MATHS SAMPLE PAPER

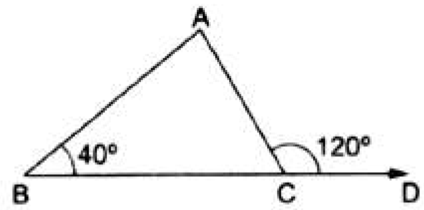
PART-A

Section-I

Section I has 16 questions of 1 mark each.

1. The complement of 72°40′ is ________.

2. In ΔABC, side BC is produced to D. If ∠ABC = 40° and ∠ACD = 120°, then find ∠A.



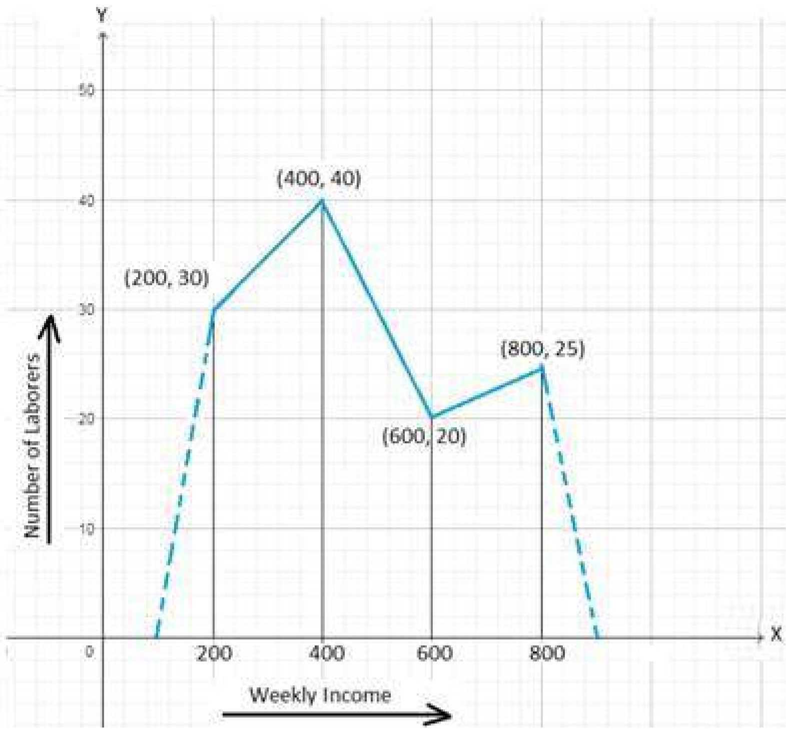
3. Three angles of a quadrilateral measure 56°, 115° and 84°. Find the measure of the fourth angle.

4. A chord of length 16 cm is drawn in a circle of radius 10 cm. Find the distance of the chord from the center of the circle.

5. The base of an isosceles triangle is 16 cm and its area is $48 cm^2$. The perimeter of the triangle is ____________.

6. Find the length of the longest pole that can be put in a room of dimensions $(10\text{ m} \times 10\text{ m} \times 5\text{ m})$.

7. The following frequency polygon displays the weekly incomes (in Rs) of labourers of a factory.



How many labourers have a weekly income of Rs 400?

8. In 50 tosses of a coin, tail appears 32 times. If a coin is tossed at random, what is the probability of getting a head?

9. Abscissa of all points on the Y–axis is ___________.

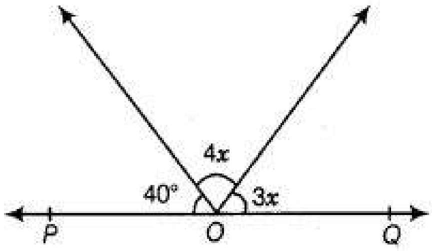
10. $\sqrt{2}$ is a polynomial of degree ___________.

11. If (2, 0) is a solution of the linear equation $2x + 3y = k$, then the value of k is ___________.

12. In ΔABC, AB = AC and ∠B = 50°. Then ∠A is equal to ___________.

13. If $p(x) = x^2 - 2\sqrt{2}x + 1$, then find the value of $p(2\sqrt{2})$.

14. In the given fig, POQ is a line. The value of x is:



15. An isosceles right triangle has area 8 cm^2, what will be the length of its hypotenuse?

16. What will be the rationalising factor of $\frac{1}{\sqrt{9}-\sqrt{8}}$?

Section II

Case-study based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

17. Case study based-1: The Pythagoreans in Greece, followers of the famous mathematician and philosopher Pythagoras, were the first to discover the numbers which were not rationals, around 400 BC. These numbers are called irrational numbers (irrationals), because they cannot be written in the form of a ratio of integers. There are many myths surrounding the discovery of irrational numbers by the Pythagorean, Hippacus of Croton. In all the myths, Hippacus has an unfortunate end, either for discovering that 2 is irrational or for disclosing the secret about 2 to people outside the secret Pythagorean sect!

(a) Which of the following numbers is not rational?

(i) 3/2 (ii) $\sqrt{3}/7$ (iii) 0.54 (iv) $5.\overline{23}$.

(b) Which of the following numbers is not irrational?

(i) 0.1232453467896548...

(ii) $\sqrt{7}$

(iii) π

(iv) 22/7

(c) The product of a rational and an irrational number is always

(i) Rational (ii) irrational (iii) integer (iv) non real number

(d) An irrational number between 2 and 2.5 is

(i) $\sqrt{11}$ (ii) $\sqrt{5}$ (iii) $\sqrt{22.5}$ (iv) $\sqrt{12.5}$

(e) The value of $0.\overline{23} + 0.\overline{22}$ is

(i) $0.\overline{45}$

(ii) $0.\overline{43}$

(iii) $0.4\overline{5}$

(iv) 0.45

18. Case study based – 2: Consider a square of side 3 units. What is its perimeter? You know that the perimeter of a square is the sum of the lengths of its four sides. Here, each side is 3 units. So, its perimeter is 4 × 3, i.e., 12 units. What will be the perimeter if each side of the square is 10 units? The perimeter is 4 × 10, i.e., 40 units. In case the length of each side is x units, the perimeter is given by 4x units. So, as the length of the side varies, the perimeter varies. Can you find the area of the square PQRS? It is x × x = x^2 square units. x^2 is an algebraic expression. You are also familiar with other algebraic expressions like 2x, $x^2 + 2x$, $x^3 - x^2 + 4x + 7$. Note that, all the algebraic expressions we have considered so far have only whole numbers as the exponents of the variable. Expressions of this form are called polynomials in one variable. In the examples above, the variable is x. For instance, $x^3 - x^2 + 4x + 7$ is a polynomial in x. Similarly, $3y^2 + 5y$ is a polynomial in the variable y and $t^2 + 4$ is a polynomial in the variable t.

(a) Degree of the polynomial $p(x) = (x + 1)(x - 1)$ is

(i) 2 (ii) 1 (iii) 0 (iv) None of these

(b) The zero of the polynomial p(x) = 2x + 5 is

(i) -2/5 (ii) -5/2 (iii) 2/5 (iv) 5/2

(c) Which of the following is a polynomial?

(i) $p(x) = 3x^2 + \sqrt{x}$

(ii) $p(x) = x + \frac{2}{x}$

(iii) $p(x) = 7x^2 - 3x^{\frac{-3}{2}} + 11$

(iv) p(x) = $\frac{7x^{\frac{3}{2}}}{\sqrt{x}}$

(d) The coefficient of x in the expansion of $(x + 3)^3$ is
(i) 9 (ii) 18 (iii) 27 (iv) None of these

(e) If x – 2 is a factor of $x^2 + 3ax - 2a$, then a is
(i) 2 (ii) -2 (iii) 1 (iv) -1

19. Case study based -3: René Déscartes, the great French mathematician of the seventeenth century, liked to lie in bed and think! One day, when resting in bed, he solved the problem of describing the position of a point in a plane. His method was a development of the older idea of latitude and longitude. In honour of Déscartes, the system used for describing the position of a point in a plane is also known as the Cartesian system.

(a) The coordinate of a point in the third quadrant is of the form
(i) (+, +) (ii) (-, +) (iii) (+, -) (iv) (-, -)

(b) The point of intersection of the axes is called the
(i) Ordinate (ii) Abscissa (iii) Origin (iv) None of these

(c) The point(-5, 8) lies in the ______ Quadrant
(i) I (ii) II (iii) III (iv) IV

(d) Ordinate of all points on the *x*-axis is
(i) 3 (ii) 4 (iii) 2 (iv) 0

(e) If $x \neq y$, then the point (x, y) in the cartesian plane is
(i) Same as (y, x)
(ii) Different from (y, x)
(iii) Depends on the values of x and y
(iv) None of these

20. Case study based – 4: In countries like USA and Canada, temperature is measured in Fahrenheit, whereas in countries like India, it is measured in Celsius. Here is a linear equation that converts Fahrenheit to Celsius:

$$F = \left(\frac{9}{5}\right)C + 32$$

Answer the questions that follow.

(a) If the temperature is 30°C, what is the temperature in Fahrenheit?
(i) 96°F (ii) 86°F (iii) 108°F (iv) 37°F

(b) If the temperature is 95°F, what is the temperature in Celsius?
(i) 37.5°C (ii) 36°C (iii) 35°C (iv) 34.7°C

(c) If the temperature is 0°C, what is the temperature in Fahrenheit?
(i) 29°F (ii) 31°F (iii) 32°F (iv) -40°F

(d) If the temperature is 0°F, what is the temperature in Celsius?
(i) -17.77°C (ii) 31.65°C (iii) 101°C (iv) None of these

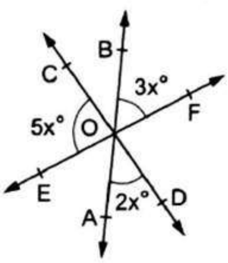
(e) Find the temperature which is numerically the same in both Fahrenheit and Celsius.
(i) 40
(ii) 0
(iii) -40
(iv) 273

PART–B

Section III

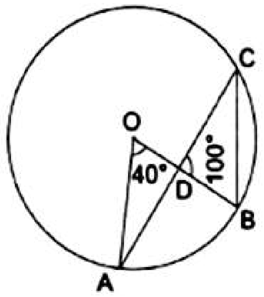
21. Evaluate: (i) $(81)^{-1/4}$ (ii) $\left(\frac{1}{3^4}\right)^{\frac{1}{2}}$

22. In the adjoining, there coplanar lines AB, CD and EF intersect at a point O. Find the value of x. Hence, find $\angle AOD$, $\angle COE$ and $\angle AOE$.



23. If the base of an isosceles triangle is produced on both sides, prove that the exterior angles so formed are equal to each other.

24. In the adjoining figure, O is the center of a circle, $\angle AOB = 40^\circ$ and $\angle BDC = 100^\circ$, find $\angle OBC$.



25. The sides of triangle are in the ratio 5 : 12 : 13 and its perimeter is 150m. Find the area of triangle.

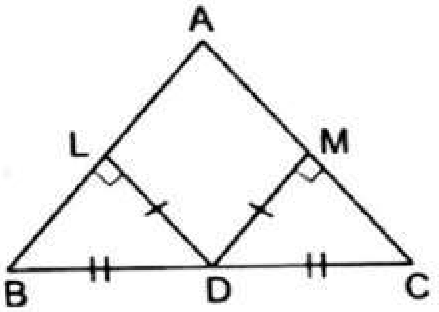
26. In a survey of 200 ladies, it was found that 142 like coffee, while 58 dislike it.

Find the probability that a lady chosen at random
(i) likes coffee, (ii) dislikes coffee.

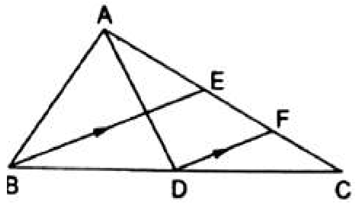
Section IV

27. The Polynomial $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ when divided by (x-1) and (x+1) leaves the remainders 5 and 19 respectively. Find the values of a and b. Hence, find the remainder when f(x) is divided by (x-2).

28. In ΔABC, D is the midpoint of BC. If $DL \perp AB$ and $DM \perp AC$ such that DL=DM, prove that AB=AC.

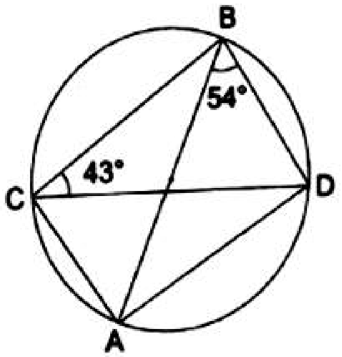


29. In the adjoining figure, AD and BE are the medians of $\Delta\,ABC$ and $DF \parallel BE.$ Show that $CF = \frac{1}{4}AC.$



30. In the given figure, $\angle ABD = 54°$ and $\angle BCD = 43°$, calculate

(i) $\angle ACD$ (ii) $\angle BAD$ (iii) $\angle BDA.$



31. The base of an isosceles triangle measures 80cm and its area is $360cm^2$. Find the perimeter of the triangle.

32. A wall 15 m long, 30 cm wide and 4 m high is made of bricks, each measuring $(22\text{ cm} \times 12.5\text{ cm} \times 7.5\text{ cm})$. If $\frac{1}{12}$ of the total volume of the wall consists of mortar, how many bricks are there in the wall?

33. Following are the ages (in years) of 360 patients, getting medical treatment in a hospital:

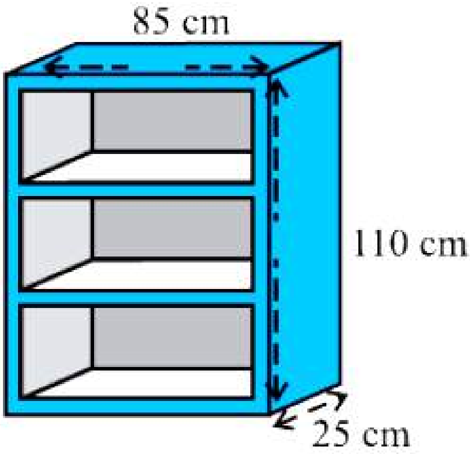
Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of patients	90	50	60	80	50	30

One of the patients is selected at random.
Find the probability that his age is
(i) 30 Year or more but less than 40 years.
(ii) 50 year or more but less than 70 years
(iii) Less than 10 years.

Section V

34. Construct a triangle PQR in which QR = 6cm, ∠Q = 60° and PR − PQ = 2cm. Mention the steps of construction.

35. A wooden bookshelf has external dimensions as follows: Height = 110 cm, Depth = 25 cm, Breadth = 85 cm. The thickness of the plank is 5 cm everywhere. The external faces are to be polished and the inner faces are to be painted. If the rate of polishing is 20 paise per cm^2 and the rate of painting is 10 paise per cm^2, find the total expenses required for polishing and painting the surface of the bookshelf.



36. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

Length (in mm)	Number of leaves
118 - 126	3
127 - 135	5
136 - 144	9
145 - 153	12
154 - 162	5
163 - 171	4
172 - 180	2

(i) Draw a histogram to represent the given data.
(ii) Is it correct to conclude that the maximum number of leave are 153 mm long? Why?

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Hints and Solutions

PART – A

Section - I

1. 17°20′

2. 80°

3. 105°

4. 6 cm

5. 36 cm

6. 15 m

7. 40

8. 9/25

9. 0

10. 0

11. 4

12. 80°

13. 1

14. 20°

15. $4\sqrt{2}$ cm

16. $\sqrt{9}+\sqrt{8}$

Section -II

17. (a) (ii) $\sqrt{3}/7$

(b) (iv) 22/7

(c) (ii) Irrational

(d) (ii) $\sqrt{5}$

(e) (i) $0.\overline{45}$

18. (a) (i) 2

(b) (ii) -5/2

(c) (iv) p(x) = $\frac{7x^{\frac{3}{2}}}{\sqrt{x}}$

(d) (iii) 27

(e) (iv) -1

19. (a) (iv) (-, -)

(b) (iii) Origin

(c) (ii) II

(d) (iv) 0

(e) (ii) Different from (y, x)

20. (a) (ii) 86°F

(b) (iii) 35°C

(c) (iii) 32°F

(d) (i) -17.77°C

(e) (iii) -40

PART – B

Section – III

21. (i) $(81)^{-\frac{1}{4}} = (3^4)^{-\frac{1}{4}} = (3)^{4\times-\frac{1}{4}} = 3^{-1} = \frac{1}{3}$.

(ii) $\left(\frac{1}{3^4}\right)^{\frac{1}{2}} = (3^{-4})^{\frac{1}{2}} = (3)^{-4\times\frac{1}{2}} = 3^{-2}$. = 1/9

22. ∠AOD + ∠DOF + ∠BOF + ∠BOC + ∠COE + ∠AOE = 360°

⇒ 2x + 5x + 3x + 2x + 5x + 3x = 360°

⇒ 20x = 360°

⇒ x = 18°

∠AOD = 2x = 2× 18° = 36°

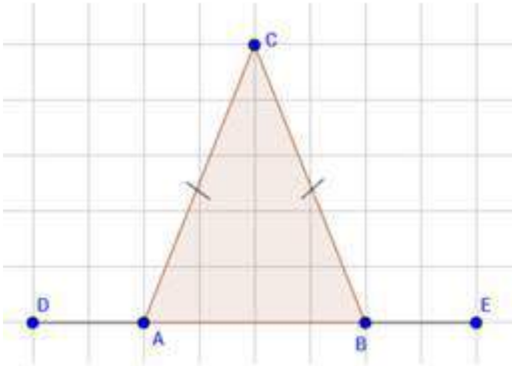
∠AOE = 3x = 3× 18° = 54°

∠COE = 5x = 4× 18° = 90°

23. Given: ΔABC is isosceles triangle.

To prove: ∠CAD = ∠CBE

Let ΔABC be our isosceles triangle as shown in the figure.



We know that base angles of the isosceles triangle are equal.

Here, ∠CAB = ∠CBA ….(1)

Also here, ∠CAD and ∠CBE are exterior angles of the triangle.

So, we know that,

∠CAB +∠CAD = 180°… exterior angle theorem

And ∠CBA + ∠CBE = 180° … exterior angle theorem

So from (1) and above statement, we conclude that,

∠CAB +∠CAD = 180°

And ∠CAB +∠CBE = 180°

Which implies that,

∠CAD = 180° - ∠CAB

And ∠CBE = 180° - ∠CAB

Hence we say that ∠CAD = ∠CBE

∴For the isosceles triangle, the exterior angles so formed are equal to each other.

24. ∠DCB = (1/2) ∠AOB [∠DCB = ∠ACB]

⇒ ∠DCB = (1/2) 40°

⇒ ∠DCB = 20°

In triangle BCD,

∠BDC + ∠DCB + ∠DBC = 180°[Sum of angles of triangle]

⇒ 100° + 20° + ∠OBC = 180°

⇒ 120° + ∠DBC = 180°

⇒ ∠DBC = 60°

∴ ∠OBC = ∠DBC = 60°

25. Let the sides of the given triangle be 5x, 12x and 13x

Given,

Perimeter of the triangle = 150m

Perimeter of the triangle = (5x + 12x + 13x)

150 = 30x

Therefore,

x = $\frac{150}{30} = 5\,m$

Thus,

Sides of the triangle are:

5x = 5 × 5 = 25 m

12x = 12 × 5 = 60 m

13x = 13 × 5 = 65 m

Let,

a = 25 m, b = 60 m and c = 65 m

Therefore,

s = $\frac{1}{2}(a+b+c)$

= $\frac{1}{2}(25+60+65)$

$= \frac{1}{2}(150)$

= 75 m

We know that,

Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{75(75-25)(75-60)(75-65)}$

$= \sqrt{75 \times 50 \times 15 \times 10}$

$= \sqrt{25 \times 3 \times 25 \times 2 \times 5 \times 3 \times 5 \times 2}$

$= \sqrt{25 \times 25 \times 5 \times 5 \times 3 \times 3 \times 2 \times 2}$

= 25 × 5 × 3 × 2

= 750 sq m

Hence, area of triangle is 750 sq m.

26. Total number of ladies: 200

Number of ladies who like coffee: 142

Number of ladies who dislike coffee: 58

Probability P(E) = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

(i). Let p(Coffee) be probability of ladies who like coffee

P (Coffee) = $\frac{\text{Number of ladies who like coffee}}{\text{Total number ladies}}$

P (Coffee) = $\frac{142}{200}$ = 0.71

(ii). Let p(No Coffee) be probability of ladies who dislikes coffee

P (No Coffee) = $\frac{\text{Number of ladies who dislike coffee}}{\text{Total number of ladies}}$

P (No Coffee) = $\frac{58}{200}$ = 0.29

Section – IV

27. Let $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$

Now,

$f(1) = 1^4 - 2(1)^3 + 3(1)^2 - a(1) + b$

$5 = 1 - 2 + 3 - a + b$

$3 = - a + b$ (i)

And,

$f(-1) = (-1)^4 - 2(-1)^3 + 3(-1)^2 - a(-1) + b$

$19 = 1 + 2 + 3 + a + b$

$13 = a + b$ (ii)

Now,

Adding (i) and (ii),

$8 + 2b = 24$

$2b = 16$

$b = 8$

Now,

Using the value of b in (i)

$3 = - a + 8$

$a = 5$

Hence,

$a = 5$ and $b = 8$

Hence,

$f(x) = x^4 - 2(x)^3 + 3(x)^2 - a(x) + b$

$= x^4 - 2x^3 + 3x^2 - 5x + 8$

$f(2) = (2)^4 - 2(2)^3 + 3(2)^2 - 5(2) + 8$

$= 16 - 16 + 12 - 10 + 8$

$= 20 - 10$

$= 10$

Therefore, remainder is 10

28. Given: BD = DC and DL ⊥ AB and DM ⊥ AC such that DL=DM

To prove: AB = AC

Proof:

In right angled triangles ΔBLD and ΔCMD,

∠BLD = ∠CMD = 90°

BD = CD … given

DL = DM … given

Thus by right angled hypotenuse side property of congruence,

ΔBLD ≅ ΔCMD

Hence, we know that, corresponding parts of the congruent triangles are equal

∠ABD = ∠ACD

In ΔABC, we have,

∠ABD = ∠ACD

∴ AB= AC …. Sides opposite to equal angles are equal

29. Here in ΔABC AD and BE are medians.

Hence, in Δ*ABC*, we have:
AC = *AE* + *EC*

But AE = *EC … as E is midpoint of AC*

∴ *AC* = *2EC …(1)*

Now in Δ*BEC*,

DF || BE

Also, *EF* = *CF … by* midpoint theorem, as *D* is the midpoint of *BC*

But,

EC = *EF* + *CF*

∴ *EC* = *2 CF …(2)*

From 1 and 2, we get,

AC = *4 CF*

$\therefore CF = \frac{1}{4}AC.$

30. (i) $\angle ACD = 54^\circ$

∠ABD and ∠ACD are in the segment AD.

∴ ∠ACD = ∠ABD [Angles in the same segment of a circle]

∠ACD = 54°

(ii) ∠BAD = 43°

∠BAD and ∠BCD are in the segment BD.

∴ ∠BAD = ∠BCD [Angles in the same segment of a circle]

∠BAD = 43°

(iii) $\angle BDA = 83^\circ$

In triangle ABD,

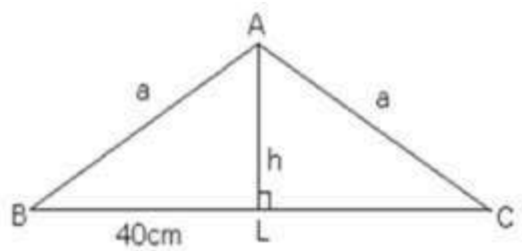
∠ABD + ∠BAD + ∠BDA = 180°[Sum of angles of triangle]

⇒ 54° + 43° + ∠BDA = 180°

⇒ 97° + ∠BDA = 180°

⇒ ∠BDA = 83°

31. Let us assume ΔABC be an isosceles triangle and let AL perpendicular BC



It is given that,

BC = 80 cm

Area of triangle ABC = 360 cm^2

We know that,

Area of triangle = $\frac{1}{2} \times base \times height$

$\frac{1}{2} \times BC \times AL$ = 360 cm^2

$\frac{1}{2} \times 80 \times h$ = 360 cm^2

$40 \times h$ = 360 cm^2

$h = \frac{360}{40}$

= 9 cm

Now,

BL = $\frac{1}{2}(BC)$

= $(\frac{1}{2} \times 80)$

= 40 cm

a = $\sqrt{BL^2 + AL^2}$

= $\sqrt{(40)^2 + (9)^2}$

= $\sqrt{1600 + 81}$

= $\sqrt{1681}$

= 41 cm

Therefore,

Perimeter of the triangle = (41 + 41 + 80) = 162 cm

32. Given,

Dimensions of wall = 15m × 30cm × 4m = 1500 cm × 30 cm × 400 cm

Dimensions of each brick = 22 cm × 12.5 cm × 7.5 cm

Volume of wall = l × b × h = 1500 × 30 × 400 = 180000000 cm^3

Area of mortar = 1/12 × volume of wall

$= \frac{1}{12} \times 180000000 = 15000000\ cm^3$

Hence,

Area occupied by bricks only = 180000000 – 15000000 = 165000000 cm^3

Number of bricks required

$= \frac{volume\ for\ bricks\ only}{volume\ of\ one\ brick} = \frac{165000000}{22 \times 12.5 \times 7.5} = 8000\ bricks.$

33. Total number of Patients: 360

Number of Patients who are 30 Years or more but less than 40 years: 60

(This includes age groups between 30-40)

Number of Patients who are 50 Years or more but less than 70 years: 80

(This includes patients of age groups 50-60 and 60-70 therefore 50+30=80)

Number of Patients who are less than 10 years: 0 (No patients below 10 years)

Number of Patients who are 10 years or more: 360 (this include all age - groups admitted in the hospital)

Probability P(E) = $\frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$

(i). Let P(P_1) be probability of patients between age groups 30-40

P (P_1) = $\frac{\text{Number of patients between age group 30−40}}{\text{Total number of patients}}$

P (P_1) = $\frac{60}{360} = \frac{1}{6}$

(ii). Let $P(P_2)$ be probability of patients between age groups 50-70

$$P(P_2) = \frac{\text{Number of patients between age groups } 50-70}{\text{Total number of patients}}$$

$$P(P_2) = \frac{80}{360} = \frac{2}{9}$$

(iii). Let $P(P_3)$ be probability of patients who are less than 10 years

$$P(P_3) = \frac{\text{Number of patients who are less than 10 years}}{\text{Total number of patients}}$$

$$P(P_3) = \frac{0}{360} = 0$$

Section – V

34. Given base QR = 6 cm

$\angle Q = 60°$

And PR – PQ = 2 cms.

Steps of construction:

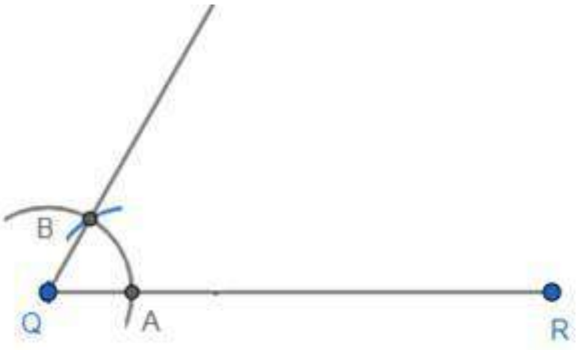
i. Draw a base line QR of 6 cms.

ii. Construct $\angle Q = 60°$.

a. With Q as centre and with any radius, draw another arc cutting the line QR at A.

b. With A as centre and with the same radius, draw an arc cutting the first arc (drawn in step a) at point B.

c. Now join the ray QB which forms an angle of 60° with the line QR.

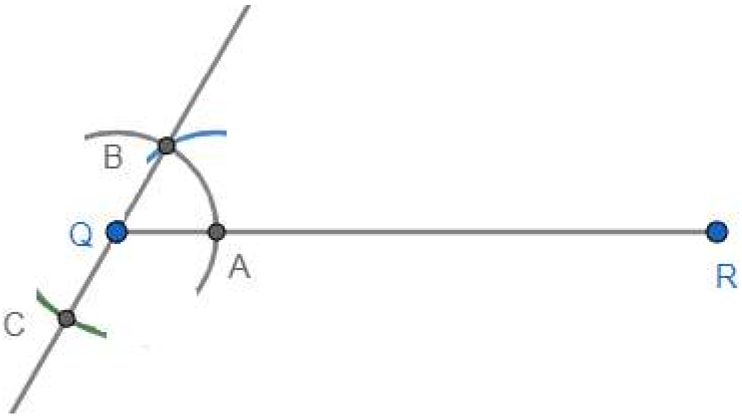


As, PR – PQ = 2

PR > PQ

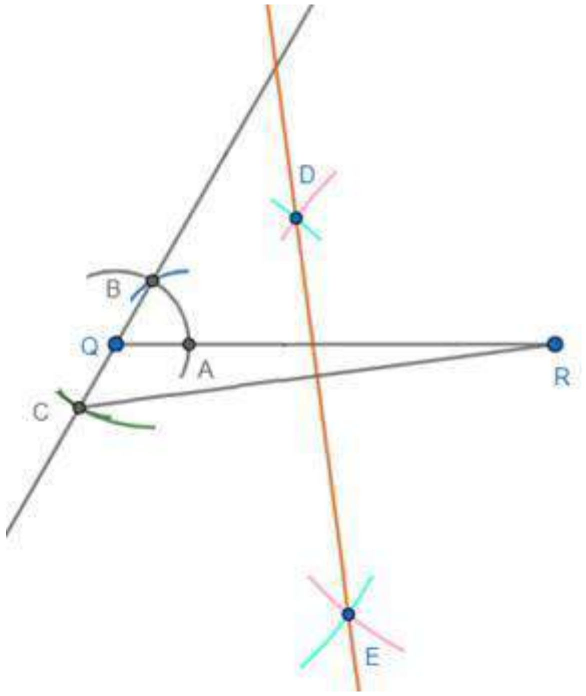
So the ray QB will be below QR

iii. Extend the ray QB below QR. With Q as centre draw an arc with length 2 cms (= PR- PQ given), such that it intersects ray QB at C below QR.

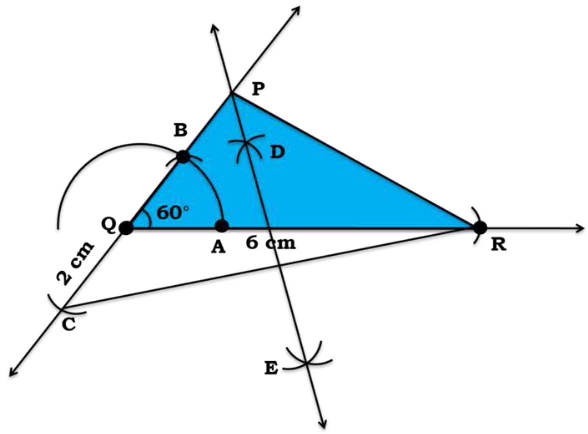


iv. Join CR and draw a perpendicular bisector for CR.

a. By drawing arcs on both sides of the line CR, with C and R as centers and with same lengths which is more than half length of CR. These arcs intersect at D and E on either side of line CR.



v. The perpendicular bisector for CR will intersect the ray QB at point P. Join PR.



Thus, the formed triangle PQR is the required triangle.

35. External height (l) of book self = 85 cm

External breadth (b) of book self = 25 cm

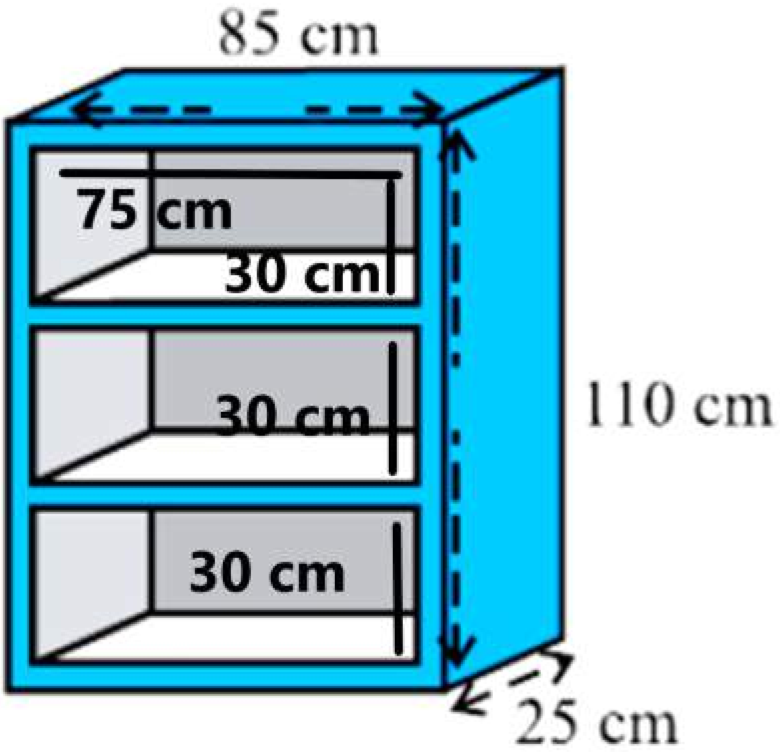
External height (h) of book self = 110 cm

The external surface area of the shelf while leaving out the front face of the shelf = lh + 2 (lb + bh)

= [85 × 110 + 2 (85 × 25 + 25 × 110)]

= (9350 + 9750)

= 19100 cm^2



we know each stripe on the front surface is also to be polished. which is 5 cm stretch.

Area of front face = [85 × 110 − 75 × 100 + 2 (75 × 5)]

= 1850 + 750

= 2600 cm^2

Area to be polished = (19100 + 2600) = 21700 cm^2

Cost of polishing 1 cm^2 area = Rs 0.20

Cost of polishing 21700 cm^2 area Rs (21700 × 0.20) = Rs 4340

It can be observed that length (l), breadth (b), and height (h) of each row of the bookshelf is 75 cm, 20 cm, and 30 cm respectively

Area to be painted in 1 row = 2 (l + h) b + lh

= [2 (75 + 30) × 20 + 75 × 30]

= (4200 + 2250)

= 6450 cm^2

Area to be painted in 3 rows = (3 × 6450)

= 19350 cm^2

Cost of painting 1 cm^2 area = Rs 0.10

Cost of painting 19350 cm^2 area = Rs (19350 × 0.1)

= Rs 1935

Total expense required for polishing and painting = Rs (4340 + 1935)

= Rs 6275

36. The parts of the questions are solved below:

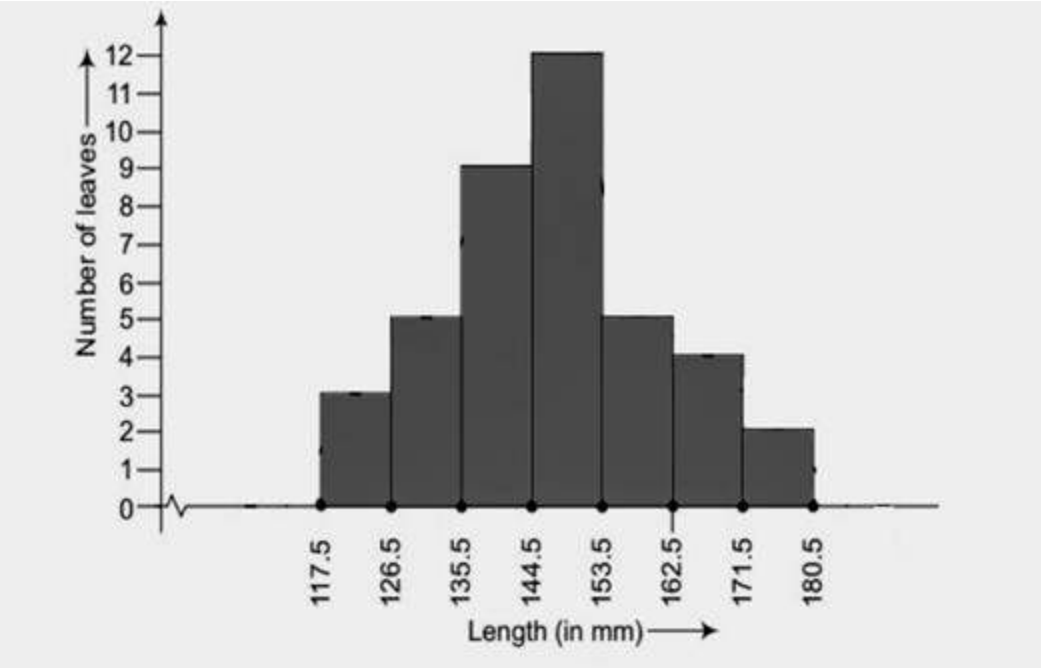
(i) The data is represented in a discontinuous class interval. So, at first we will make it continuous.

The difference is 1.

So, we subtract 0.5 from the lower limit and add 0.5 to the upper limit.

S.No.	Length (in mm)	Number of Leaves
1.	117.5-126.5	3
2.	126.5-135.5	5
3.	135.5-144.5	9
4.	144.5-153.5	12
5.	153.5-162.5	5
6.	162.5-171.5	4
7.	171.5-180.5	2

Now, the above information is represented by the histogram below:



(ii) No, it is incorrect to conclude that the maximum number of leaves are lying between length of 144.5 – 153.5

Explanation: Maximum length of leave lies between 144.5 - 153.5, it is not necessarily 153 mm. It can be any value between the range.

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