General Instructions :

1. All questions are compulsory.
2. The question paper consists of 34 questions divided into four sections A,B,C and D. Section – A comprises of 10 question of 1 mark each. Section – B comprises of 8 questions of 2 marks each. Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 6 questions of 4 marks each.
3. Question numbers 1 to 10 in Sections – A are multiple choice questions where you are to select one correct option out of the given four.
4. There is no overall choice. However, internal choice has been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four mark each. You have to attempt only one If the alternatives in all such questions.
5. Use of calculator is not permitted.

CLASS X _ 2011-2012 (SA-1)

Time : 3 Hours 15 Minutes **Maximum Marks : 80**

SECTION A

Q.1 Given that HCF (2520, 6600) = 40, LCM (2520, 6600) = $252 \times k$, then the value of k is :

$40 \times 252 \times k = 2520 \times 6600$

$k = \frac{2520 \times 6600}{40 \times 252} = 1650$

(a) 1650 (b) 1600 (c) 165 (d) 1625 ans: A

Q.2 If p, q are two co- prime numbers. HCF (p, q) is :
(A) p (B) q (C) pq (D) 1 ANS : D

Q.3 If A is an acute angle in a right ΔABC, right angled at B, then the value of $\sin A + \cos A$ is :
(A) equal to one (B) greater than one
(C) less than one (D) equal to two ANS : B

Q.4 If $\cos(\alpha+\beta)=0$, then $\sin(\alpha-\beta)$ can be reduced to :
(a) $\cos\beta$ (b) $\cos 2\beta$ (c) $\sin\alpha$ (d) $\sin 2\alpha$ ANS : B

Q.5 The value of p for which the polynomial x^3+4x^2-px+8 is exactly divisible by (x – 2) is
(A) 0 (B) 3 (C) 5 (D) 16 ANS : D

Q.6 The value of k for which the pair of linear equations $4x+6y-1=0$ and $2x+ky-7=0$ represents parallel lines is
(A) $k=3$ (b) $k=2$ (c) $k=4$ (d) $k=-2$ ans: A

Q.7 If $\operatorname{cosec}\theta-\cot\theta=\frac{1}{3}$, the value of $(\operatorname{cosec}\theta+\cot\theta)$ is
(a) 1 (b) 2 (c) 3 (d) 4 ans: C

Q.8 The abscissa of the point of intersection of the less than type and of the more than type cumulative frequency curves of a grouped data gives its :
(a) Mean (b) Median (c) mode (d) all the three above ans: B

Q.9 The value of $[(\sec A+\tan A)(1-\sin A)]$ is equal to
(a) $\tan^2 A$ (b) $\sin^2 A$ (c) cos A (d) sin A ans: C

Q.10 If $\sin A+\sin^2 A=1$, then the value of $\cos^2 A+\cos^4 A$ is
(A) 2 (B) 1 (C) -2 (D) 0 ans: B

SECTION B

Q.11 Write the following distribution as less than type cumulative frequency distribution :

C. I.	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Frequency	5	3	4	3	3	4	7	9

ANS:
Less than 10 --- 5
Less than 20 --- 8
Less than 30 --- 12
Less than 40 --- 15
Less than 50 --- 18
Less than 60 --- 22
Less than 70 --- 29
Less than 80 --- 38

Q.12 Find the modal class and the median class for the following distribution :

C.I.	140 - 150	150 - 160	160 - 170	170 - 180	180 - 190
Frequency	6	28	48	30	8

ANS:

C.I	freq	cu.freq
140-150	6	6
150-160	28	34
160-170	48	82
170-180	30	112
180-190	8	120

Modal class ⇒ C.I having highest freq = 160-170

$n = 120$, $\frac{n}{2} = 60$

∴ Median class is 160-170

Q.13 Solve $148x + 231y = 527,\ 231x + 148y = 610$. ANS : X = 2 ; Y = 1

$148x + 231y = 527$
$231x + 148y = 610$
$379x + 379y = 1137$
$x + y = 3$

$148x + 231y = 527$
$231x + 148y = 610$
$-83x + 83y = -83$
$\Rightarrow -x + y = -1$

$x + y = 3$
$-x + y = -1$

OR

$\frac{4}{x} + 3y = 14, \frac{3}{x} - 4y = 23$ ANS : X = 1/5 ; Y = -2

Q.14 If α and $\frac{1}{\alpha}$ are the zeroes of the polynomial $4x^2 - 2x + (k-4)$ find the value of k.

ANS : K = 8

Q.15 If sec 4A = cosec $(A - 20^0)$ where 4A is an acute angle, find the value of A. ANS:

$\sec 4A = \csc(A - 20^\circ)$

Since, $\sec 4A = \csc(90^\circ - 4A)$

$90^\circ - 4A = A - 20^\circ$

$A = 22^\circ$

Q.16 Check whether 6^n can end with the digit 0 for any natural number.

Sol. Any positive integer ending with the digit zero is divisible by 5 and so its prime factorisations must contain the prime 5.

$6^n = (2 \times 3)^n = 2^n \times 3^n$

⇒ The prime in the factorisation of 6^n is 2 and 3.

⇒ 5 does not occur in the prime factorisation of 6^n for any n.

⇒ 6^n does not end with the digit zero for any natural number n.

Q.17 The sum of the numerator and the denominator of a fraction is 8. If 3 is added to both the numerator and the denominator, the fraction becomes $\frac{3}{4}$. Find the fraction. ANS:

Let the numerator be x and denominator be y.

Fraction $= \frac{x}{y}$

$x + y = 8$ ....(i)

$\frac{x+3}{y+3} = \frac{3}{4}$

$\Rightarrow 4x - 3y + 3 = 0$ ....(ii)

Solving (i) and (ii)

$y = 5$

$x = 3$

Fraction $= \frac{3}{5}$

Q.18 Prove that : $\frac{\tan\theta - \cot\theta}{\sin\theta\cos\theta} = \tan^2\theta - \cot^2\theta$. ANS:

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$$LHS = \frac{\tan\theta - \cot\theta}{\sin\theta\cos\theta}$$

$$= \frac{\frac{\sin\theta}{\cos\theta} - \frac{\cos\theta}{\sin\theta}}{\sin\theta\cos\theta}$$

$$= \frac{\sin^2\theta - \cos^2\theta}{\sin^2\theta\cos^2\theta}$$

$$= \frac{1}{\cos^2\theta} - \frac{1}{\sin^2\theta}$$

$$= \sec^2\theta - \csc^2\theta$$

$$= 1 + \tan^2\theta - 1 - \cot^2\theta$$

$$= \tan^2\theta - \cot^2\theta$$

$$= RHS$$

SECTION C

Q.19 If α and β are zeroes of the quadratic polynomial $x^2 - 6x + a$; find the value of 'a' if $3\alpha + 2\beta = 20$. ANS:

$p(x) = x^2 - 6x + a$

$\alpha + \beta = -\frac{b}{a} = \frac{6}{1}$ ---(i)

$3\alpha + 2\beta = 20$ ——(ii)

(i)×3 ⇒ $3\alpha + 3\beta = 18$ ---(iii)

Solving $\beta = -2$, $\alpha = 8$

$\alpha\beta = \frac{c}{a}$

$(-2) \times 8 = a$

$\Rightarrow a = -16$

Q.20 In figure 6, P and Q are the midpoints of the sides CA and CB respectively of ΔABC right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$.

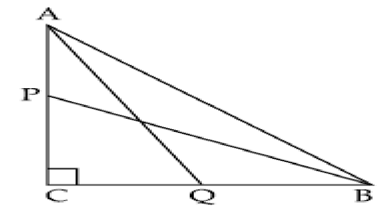

Figure 6

ANS:

In rt ΔABC, $AB^2 = AC^2 + BC^2$ (Pythagoras theorem) ---(i)

In rt ΔACQ, $AQ^2 = AC^2 + CQ^2$

$\Rightarrow AQ^2 = AC^2 + \frac{BC^2}{4}$

$\Rightarrow 4AQ^2 = 4AC^2 + BC^2$ ---(ii)

In rt ΔPCB, $PB^2 = PC^2 + BC^2$

$4PB^2 = AC^2 + 4BC^2$ ---(iii)

From (2) and (3)

$4(AQ^2 + PB^2) = 5AC^2 + 5BC^2$

$= 5(AC^2 + BC^2)$

$= 5AB^2$

Q.21 Prove that $\sqrt{2}$ is an irrational number. **Sol.** Let assume on the contrary that $\sqrt{2}$ is a rational number.

Then, there exists positive integer a and b such that $\sqrt{2} = \frac{a}{b}$ where, a and b are co primes i.e. their HCF is 1.

$\Rightarrow (\sqrt{2})^2 = \left(\frac{a}{b}\right)^2 \Rightarrow 2 = \frac{a^2}{b^2} \Rightarrow a^2 = 2b^2 \Rightarrow a^2$ is multiple of 2

a is a multiple of 2 (i) ⇒ a = 2c for some integer c. ⇒ $a^2 = 4c^2 \Rightarrow 2b^2 = 4c^2 \Rightarrow b^2 = 2c^2 \Rightarrow b^2$ is a multiple of 2 Therefore b is a multiple of 2 ...(ii) From (i) and (ii), a and b have at least 2 as a common factor. But this contradicts the fact that a and b are co-prime. This means that $\sqrt{2}$ is an irrational number.

Q.22 What must be added to $3x^3 + x^2 - 22x + 9$ so that the result is exactly divisible by $3x^2 + 7x - 6$. ANS: If we added $2x + 3$ then it is exactly divisible by $3x^2 + 7x - 6$.

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Q.23 For what value of K will the system $x + 2y = 3$, $5x + Ky + 7 = 0$ have (i) unique solution (ii) no solution ?(iii) Is there is any value of K for which the given system has an infinite number of solutions? Ans.(i) $k \neq 10$ (ii)k=10 ,$k \neq -14/3$ (iii) There is no value of k for infinité number of solution .

Q.24 Ramesh travels 760 km to his home partly by train and partly by car. He taken 8 hr, if he travels 160 km by train and the rest by car. He takes 12 minutes more, if he travels 240 km by train and the rest by car. Find the speed of train and the car.

Sol. Let the speed of train be x km/hr & car be y km/hr respectively.

Acc. to problem $\frac{160}{x} + \frac{600}{y} = 8$ ....(i)

$\frac{240}{x} + \frac{520}{y} = \frac{41}{5}$ ....(ii)

Solving equation (i) & (ii) we gets x = 80 and y = 100.

Hence , speed ot train = 80 km/hr and speed of car = 100km/hr.

OR

The sum of a two - digit number and the number obtained by reversing the order of its digits is 165. If the digits differ by 3, find the number

Sol. Let unit digit be x ten's digit be y no. will be 10y + x.

Acc. to problem $(10y + x) + (10x + y) = 165$

$\Rightarrow$ $x + y = 15$ ...(i)

and $x - y = 3$ ...(ii)

or $-(x - y) = 3$ ....(iii)

On solving eq. (i) and (ii)

we gets = 9 and y = 6

$\therefore$ The number will be 69. **Ans.**

On solving eq. (i) and (iii)

we gets x = 6 and y = 9

$\therefore$ The number will be 96. **Ans.**

Q.25 Find a quadratic polynomial whose zeros are $5 + \sqrt{2}$ and $5 - \sqrt{2}$.

Sol. Given $\alpha = 5 + \sqrt{2}, \beta = 5 - \sqrt{2}$

$\therefore$ $f(x) = k\{x^2 - x(\alpha + \beta) + \alpha\beta\}$

Here, $\alpha + \beta = 5 + \sqrt{2} + 5 - \sqrt{2} = 10$

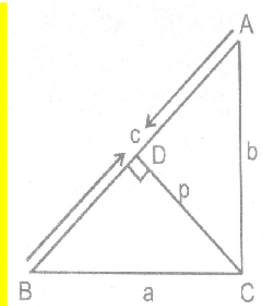
and $\alpha\beta = (5 + \sqrt{2})(5 - \sqrt{2})$

$= 25 - 2 = 23$

$\therefore$ $f(x) = k\{x^2 - 10x + 23\}$, where, k is any non-zero real number.

Q.26 ABC is a right triangle, right-angled at C. Let BC = a, CA b, AB = c and let p be the length of perpendicular form C on AB, prove that (i) cp = a b(ii) $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

Sol. Let $CD \perp AB$. Then CD = p



$\therefore$ Area of $\Delta ABC = \frac{1}{2}$ (Base × height)

$= \frac{1}{2}$ (AB × CD) $= \frac{1}{2}cp$

Also,

Area of Δ ABC $= \frac{1}{2}(BC \times AC) = \frac{1}{2}ab$

$\therefore$ $\frac{1}{2}cp = \frac{1}{2}ab$

$\Rightarrow$ CP = AB.

(ii) Since Δ ABC is a right triangle, right angled at C.

$\therefore$ $AB^2 = BC^2 + AC^2$

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$\Rightarrow \quad c^2 = a.. + b^2$

$\Rightarrow \quad \left(\frac{ab}{p}\right)^2 = a^2 + b^2 \qquad \left[\because cp = ab \Rightarrow c = \frac{ab}{p}\right]$

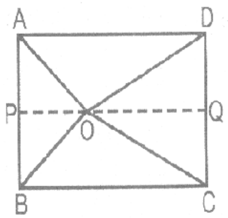
$\Rightarrow \quad \frac{a^2b^2}{p^2} = a^2 + b^2$

$\Rightarrow \quad \frac{1}{p^2} = \frac{1}{b^2} + \frac{1}{a^2}$

$\Rightarrow \quad \frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

OR

O is any point inside a rectangle ABCD (shown in the figure).



Prove that $OB^2 + OD^2 = OA^2 + OC^2$

Sol. Through O, draw PQ | | BC so that P lies on A and Q lies on DC.

Now, PQ | | BC

Therefore, $PQ \perp AB$ and $PQ \perp DC$ $[\angle B = 90^0$ and $\angle C = 90^0]$

So, $\angle BPQ = 90^0$ and $\angle CQP = 90^0$

Therefore, BPQC and APQD are both rectangles.

Now, from Δ OPB,

$OB^2 = BP^2 + OP^2$ ....(i)

Similarly, from Δ ODQ,

$OD^2 = OQ^2 + DQ^2$ ....(ii)

From Δ OQC, we have

$OC^2 = OQ^2 + CQ^2$ ....(iii)

And form Δ OAP, we have

$OA^2 = AP^2 + OP^2$ ....(iv)

Adding (i) and (ii)

$OB^2 + OD^2 = BP^2 + OP^2 + OQ^2 + DQ^2$

$= CQ^2 + OP^2 + OQ^2 + AP^2$

[As BP = CQ and DQ = AP]

$= CQ^2 + OQ^2 + OP^2 + AP^2$

$= OC^2 + OA^2$ [From (iii) and (iv)]

Q.27 Prove that : $\frac{1+\cos\theta+\sin\theta}{1+\cos\theta-\sin\theta} = \frac{1+\sin\theta}{\cos\theta}$.

OR

If A + B = 90º, prove that : $\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 A}{\cos^2 B}} = \tan A$ .Ans:

$\sqrt{\frac{\tan A \tan(90-A) + \tan A \cot(90-A)}{\sin A \sec(90-A)} - \frac{\sin^2 A}{\cos^2(90-A)}} = \sqrt{\frac{1+\tan^2 A}{\sin A \operatorname{cosec} A} - \frac{\sin^2 A}{\sin^2 A}}$

$= \sqrt{1+\tan^2 A - 1} = \tan A$

Q.28 Draw the graphs of the equations 4x – y = 4 & 4x + y = 12 .Deter mine the vertices of the triangle formed by the lines representing these equations and the x-axils. Shade the triangular region so formed. Also find its area .**Solution: -** Let us take the equation

$4x - y = 4$

X	O	1	2
Y	-4	0	4

= We plot the points (0, -4), (1, 0) and (2, 4) on the graph paper and join them. We get a straight line. Now we take the line AB. 4x + y = 121

X	2	3	4
Y	4	0	-4

We plot the points (2, 4) (3, 0) and (4, -4) on the same graph paper. on joining them we get a line CD which intersect previous line AB. at P (2, 4)

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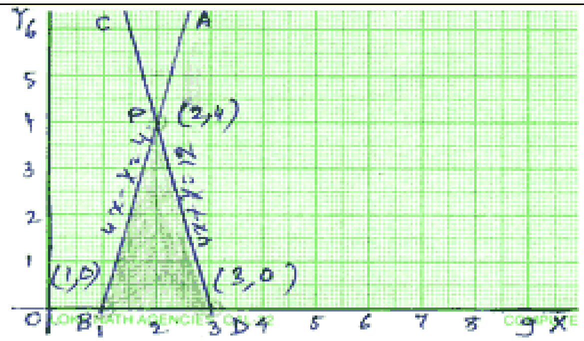

AB intersects the x-axis at (1, 0) and CD intersects the x-axis at (3, 0)

Hence the vertices of the triangle PBD are (2, 4), (1, 0) and (3, 0) . The required region is shaded.Area = $\frac{1}{2}\times 2\times 4 = 4$ sq unit .

SECTION D

Q.29 The mean of the following frequency distribution is 62.8 and the sum of all frequency is 50. Complete the missing frequencies f_1 and f_2:

Class	0-20	20-40	40-60	60-80	80-100	100-120	Total
Frequency	5	f_1	10	f_2	7	8	50

Class	f_1	x_1	f_1x_1
0-20	5	10	50
20-40	f1	30	30f1
40-60	10	50	500
60-80	f_2	70	70f2
80-100	7	90	630
100-120	8	110	880
	50		$\sum f_i x_i =$ 2060+ $30f_1 + 70f_2$

$5 + f_1 + 10 + f_2 + 7 + 8 = 50 \Rightarrow 30 + f_1 + f_2 = 50 \Rightarrow f_1 + f_2 = 20 \Rightarrow f_2 = 20 - f_1$ --------- (i)

$Mean = \frac{\sum f_i x_i}{\sum f_i}$, $Mean = 62.8$

$62.8 = \frac{2060 + 30f_1 + 70f_2}{50}$

$2060 + 30f_1 + 70f_2 = 3140 \Rightarrow 30f_1 + 70f_2 = 3140 - 2060 \Rightarrow 30f_1 + 70f_2 = 1080 \Rightarrow 3f_1 + 7f_2 = 108$ --------------- (ii)

$3f_1 + 7(20 - f_1) = 108 \Rightarrow -4f_1 + 140 = 108 \Rightarrow -4f_1 = 108 - 140 \Rightarrow -4f_1 = -32 \Rightarrow f_1 = 8$

From (i) $f_2 = 20 - f_1 = 20 - 8 = 12 \Rightarrow \therefore f_1 = 8, f_2 = 12$.

Q.30 Find all the zeros of the polynomial $f(x) = 2x^4 - 2x^3 - 7x^2 + 3x + 6$, if two of its zeros are $-\sqrt{\frac{3}{2}}$ and $\sqrt{\frac{3}{2}}$. **Sol.** Since $-\sqrt{\frac{3}{2}}$ and $\sqrt{\frac{3}{2}}$ are zeros of f(x). Therefore, $\left(x+\sqrt{\frac{3}{2}}\right)\left(x-\sqrt{\frac{3}{2}}\right)=\left(x^2-\frac{3}{2}\right)=\frac{2x^2-3}{2}$ or $2x^2 - 3$ is a factor of f(x).

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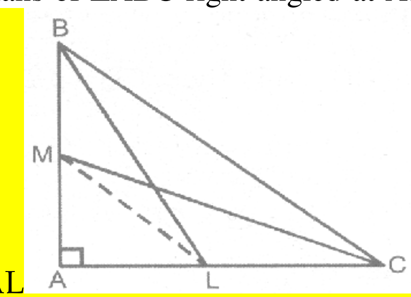
$$\begin{array}{l} \qquad\qquad\quad x^2 - x - 2 \\ 2x^2 - 3\overline{)2x^4 - 2x^3 - 7x^2 + 3x + 6} \\ \quad\; \underline{{}_{-}2x^4 \quad\;\; {}_{\mp}3x^2} \\ \quad -2x^3 - 4x^2 + 3x + 6 \\ \quad \underline{{}_{\mp}2x^3 \quad\;\; {}_{\mp}3x} \\ \qquad\quad -4x^2 + 6 \\ \qquad\quad -4x^2 + 6 \\ \qquad\quad \underline{+ \qquad -} \\ \qquad\qquad 0 \end{array}$$

$\therefore$ $2x^4 - 2x^3 - 7x^2 + 3x + 6 = (2x^2 - 3)(x^2 - x - 2) = (2x^2 - 3)(x - 2)(x + 1) = 2\left(x+\sqrt{\frac{3}{2}}\right)\left(x-\sqrt{\frac{3}{2}}\right)(x-2)(x+1)$ So, the zeros are $-\sqrt{\frac{3}{2}}, \sqrt{\frac{3}{2}}, 2, -1$

Q.31 BL and CM are medians of ΔABC right angled at A. Prove that $4(BL^2 + CM^2) = 5BC^2$.



Sol. In ΔBAL $BL^2 = AL^2 + AB^2$ ....(i) [Using Pythagoreans theorem] and In ΔCAM $CM^2 = AM^2 + AC^2$ ...(ii) [Using Pythagoreans theorem] Adding (1) and (2) and then multiplying by 4, we get $4(BL^2 + CM^2) = 4(AL^2 + AB^2 + AM^2 + AC^2)$

$= 4\{AL^2 + AM^2 + (AB^2 + AC^2)\}$ [$\therefore$ Δ ABC is a right triangle]

$= 4(AL^2 + AM^2 + BC^2)$

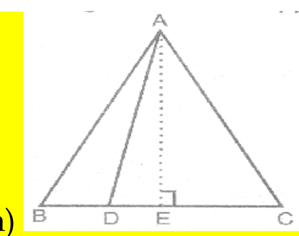
$= 4(ML^2 + BC^2)$ [$\therefore$ ΔLAM is a right triangle]

$= 4ML^2 + 4BC^2$ [A line joining mid-points of two sides is parallel to third side and is equal to half of it, ML = BC/2] $= BC^2 + 4BC^2 = 5BC^2$

OR

In an equilateral triangle ABC, the side B is trisected at D. Prove that $9AD^2 = 7AB^2$.

Sol. ABC be can equilateral triangle and D be point on BC such that



$BC = \frac{1}{3}BC$ (Given)

Draw $AE \perp BC$, Join AD.

BE = EC (Altitude drown from any vertex of an equilateral triangle bisects the opposite side)

So, $BE = EC = \frac{BC}{2}$

In Δ ABC

$AB^2 = AE^2 + EB^2$ .....(i)

$AD^2 = AE^2 + ED^2$ ....(ii)

From (i) and (ii)

$AB^2 = AD^2 - ED^2 + EB^2$

$AB^2 = AD^2 - \frac{BC^2}{36} + \frac{BC^2}{4}$ ($\therefore$ $BD + DE = \frac{BC}{2} \Rightarrow \frac{BC}{3} + DE = \frac{BC}{2} \Rightarrow DE = \frac{BC}{6}$)

$AB^2 + \frac{BC^2}{36} - \frac{BC^2}{4} = AD^2$ $(\therefore EB = \frac{BC}{2})$

$AB^2 + \frac{AB^2}{36} - \frac{AB^2}{4} = AD^2$ $(\therefore AB = BC)$

$\frac{36AB^2 + AB^2 - 9AB^2}{36} = AD^2 \Rightarrow \frac{28AB^2}{36} = AD^2$

$7AB^2 = 9AD^2$

Q.32 Prove that $\frac{\tan\theta - 1 + \sec\theta}{\tan\theta + 1 - \sec\theta} = \frac{1}{\sec\theta - \tan\theta}$.

OR

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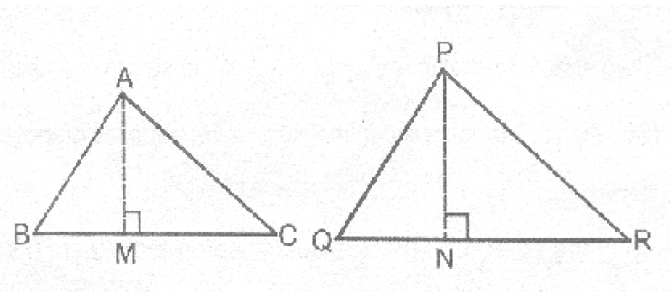
If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$ show that $m^2 - n^2 = 4\sqrt{mn}$.

Q.33 The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. Prove it . **Given :** Two triangles ABC and PQR such that $\Delta ABC \sim \Delta PQR$ [Shown in the figure]



To Prove : $\frac{ar(ABC)}{ar(PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{CA}{RP}\right)^2$

Construction : Draw altitudes AM and PN of the triangle ABC an PQR.

Proof : $ar(ABC) = \frac{1}{2} BC \times AM$

And $ar(PQT) = \frac{1}{2} QR \times PN$ $\frac{ar(ABC)}{ar(PQR)} = \frac{\frac{1}{2} BC\times AM}{\frac{1}{2} QR\times PN} = \frac{BC\times AM}{QR\times PN}$ ...(i)

Now, in Δ ABM and Δ PQN,

And $\angle B = \angle Q$

[As Δ ABC ~ ΔPQR]

$\angle M = \angle N$ [90^0 each]

$\Delta ABM \sim \Delta PQN$ [AA similarity criterion]

Therefore, $\frac{AM}{PN} = \frac{AB}{PQ}$ ....(ii)

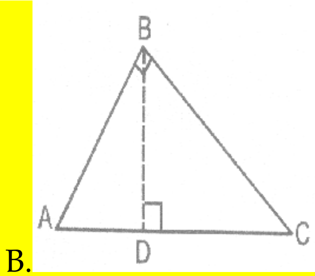
Also, $\Delta ABC \sim \Delta PQR$ [Given] $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{CA}{RP}$ .....(iii)

Therefore, $\frac{ar(ABC)}{ar(PQR)} = \frac{BC}{QR} \times \frac{AB}{PQ}$ [From (i) and (ii)] $= \frac{AB}{PQ} \times \frac{AB}{PQ}$ [From (iii)] $= \left(\frac{AB}{PQ}\right)^2$

Now using (iii), we get $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{CA}{RP}\right)^2$

. **OR**

In a right triangle, the square of the hypotenuse is equal to the sum of the square of the other two sides. Prove it. **Given :** A right triangle ABC, right angled at B.



To prove : $AC^2 = AB^2 + BC^2$

Construction : $BD \perp AC$

Proof : Δ ADB & ΔABC

$\angle DAB = \angle CAB$ [Common]

$\angle BDA = \angle CBA$ [90^0 each]

So, Δ ADB ~ ΔABC [By AA similarity]

$\frac{AD}{AB} = \frac{AB}{AC}$ [Sides are proportional]

or, $AD \cdot AC = AB^2$ .....(i)

Similarly Δ BDC ~ ΔABC

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So, $\frac{CD}{BC} = \frac{BC}{AC}$

or CD . AC = BC^2 .....(ii)

Adding (i) and (ii),

AD . AC + CD . AC = $AB^2 + BC^2$

AC (AD + CD) = $AB^2 + BC^2$

AC.AC = $AB^2 + BC^2$

$AC^2 = AB^2 + BC^2$

Q.34 The mean of the following distribution is 18 and the sum of all frequencies is 64. Compute the missing frequencies f_1 & f_2. Ans $f_1 = 6, f_2 = 20$

C.I.	11 - 13	13 – 15	15 – 17	17 – 19	19-21	21 – 23	23 – 25	Total
F	7	f_1	9	13	f_2	5	4	64

___________x___________

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