PRACTICE QUESTION PAPER - I
CLASS-IX
MATHEMATICS

Time: 3 Hrs. **M.M. 80**

General Instruction:

1. All questions are compulsory.
2. The paper consists of 40 questions divided into four sections A, B, C and D. Section A comprises of 20 questions of 1 marks each. Section B comprises of 6 question of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 question of 4 marks each.
3. There is no over all choice in this question paper. All though internal choices has been provided in some question.

SECTION - A

1. $\sqrt[4]{\sqrt[3]{2^2}}$

a) $2^{\frac{-1}{6}}$ b) 2^{-6}

c) $2^{\frac{1}{6}}$ d) 2^{6}

or

$(625)^{0.16} \times (625)^{0.09} = ?$

a) 5 b) 25

c) 125 d) 625.25

2. If $\frac{x}{y}+\frac{y}{x} = -1$ $(x, y \neq 0)$. the value of $x^3 - y^3$ is

a) – 1 b) 1

c) 0 d) $\frac{1}{2}$

3. If $a + b + c = 0$ then $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab} = ?$

a) 1 b) 0

c) – 1 d) 3

4. The values of $249^2 - 248^2$ is

a) 1^2 b) 477
c) 487 d) 497

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

a) 4 b) 6
c) 5 d) 2

6. How many linear equations is x and y can be satisfied by $x = 1$ and $y = 2$?

a) Only One b) Two
c) Infinitely many d) Three

7. The point whose ordinate is 4 and which lies on y-axis is

a) (4, 0) b) (0, 4)
c) (1, 4) d) (4, 2)

or

If P(–1, 1), Q(3, –4), R(1, –1), S(–2, –3) and T(– 4, 4) are plotted on the graph paper, then the points in the fourth quadrant are

a) P and T b) Q and R
c) Only S d) P and R

8. The angles of a triangle are in the ratio 2 : 4 : 3. The smallest angle of the triangle is

a) 60° b) 40°
c) 80° d) 20°

9. Two sides of a triangle are of length 5cm and 1.5cm. The length of the third side of the triangle cannot be.

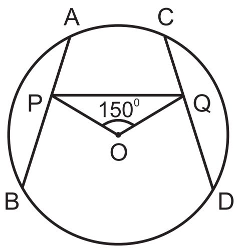
a) 3.4cm b) 3.6cm
c) 3.8cm d) 4.1cm

10. The figure obtained by joining the mid point of the sides of a rhombus, taken in order is

a) a rhombus b) a rectangle

c) a square d) any Parallelogram

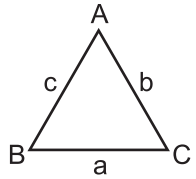
11. In Fig. AB and CD are two equal chords of a circle with centre O. OP and OQ are perpendiculars on chords AB and CD respectively. If $\angle POQ = 150°$, then $\angle APQ$ is equal to



a) 30° b) 75°

c) 15° d) 60°

12. By the Heron's formula, the area of Δ ABC is given by Δ = _____________ sq. unit.



13. The sides of a triangle are 56cm, 60cm, and 52cm long. Then the area of the triangle is

a) $1322 cm^2$ b) $1311 cm^2$

c) $1344 cm^2$ d) $1392 cm^2$

14. The sides of a triangle are in the ratio 5:12:13 and its perimeter is 150cm. The area of the triangle is

a) $375 cm^2$ b) $750 cm^2$

c) $250 cm^2$ d) $500 cm^2$

15. The total surface area of *a* cone whose radius is $\frac{r}{2}$ and short height $2l$ is

a) $2\pi r\,(l + r)$ b) $\pi r\,(l + \frac{r}{4})$

c) $\pi r\,(l + r)$ d) $2\pi r l$

16. The radius of a hemispherical balloon increases from 6cm to 12cm as air is being pumped into it. the ratios of the surface areas of the

balloon in the two cases is

a) 1 : 4 b) 1 : 3

c) 2 : 3 d) 2 : 1

17. The class mark of the class 90 – 120 is :

a) 90 b) 105

c) 115 d) 120

18. The mean of five number is 30. If one number is excluded their mean becomes 28. The excluded number is :

a) 28 b) 30

c) 35 d) 38

19. A coin is tossed 60 times and the tail appears 35 times. What is the probability of getting a head ?

a) $\frac{7}{12}$ b) $\frac{12}{7}$

c) $\frac{5}{12}$ d) $\frac{12}{5}$

20. Fill in the blanks :

If E be an event, then P(E) + P(not E) = _____________

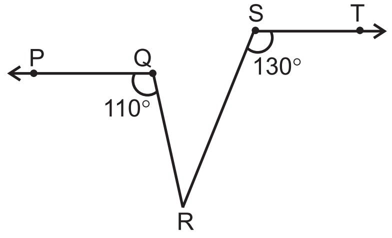
SECTION - B

21. If the point (3, 4) lies on the graph of $3y = ax + 7$, then find the value of a.

or

Find four different solutions of $2x + y = 6$.

22. If PQ || ST, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$, find $\angle QRS$



23. Find the area of the trapezium whose parallel sides are 14cm and 10cm and whose height is 6cm.

24. The perimeter of a an isosceles triangle is 32cm. The ratio of the equal side to its base is 3:2. Find the area of the triangle.

25. The diameter of a roller is 84cm and its length is 120cm. It takes 500 complete revolutions to move once cover to level a playground. Find the area of the playground is m^2.

26. A die was rolled 100 times and the number of times 6 appeared was noted. If the probability of getting a 6 be 2/5, how many times did 6 come up ?

or

1500 families with 2 children each, were selected randomly and the following data were recorded.

Number of girls is a family	2	1	0
Number of families	102	675	723

out of these families, one family is selected at random. What is the probability that the selected family has.

i) 2 girls ii) 1 girl

SECTION - C

27. If $a = 2 + \sqrt{3}$, then find the value of $a - \frac{1}{a}$.

28. Factories : a(a–1) – b (b–1)

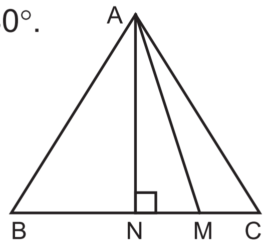
or

If P = 2 – a, prove that $a^2 + 6ap + p^3 - 8 = 0$

29. The taxi fare in a city as follows : for the first kilometre, the fare is ₹ 25 and for the subsequent distance it is ₹ 14 per km. Taking the distance covered as *x* km and total fare as ₹*y*, write the linear equation for this information and draw its graph.

30. Three vertices of a rectangle are (3, 2), (–4, 2) and (–4, 5), plot these points on a graph paper and the coordinates of the fourth vertex.

31. Prove that the sum of three angles of a triangle is 180°.



or

In a ΔABC, $\angle B > \angle C$ if AM is the bisector of $\angle ABC$ and $AN \perp BC$. Prove that $\angle MAN = \frac{1}{2}(\angle B - \angle C)$

32. The measure of angles of a quadrilateral are $(x+20)^\circ$, $(x-20^\circ)^\circ$, $(2x+5)^\circ$ & $(2x-5)^\circ$. Find the value of x.

or

E is the mid point of the median AD of ΔABC and BE is produced to meet AC at F. Show that $AF = \frac{1}{3}$ AC.

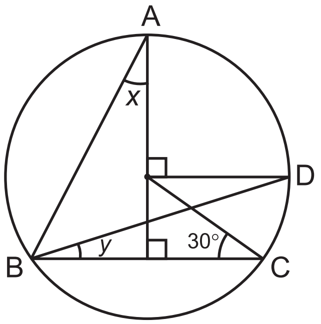
33. Prove that parallelogram on the same base and between the same parallels are equal is area.

or

ABCD is trapezium in which AB|| DC, DC=30cm and AB=50cm. If *x* and *y* are, respectively the mid points of AD and BC prove that

$$\text{ar (DCYX)} = \frac{7}{9}\,\text{ar (XYBA)}$$

34. In figure, O is the centre of the circle. $\angle BCO = 30^\circ$. Find *x* and *y*.



SECTION – D

35. Show that :

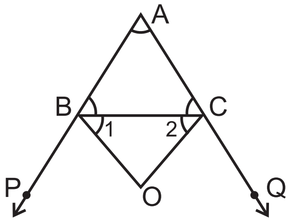
$$\frac{1}{(3-\sqrt{8})} - \frac{1}{(\sqrt{8}-\sqrt{7})} + \frac{1}{(\sqrt{7}-\sqrt{6})} - \frac{1}{(\sqrt{6}-\sqrt{5})} + \frac{1}{(\sqrt{7}-6)} = 5$$

36. Factories the expression

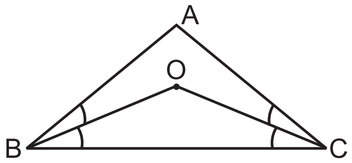
$$8x^3 + 27y^3 + 36x^2y + 54xy^2$$

37. In a Δ ABC.

i) The sides AB and AC are produced to P and Q respectively. If the bisectors of $\angle$PBC and $\angle$QCB intersect at A point O. Prove that $\angle BOC = 90° - \frac{1}{2}\angle A$



ii) The bisectors of $\angle$B and $\angle$C intersect each other at a point O. Prove that $\angle BOC = 90° + \frac{1}{2}\angle A$



or

If the bisector of an angle of a triangle also bisect the opposite side. Prove that the triangle is isosceles.

38. Construct a triangle XYZ in which $\angle Y = 30°$, $\angle Z = 90°$ and XY + YX + ZX = 11cm. Write steps of construction also.

39. The radius of a sphere is increased by 10%. Prove that the volume will be increased by 33.1% approximately.

or

The ratio of the curved surface area and the total surface area of a circular cylinder is 1:2 and the total surface area is 616cm². Find its volume

40. The mean marks (out of 100) of boys and girls in an examination are 70 and 73 respectively. If the mean marks of all the students is the examination is 71. Find the ratio of the number of boys to the number of girls.

or

The mean of 100 items was found to be 64. Later on it was discovered that two items misread as 26 and 9 instead of 36 and 90 respectively. Find the correct mean.

SOLUTION

PRACTICE QUESTION PAPER - I

1.	c)	$2^{\frac{1}{6}}$ or	a)	5
2.	c)	0		
3.	d)	3		
4.	d)	497		
5.	a)	4		
6.	c)	Infinitely many		
7.	b)	(0, 4) or	b)	Q and R
8.	b)	40°		
9.	a)	3.4cm		
10.	b)	a rectangle		
11.	b)	75°		
12.	$\Delta = \sqrt{s(s-a)(s-b)(s-c)}$			
13.	c)	13 4 4cm²		
14.	b)	$750cm^2$		
15.	b)	$\pi r\left(l + \frac{r}{4}\right)$		
16.	a)	1 : 4		
17.	b0	105		
18.	d)	38		
19.	c)	$\frac{5}{12}$		
20.	P(E) + P(Not E) = 1 [P(E) + P($\overline{E}$) = 1]			

21. $a = \frac{5}{3}$ or $y = 6 - 2x$ Four solutions are

$(x = 1 \Rightarrow y = 4)$ $(x = 3 \Rightarrow y = 0)$

$(x = 2 \Rightarrow y = 2)$ $(x = 4 \Rightarrow y = -2)$

x	1	2	3	4
y	4	2	0	–2

other solutions may be possible

22. $\angle QRS = 60^\circ$

23. $72cm^2$

24. $32\sqrt{2}\ cm^2$

25. $1584\ m^2$

26. 40 times or i) $\frac{102}{1500} = 0.068$ ii) $\frac{675}{1500} = 0.45$

27. $\boxed{a - \frac{1}{a} = 2\sqrt{3}}$ $\therefore$ $a = 2 + \sqrt{3}$

$\therefore$ $\frac{1}{a} = 2 - \sqrt{3}$

$a - \frac{1}{a} = (2+\sqrt{3}) - (2-\sqrt{3}) = 2+\sqrt{3} - 2+\sqrt{3} = 2\sqrt{3}$

28. $a(a-1) - b(b-1) = a^2 - a - b^2 + b = (a^2-b^2) - (a-b) = (a-b)(a+b)-(a-b)$

$= (a-b)(a+b+-1)$

Hence $a(a-b) - b(b-1) = (a-b)(a+b-1)$

or

$P = 2-a$ $\Rightarrow a+p+(-2) = 0$

$\Rightarrow a^3 + p^3 + (-2)^3 = 3\times a\times p\times(-2)$

$\Rightarrow a^3 + p^3 - 8 = -6ap$

$\Rightarrow a^3 + 6ap + p^3 - 8 = 0$

29. $Y = 25 + 14(x-1) \Rightarrow y = 25 + 14x-14 \Rightarrow \boxed{y=14x+9}$

Take any two points such as ($x=0 \Rightarrow y=9$) and ($x=-1 \Rightarrow y=-5$)

on the graph paper take distance along *x*–axis and fare (in ₹) along y-axis.

Now, plot the points A(0, 9) and B(–1, –5) on the graph paper

x	0	–1
y	9	–5

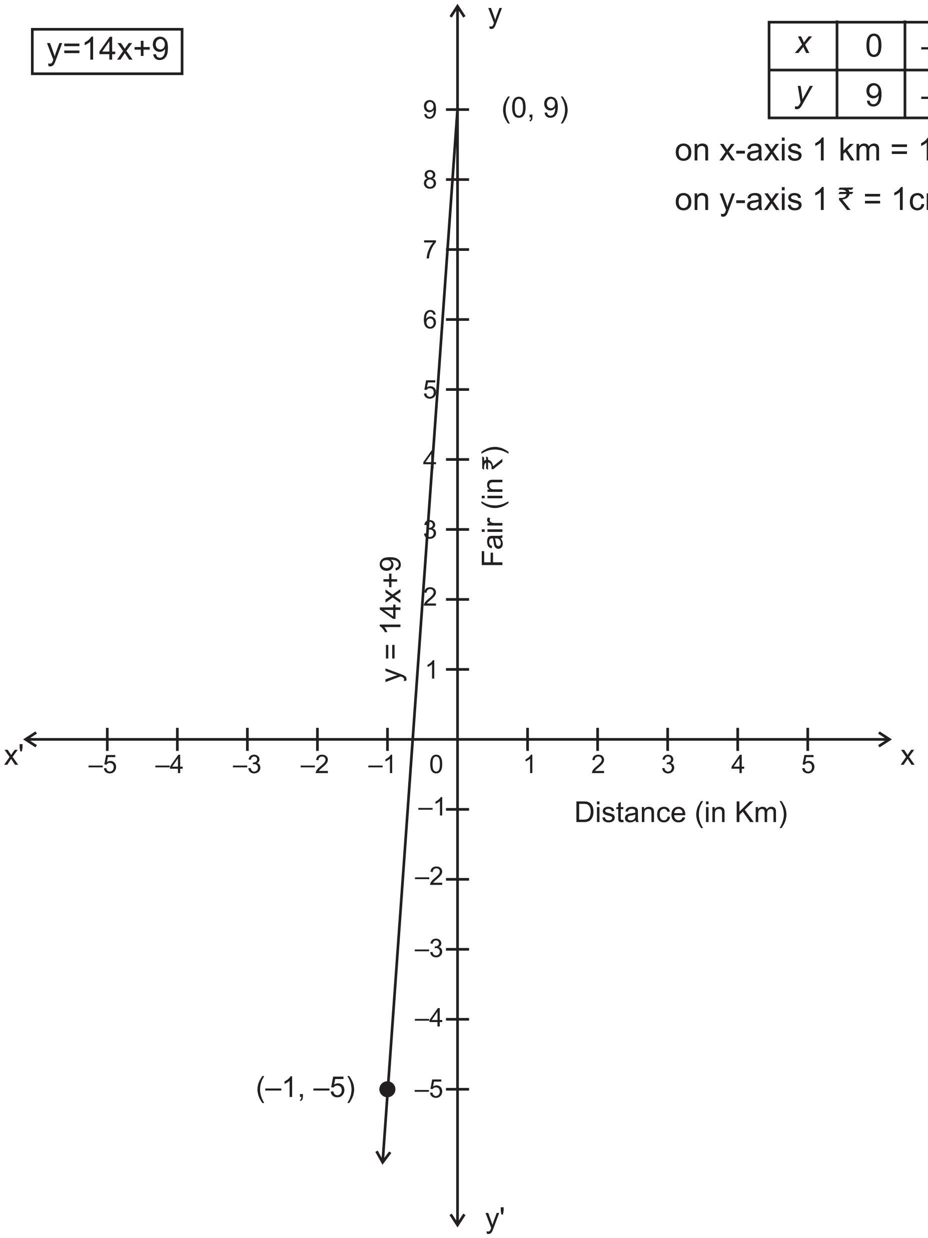
Join AB and produce it on both side to obtain the required graph.

y=14x+9

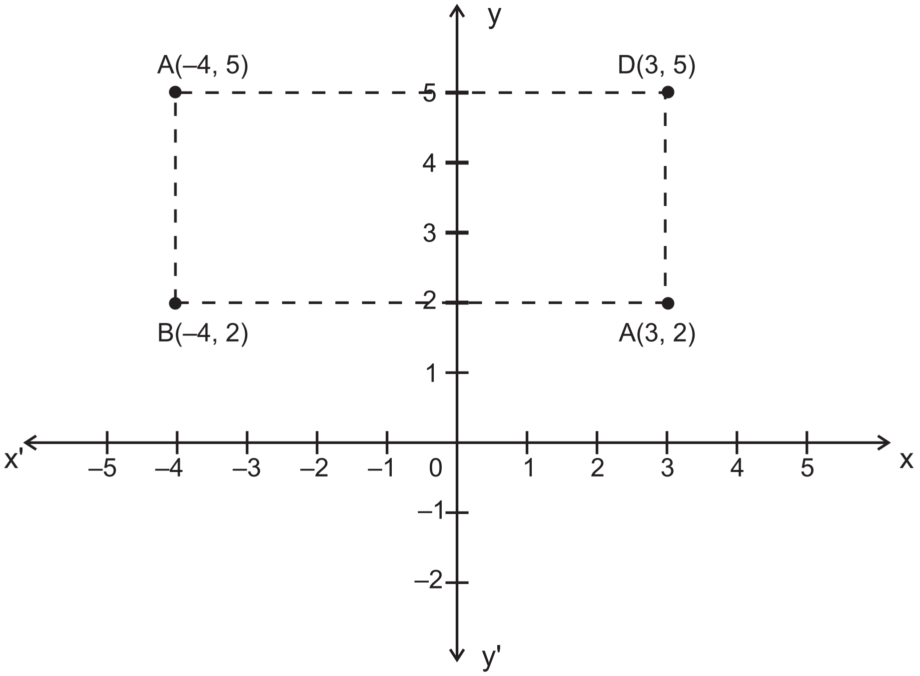
x	0	–1
y	9	–5

on x-axis 1 km = 1cm

on y-axis 1 ₹ = 1cm



30. Plot the three vertices of the rectangle as A(3, 2), B(–4, 2), C(–4, 5). To find the coordinate of the fourth vertex D. Since ABCD is a rectangle. The opposite sides of a rectangle are equal. So the abscissa of D should be equal to abscissa of A. i.e. 3 and the ordinate of D should be equal to ordinate of C. i.e. 5. So the coordinates of D are (3, 5).

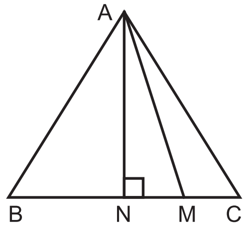


31. Prove that the sum of the three angles of a triangle is 180°.

or

In a ΔABC, $\angle B > \angle C$, If AM is the bisector of $\angle BAC$ and $AN \perp BC$.

Prove that $\angle MAN = \frac{1}{2}(\angle B - \angle C)$



Given :– ΔABC, in which $\angle B > \angle C$, $AN \perp BC$

and AM is the bisector of $\angle A$

To prove : $\angle MAN = \frac{1}{2}(\angle B - \angle C)$

Proof :Since AM is the bisector of $\angle A \Rightarrow \angle MAB = \frac{1}{2}\angle A$ _____ (i)

In the right angle ΔANB

$\angle B + \angle NAB = 90° \Rightarrow \angle NAB = 90° - \angle B$ ________ (ii)

$\therefore \angle MAN = \angle MAB - \angle NAB = \quad \angle A - (90° - \angle B)$

$= \frac{1}{2}\angle A - \frac{1}{2}(\angle A + \angle B + \angle C) + \angle B \quad [\because \frac{1}{2}(\angle A + \angle B + \angle C) = 90°]$

$= \frac{1}{2}(\angle B - \angle C)$

Hence $\angle MAN = \frac{1}{2}(\angle B - \angle C)$

32. We know that $(x+20)^\circ + (x-20)^\circ + (2x+5)^\circ + (2x-5)^\circ = 360^\circ$

$$= 6x = 360^\circ$$

$$x = \frac{360^\circ}{6}$$

$$x = 60$$

or

Draw DP||EF

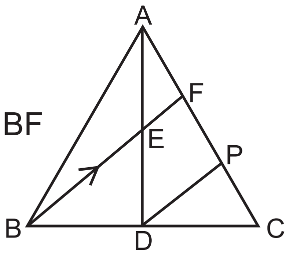
In Δ ADP, E is the mid pint of AD and EF||DP

$\Rightarrow$ F is the mid point of AP

(By converse of mid point theorem)

in ΔFBC , D is the mid point of BC and DP||BF

$\therefore$ P is the mid point of FC



Then AF = FP = PC

AF + FP + PC = AC

AF + AF + AF = AC $\Rightarrow$ 3AF = AC $\Rightarrow$ AF = $\frac{1}{3}$ AC

Hence AF = $\frac{1}{3}$ AC

33. Given :– Two || gms ABCD and ABEF on the same base AB and between the same parallel lines AB and FC.

To prove : ar (|| gm ABCD) = ar (|| gm ABEF)

Proof : In ΔADF and ΔBCE

AD = BC (opposite sides of || gm)

AF = BE (opposite sides of || gm)

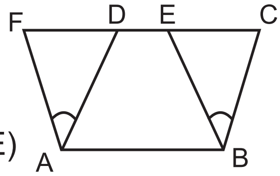
$\angle$DAF = $\angle$CBE ($\therefore$ AD || BC and AF || BE)

angle between AD and AF = angle between BC and BE

$\therefore$ ΔADF $\cong$ ΔBCE (SAS Criteria)

$\therefore$ ar (ΔADF) = ar (ΔBCE) (i)

$\therefore$ ar (|| gm ABCD) = ar ($\square$ ABED) + ar (ΔBCE)



= ar ($\square$ ABED) + ar (ΔADF) using (i)

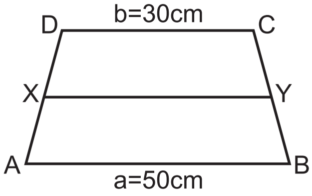
= ar (|| gm ABEF)

Hence = ar (|| gm ABCD) = ar (|| gm ABEF) or

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

Let d be distance between AB and XY

then D is the distance between XY and DC.



$$\text{ar (trap. ABXY)} = \frac{1}{2}\left(a + \frac{a+b}{2}\right) d = \frac{(3a+b)d}{4}$$

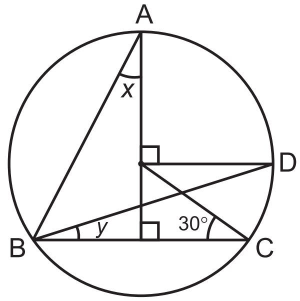
$$\text{ar (trap XYCD)} = \frac{1}{2}\left(\frac{a+b}{2}+b\right)^{d} = \frac{(a+3b)d}{4}$$

$$\frac{\text{ar(trap xy)}}{\text{ar(trap XYBA)}} = \frac{\text{ar(DCYX)}}{\text{ar(XYBA)}} = \frac{\frac{(3a+b)d}{4}}{\frac{(a+3b)d}{4}}$$

$$\frac{\text{ar(DCYX)}}{\text{ar(XYBA)}} = \frac{a+3b}{3a+b} = \frac{50+3\times30}{3\times50+30} = \frac{50+90}{150+30} = \frac{140}{180} = \frac{7}{9}$$

$\therefore$ ar (DCYX) = $\frac{7}{9}$ ar (XYBA)

34. In Δ OEC



$\angle EOC = 180° - (90° + 30°) = 180° - 120° - 60°$

$\therefore \angle COD = 90° - 60° = 30°$

$\angle CBD = \frac{1}{2}\angle COD = \frac{1}{2} \times 30° = 15°$

$\Rightarrow y = 15°$ [$\therefore \angle CBD = y$]

Again $\angle ABD = \frac{1}{2}\angle AOD = \frac{1}{2} \times 90° = 45°$

and $\angle ABC = \angle ABD + y = 45° + 15° = 60° = \angle ABE$

In ΔABE

$\angle BAE = 180° - (90° + \angle ABE) = 180° - (90° + 60°)$

$x = \angle BAE = 180° - 150° = 30°$

$\Rightarrow x = 30°$

Hence $x = 30°$ and $y = 15°$

35. on Rationalising

$$\frac{1}{3-\sqrt{8}} = \frac{1}{(3-\sqrt{6})} \times \frac{(3+\sqrt{8})}{(3+\sqrt{8})} = \frac{3+\sqrt{8}}{(3)^2-(\sqrt{8})^2} = \frac{3+\sqrt{8}}{9-8} = \frac{3+\sqrt{8}}{1} = 3+\sqrt{8}$$

Similarly

$$\frac{1}{\sqrt{8}-\sqrt{7}} = \sqrt{8}-\sqrt{7},\quad \frac{1}{\sqrt{7}-\sqrt{6}} = \sqrt{7}+\sqrt{6},\quad \frac{1}{\sqrt{6}-\sqrt{5}} = \sqrt{6}+\sqrt{5},\quad \frac{1}{\sqrt{5}-2} = \sqrt{5}+2$$

L.H.S.

$$\frac{1}{(3-\sqrt{8})} - \frac{1}{(\sqrt{8}-\sqrt{7})} + \frac{1}{(\sqrt{7}-\sqrt{6})} - \frac{1}{(\sqrt{6}-\sqrt{5})} + \frac{1}{(\sqrt{5}-2)}$$

$(3-\sqrt{8}) - (\sqrt{8}-\sqrt{7}) + (\sqrt{7}-\sqrt{6}) - (\sqrt{6}-\sqrt{5}) + (\sqrt{5}+2)$

$3-\sqrt{8} - \sqrt{8}-\sqrt{7} + \sqrt{7}-\sqrt{6} - \sqrt{6}-\sqrt{5} + \sqrt{5}+2$

$3+2$

5

$=$ R.H.S

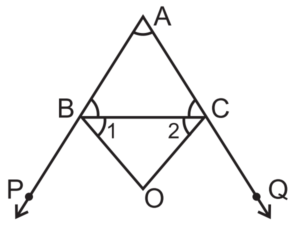
36. $8x^3 + 27y^3 + 36x^2y + 54xy^2$

$= (2x)^3 + (3y)^3 + 18xy(2x+3y)$ $\quad [\therefore a^3+b^3+3ab(a+b)=(a+b)^3]$

$= (2x)^3 + (3y)^3 + 3(2x)(3y)(2x+3y)$

$= (2x+3y)^3 = (2x+3y)(2x+3y)(2x+3y)$

37. i) $\angle B + \angle CBP = 180^\circ$ (Liner Pair)



$\Rightarrow = \frac{1}{2}\angle B + \frac{1}{2}\angle CBP = 90^\circ$

$= \frac{1}{2}\angle B + \angle 1 = 90^\circ$

$= \angle 1 = 90^\circ - \frac{1}{2}\angle B$

Again $\angle C + \angle BCQ = 180^\circ$

$= \frac{1}{2}\angle C + \frac{1}{2}\angle BCQ = +0^\circ$

$= \frac{1}{2}\angle C + \angle 2 = 90^\circ$

$\Rightarrow \angle 2 = 90^\circ - \frac{1}{2}\angle C$ ______ (ii)

In ΔBOC $\angle 1 + \angle 2 + \angle BOC = 180^\circ$ (Angle sum property of A's)

$\angle BOC = 180^\circ - (\angle 1 + \angle 2) = 180^\circ - (90^\circ \frac{1}{2}\angle B + 90^\circ - \frac{1}{2}\angle c)$

$\angle BOC = ½(\angle B + \angle C) = ½(\angle A + \angle B + \angle C) - ½\angle A$

$= ½ \times 180^\circ - ½\angle A$ [$\therefore \angle A + \angle B + \angle C = 180^\circ$]

$\angle BOC = 90^\circ - ½\angle A$

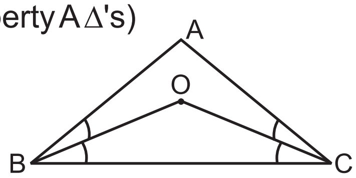
ii) In ΔABC

$\angle A + \angle B + \angle C = 180^\circ$ (Angle sum property A Δ's)

$\Rightarrow ½\angle A + ½\angle B + ½\angle C = 90^\circ$

$\Rightarrow ½\angle A + \angle 1 + \angle 2 = 90^\circ$

$\Rightarrow \angle 1 + \angle 2 = (90^\circ - ½\angle A)$ ____ (i)



In ΔBOC

$(\angle 1 + \angle 2) + \angle BOC = 180^\circ$

$(90^\circ - ½\angle A) + \angle BOC = 180^\circ$ Using equation (i)

$\angle BOC = 90^\circ + ½\angle A$

or

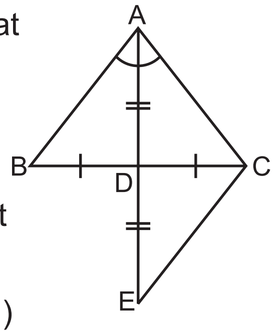
Given :- A point D on side BC of a ΔABC such that

$\angle BAD = \angle CAD$

and AD = CD

To prove :- AB = AC

Construction :- Produce AD to *a* point E such that AD = DE and Join EC



Proof : In Δ ABD and ΔECD

BD=CD (Given)

AD=ED (By construction)

$\angle ADB = \angle EDC$ (V.O.A.)

$\Rightarrow \Delta ABD \cong \Delta ECD$ (SAS)

So, $\left.\begin{array}{l} AB = EC \\ \text{and } \angle BAD = \angle CED \end{array}\right\}$ (CPT) _________ (i)

Also $\angle BAD = \angle CAD$ (Given) ___________ (ii)

From (i) and (ii)

$\angle CAD = \angle CED$

$\Rightarrow$ AC=EC [side opposite to equal angles) _________ (iii)

From (i) and (iii)

$$\left.\begin{array}{l} AB = EC \\ AC = EC \end{array}\right\} \Rightarrow AB = AC$$

Hence ΔABC is isosceles.

39. The volume of the sphere = $\frac{4}{3}\pi r^3$

10% increase in radius = 10% r

Increase radius = $r + \frac{1}{10} r = \frac{11}{10} r$

the volume of the sphere now becomes

$$= \frac{4}{3}\pi\left(\frac{11}{10}r\right)^3 = \frac{4}{3}\pi \times \frac{1331}{1000} r^3$$

$$= \frac{4}{3}\pi \times 1.331\, r^3$$

$$= \frac{4}{3}\pi \times 1.331\, r^3 - \frac{4}{3}\pi r^3 = \frac{4}{3}\pi r^3 (1.331-1)$$

$$= \frac{4}{3}\pi r^3 \times 0.331$$

$$\text{\% increase in volume} = \frac{\frac{4}{3}\pi r^3 \times 0.331}{\frac{4}{3}\pi r^3} \times 100\% = 33.1\%$$

or

$$\frac{\text{C.S.A.}}{\text{T.S.A.}} = \frac{2\pi rh}{2\pi r(h+r)} = \frac{1}{2}$$

$$\Rightarrow \frac{h}{h+r} = \frac{1}{2}$$

$\Rightarrow \quad h + r = 2h \quad \Rightarrow h = r$

T.S.A. $= 2\pi r(h+r) = 616 = 2\pi r(r+r) = 616$

$= 2\pi r \times 2r = 616 \Rightarrow 4\pi r^2 = 61.6$

$= 4 \times \frac{22}{7} \times r^2 = 616 \times \frac{7}{88} \Rightarrow r = 7 = h$

Volume of cylinder $= \pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 7 = 1078 cm^3$

Volume of cylinder = 1078 cm^3

40. Let number of boys = x, number of girls = y

Total marks obtained by boys = 70x

Total marks obtained by girls = 73y

Total marks obtained by both = 71(x+y)

$\therefore 70x + 73y = 71(x+y)$

$\Rightarrow 73y - 71y = 71x - 70x$

$\Rightarrow 2y = x \quad \Rightarrow \frac{x}{y} = \frac{2}{1} \quad \Rightarrow \quad x:y = 2:1$

or

Mean of item = 64

Total items = 100

Num. of items = 64 $\times$ 100 = 6400

Correct new sum of items = 6400 – (26+9)+(36+90)

= 6400 – 35 + 126

$\therefore$ Correct new sums of items = 6400+91=6491

$\therefore$ Correct mean $= \frac{6491}{100} = 64.91$