

✗ (c) 12

✓ (d) 14

20

A polynomial is given by p(x) = $x^3 - 2x^2 + \frac{3}{4}x$
For what values of x is the polynomial p(x) = 0?

21

Tickets for a play can be booked online as well as purchased from the theatre. A 10% discount is available on online ticket purchase. Simran likes to watch plays. She purchased the ticket online for

a play. The ticket and food cost her Rs 600. The cost of food was one-third the cost of the ticket. Simran purchased the ticket for a musical play from the theatre. How much can she spend on food in Rs 600?

✗ (a) 200
✗ (b) 300
✓ (c) 100
✗ (d) 500

22

A group of friends went to watch a play. Some of them purchased tickets online and some bought them at the theatre. If two more had purchased online tickets the total ticket price would be Rs 100 less.
Is this true for any group greater than 2? Why?

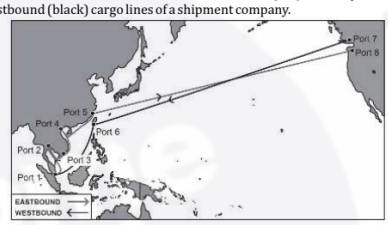
23

In the theatre canteen, two packets of popcorn and a mango drink cost Rs 330. One packet of popcorn and two mango drinks cost Rs 300. What is the cost of the packet of popcorn?

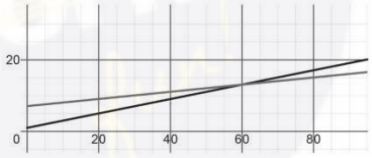
✗ (a) 100
✓ (b) 120
✗ (c) 150
✗ (d) 200

24

Large cargo ships ferry cargo between ports. They take months to ferry them from one port to another. The distance in the sea is calculated in nautical miles (nm). The map shows the eastbound (grey) and westbound (black) cargo lines of a shipment company.



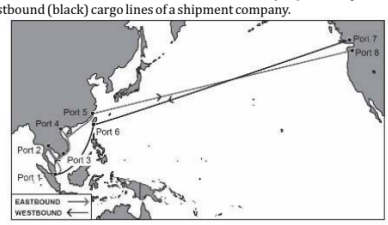
The distance between port 6 and port 7 is approximately 20 000 nm and a ship takes 95 days to travel between the ports in either direction.
The distance-time graph drawn by Pooja shows the journey of eastbound and westbound ships.



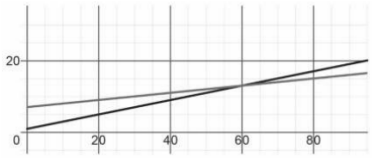
What do the two axes in the graph show?

25

Large cargo ships ferry cargo between ports. They take months to ferry them from one port to another. The distance in the sea is calculated in nautical miles (nm). The map shows the eastbound (grey) and westbound (black) cargo lines of a shipment company.



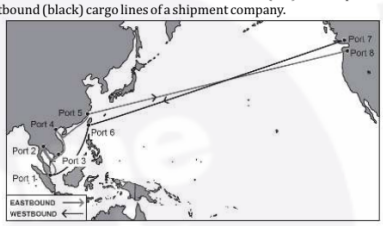
The distance between port 6 and port 7 is approximately 20 000 nm and a ship takes 95 days to travel between the ports in either direction.
The distance-time graph drawn by Pooja shows the journey of eastbound and westbound ships.



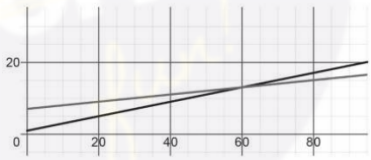
According to Pooja's graph, what is the approximate distance travelled by the eastbound ship during these 95 days?

26

Large cargo ships ferry cargo between ports. They take months to ferry them from one port to another. The distance in the sea is calculated in nautical miles (nm). The map shows the eastbound (grey) and westbound (black) cargo lines of a shipment company.

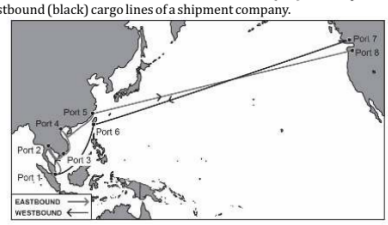
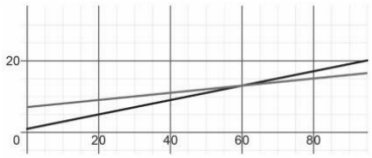


The distance between port 6 and port 7 is approximately 20 000 nm and a ship takes 95 days to travel between the ports in either direction.
The distance-time graph drawn by Pooja shows the journey of eastbound and westbound ships.



Anish looks at the graph and claims that an eastbound ship route meets the westbound route at 13000 nm. Is he correct? Give reasons.

27

	Large cargo ships ferry cargo between ports. They take months to ferry them from one port to another. The distance in the sea is calculated in nautical miles (nm). The map shows the eastbound (grey) and westbound (black) cargo lines of a shipment company.  The distance between port 6 and port 7 is approximately 20 000 nm and a ship takes 95 days to travel between the ports in either direction. The distance-time graph drawn by Pooja shows the journey of eastbound and westbound ships.  The eastbound and westbound journeys are of different length in 95 days. What can be the possible reason for it?
28	Given below is a pair of linear equations. $4x + y = 8, 4x - 2y = 16$ Is the given pair of equations consistent? Justify your answer.
29	Given below is a pair of linear equations. $4x + y = 8, 4x - 2y = 16$ Does $x= 3$ and $y= -4$ satisies the pair of linear equations? Justify your answer.
30	

Digital images consist of pixels. A pixel can be considered as the smallest unit on a display screen in a mobile or a computer. The number of pixels, their size and colours depend on the display screen and its graphic card. Display screens are rectangular in shape and their size is defined as the length of the diagonal.
Amit is designing a web page for a display on a screen whose size is 1000 pixels.
The width of the screen is 800 pixels.
Which of the following equation can be used to calculate the height (h) of the screen?

✗ (a) $h^2 + 200 \times 1800 = 0$

✓ (b) $h^2 - 200 \times 1800 = 0$

✗ (c) $h^2 - 200 = 0$

✗ (d) $h^2 - 1800 = 0$

31

Digital images consist of pixels. A pixel can be considered as the smallest unit on a display screen in a mobile or a computer. The number of pixels, their size and colours depend on the display screen and its graphic card. Display screens are rectangular in shape and their size is defined as the length of the diagonal.
Amit is designing a web page for a display on a screen whose size is 1000 pixels.
The width of the screen is 800 pixels.
The size of a screen display can be measured in inches also. Is it possible to have a screen of size 13 inches where the width is 7 inches more than height? Give an example to justify.

32

Digital images consist of pixels. A pixel can be considered as the smallest unit on a display screen in a mobile or a computer. The number of pixels, their size and colours depend on the display screen and its graphic card. Display screens are rectangular in shape and their size is defined as the length of the diagonal.
Amit is designing a web page for a display on a screen whose size is 1000 pixels.
The width of the screen is 800 pixels.
The size of a screen is an important factor in designing a web page. The page can be opened on different screen sizes but during the initial designing stage, one screen area is considered as the safe area. The content in the safe area can be viewed without horizontal and vertical scrolling of the web page. The safe area of a web page is 40 pixels less than the width and 190 pixels less than the height of the
display screen. Which of the following expression represents the safe area for the screen whose screen height is 200 pixels less than the screen width (w)?

✗ (a) $w^2 - 50w + 400$

✗ (b) $w^2 - 350w + 30400$

✓ (c) $w^2 - 430w + 15600$

✗ (d) $w^2 - 200w + 7600$

33

Which of the following is not a method of solving a quadratic equation?

✗ (a) Factorisation

✗ (b) Completing the square

✗ (c) Using quadratic formula

✓ (d) Identifying the nature of the root

34

Given below is the conversation between Gayatri and a mason.
Gayatri: 'Here are some 90 cm × 90 cm tiles. I want to use these in flooring of our courtyard.'
Mason: 'If I use all of these tiles, there will be four more columns than rows.'
Gayatri: 'I want to make a square floor.'
Mason: 'Either some tiles will be left unused or 35 additional tiles are required.'
Gayatri: 'I do not think 35 additional tiles are required to make a square courtyard.'
Mason: 'Okay, that is possible, but you still have to buy some more.'
How many tiles did Gayatri have?

✓ (a) 221
✗ (b) 222
✗ (c) 223
✗ (d) 224

35

Given below is the conversation between Gayatri and a mason.
Gayatri: 'Here are some 90 cm × 90 cm tiles. I want to use these in flooring of our courtyard.'
Mason: 'If I use all of these tiles, there will be four more columns than rows.'
Gayatri: 'I want to make a square floor.'
Mason: 'Either some tiles will be left unused or 35 additional tiles are required.'
Gayatri: 'I do not think 35 additional tiles are required to make a square courtyard.'
Mason: 'Okay, that is possible, but you still have to buy some more.'
What is the minimum number of tiles she has to purchase to make a square courtyard?

✗ (a) 5
✓ (b) 4
✗ (c) 6
✗ (d) 8

36

Given below is the conversation between Gayatri and a mason.
Gayatri: 'Here are some 90 cm × 90 cm tiles. I want to use these in flooring of our courtyard.'
Mason: 'If I use all of these tiles, there will be four more columns than rows.'
Gayatri: 'I want to make a square floor.'
Mason: 'Either some tiles will be left unused or 35 additional tiles are required.'
Gayatri: 'I do not think 35 additional tiles are required to make a square courtyard.'
Mason: 'Okay, that is possible, but you still have to buy some more.'
For the minimum number of tiles purchased, what can be the side length (in m) of the square courtyard?

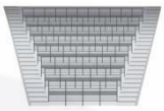
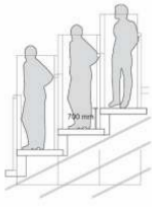
✗ (a) 12.5
✓ (b) 13.5
✗ (c) 14.5
✗ (d) 15.5

37

Under a relief scheme, Rs. n^2 was distributed among 'n' number of people. The first beneficiary received Re. 1 plus $\frac{1}{n+1}$ of the remaining amount. The second beneficiary receivedRs. 2 plus $1\frac{1}{n+1}$ of the remaining amount. The third beneficiary received Rs. 3 plus $1\frac{1}{n+1}$ of the remaining amount. The distribution is done in the same pattern for all the beneficiaries.
Which of the following expression represent money received by the first beneiciary?

✗ (a) $1+\frac{1}{n}(n^2-1)$
✗ (b) $1+\frac{1}{n}\times n$
✗ (c) $1+\frac{1}{(n+1)}\times n$
✓ (d) $1+\frac{1}{(n+1)}(n^2-1)$

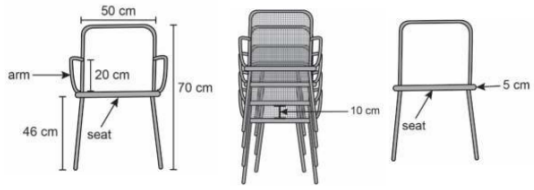
38

	Under a relief scheme, Rs. n^2 was distributed among 'n' number of people. The first beneficiary received Re. 1 plus $\frac{1}{n+1}$ of the remaining amount. The second beneficiary receivedRs. 2 plus $1\frac{1}{n+1}$ of the remaining amount. The third beneficiary received Rs. 3 plus $1\frac{1}{n+1}$ of the remaining amount. The distribution is done in the same pattern for all the beneficiaries. Who do you think will get the maximum amount?
39	Under a relief scheme, Rs. n^2 was distributed among 'n' number of people. The first beneficiary received Re. 1 plus $\frac{1}{n+1}$ of the remaining amount. The second beneficiary receivedRs. 2 plus $1\frac{1}{n+1}$ of the remaining amount. The third beneficiary received Rs. 3 plus $1\frac{1}{n+1}$ of the remaining amount. The distribution is done in the same pattern for all the beneficiaries. Is the distribution of the relief fund fair? Justify your answer.
40	Stadium seating surrounds the centre pitch. Each row in the seating is positioned at a slightly higher level than the one in front of it. A safe seating-standing section of a stadium is shown in the figure below.  There are 20 rows in the section. Each row in the section is 700 mm in height, excluding the seat and has one more seat than the previous row, starting from the second row. The first row has 4 seats. What is the seating capacity of the section? ✗ (a) 80 ✗ (b) 210 ✓ (c) 270 ✗ (d) 840
41	Sam is standing in Row 15 and Ronit is standing in Row 1.  Sam is standing in Row 15 and Ronit is standing in Row 1. How much higher is Sam's row than Ronit's?
42	Sam is standing in Row 15 and Ronit is standing in Row 1.  The height of the section is measured from the foot of the first row to the last row.

What is the height of the section?

43

A chair is available in two models – with arms and without arms. A person bought 20 chairs of each model. After use, he stacked the chairs in a storeroom. The height of the storeroom is 1.55 m. The dimensions of the chair and how they are stacked is shown in the figure below.



The dimensions of the seat (in cm) is 50×40×5.

What is the height of the stack shown in the figure?

✗ (a) 30

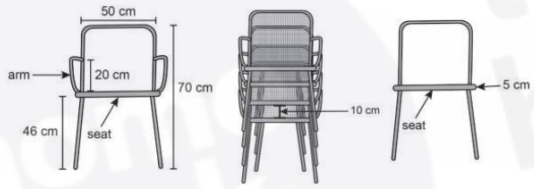
✗ (b) 76

✓ (c) 100

✗ (d) 110

44

A chair is available in two models – with arms and without arms. A person bought 20 chairs of each model. After use, he stacked the chairs in a storeroom. The height of the storeroom is 1.55 m. The dimensions of the chair and how they are stacked is shown in the figure below.



The dimensions of the seat (in cm) is 50×40×5.

What is the maximum number of chairs with arms that can be stacked in the storeroom?

✗ (a) 4

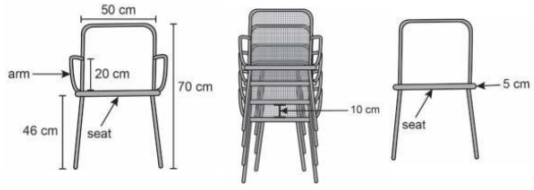
✓ (b) 8

✗ (c) 9

✗ (d) 10

45

A chair is available in two models – with arms and without arms. A person bought 20 chairs of each model. After use, he stacked the chairs in a storeroom. The height of the storeroom is 1.55 m. The dimensions of the chair and how they are stacked is shown in the figure below.

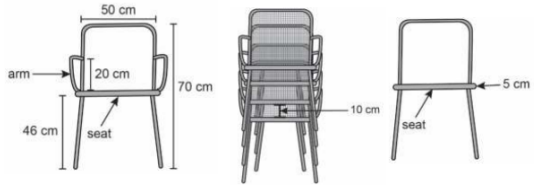


The dimensions of the seat (in cm) is 50×40×5.

What is the maximum number of chairs without arms that can be stacked in the storeroom?

46

A chair is available in two models – with arms and without arms. A person bought 20 chairs of each model. After use, he stacked the chairs in a storeroom. The height of the storeroom is 1.55 m. The dimensions of the chair and how they are stacked is shown in the figure below.



The dimensions of the seat (in cm) is 50×40×5.

What is the minimum number of columns (stacks) in which all chairs can be stacked in the storeroom?

47

A chair is available in two models – with arms and without arms. A person bought 20 chairs of each model. After use, he stacked the chairs in a storeroom. The height of the storeroom is 1.55 m. The dimensions of the chair and how they are stacked is shown in the figure below.

The dimensions of the seat (in cm) is 50×40×5.

What can be the dimension of the storeroom (in m)?

✗ (a) 0.3x1.5x1.55
✗ (b) 0.4x1.75x1.55
✗ (c) 0.5x0.4x1.55
✓ (d) 1x2.75x1.55

48

What cannot be the difference between four consecutive terms of an arithmetic progression?

✗ (a) 0,0,0
✗ (b) -2,-2,-2
✓ (c) 2,3,4
✗ (d) 2/7,2/7,2/7

49

Sidharth is sitting in the center seat of Row 12 in a stadium. If there are total 15 seats in this row, how many seats are on his left?

✗ (a) 5
✓ (b) 7
✗ (c) 8
✗ (d) 24

50

Some concrete water towers have been built to supply water to the localities nearby. They are usually mounted with a cylindrical tank. A water tower for a locality is 40 m high.

The water tower cast a shadow of 25 m. At the same time, a tree near it casts a shadow of 5 m. What is the height of the tree?

✗ (a) 3.12m

✓ (b) 8m

✗ (c) 20m

✗ (d) 25m

51

Some concrete water towers have been built to supply water to the localities nearby. They are usually mounted with a cylindrical tank. A water tower for a locality is 40 m high.

A scale model of the water tower of 100 cm height is created. The height of its pillars is 75 cm each. What is the height of a pillar (in m) in the actual water tower?

✗ (a) 7.5

✗ (b) 25

✓ (c) 30

✗ (d) 53.4

52

Some concrete water towers have been built to supply water to the localities nearby. They are usually mounted with a cylindrical tank. A water tower for a locality is 40 m high.

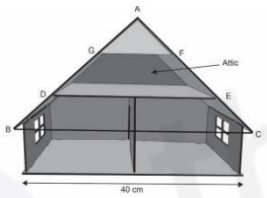
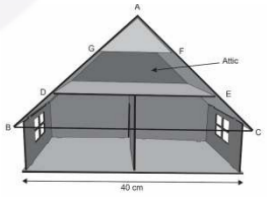
Dharmendra made a scale model of a water tower for another locality. The radius of the reservoir in the model is 6 cm and its volume is 216 cm^3. The radius of the actual water reservoir is 2.5 m. What is its volume?

53

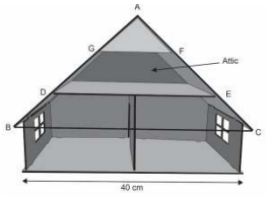
Three villages X, Y and Z are situated at the three ends of a triangular region bounded by three roads. The lengths of the roads connecting X to Y, Y to Z and Z to X are in the ratio 5:3:4. The total lengths of the three roads are 180 km. A new road is to be constructed parallel to the longest road. A team of three researchers Mayank,
Biju and Shanti work on the technical speciications of the new road construction. Each of them makes a scale drawing of the region using different scale factors. Which types of triangles are included in their scale drawings, similar or congruent? Why

54

Three villages X, Y and Z are situated at the three ends of a triangular region bounded by three roads. The lengths of the roads connecting X to Y, Y to Z and Z to X are in the ratio 5:3:4. The total lengths of the three roads are 180 km. A new road is to be constructed parallel to the longest road. A team of three researchers Mayank,

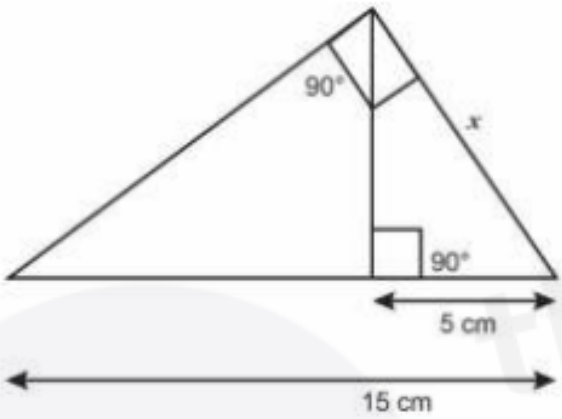
	Biju and Shanti work on the technical speciications of the new road construction. Each of them makes a scale drawing of the region using different scale factors The proposed road will meet the road between Y and Z in the middle. How far is the village Y (in km) from the meeting point of the roads?
55	A new road is to be constructed parallel to the longest road. A team of three researchers Mayank, Biju and Shanti work on the technical speciications of the new road construction. Three villages X, Y and Z are situated at the three ends of a triangular region bounded by three roads. The lengths of the roads connecting X to Y, Y to Z and Z to X are in the ratio 5:3:4. The total lengths of the three roads are 180 km. Each of them makes a scale drawing of the region using different scale factors In all the three scale drawings, the actual length of the new road is provided. Would the road length be the same in their maps? Justify your answer.
56	A dollhouse with a triangular roof is shown below. The front and back triangles are equilateral triangles with side lengths 45 cm each. Panels parallel to the floor of the dollhouse are used to make the attic. The sides DE and GF of the panels divide the sides AB and AC into three equal parts.  A dollhouse with a triangular roof is shown below. The front and back triangles are equilateral triangles with side lengths 45 cm each. Panels parallel to the floor of the dollhouse are used to make the attic. The sides DE and GF of the panels divide the sides AB and AC into three equal parts. Which criteria of similar triangles do not apply to triangles AGF and ADE? ✗ (a) AAA ✗ (b) SSS ✗ (c) SAS ✓ (d) RHS
57	A dollhouse with a triangular roof is shown below. The front and back triangles are equilateral triangles with side lengths 45 cm each. Panels parallel to the floor of the dollhouse are used to make the attic. The sides DE and GF of the panels divide the sides AB and AC into three equal parts.  The area of triangle ABC is 692 cm^2 What is the area of the plank AGF?
58	

A dollhouse with a triangular roof is shown below. The front and back triangles are equilateral triangles with side lengths 45 cm each. Panels parallel to the floor of the dollhouse are used to make the attic. The sides DE and GF of the panels divide the sides AB and AC into three equal parts.



What is the height (in cm) of the attic?

59



Two overlapping right triangles are shown below. What is the value of 'x'?

✗ (a) 4cm

✓ (b) $5\sqrt{3}$cm

✗ (c) 10cm

✗ (d) 37.5cm