छत्तीसगढ़ माध्यमिक शिक्षा मण्डल, रायपुर

xf.kr

d{kk IX

lEiw.kZ ikB~;&i=

¼fo|kfpr bdkbZ½

NÙkhlx< ek/;fed f'k{kk e.My] jk;iqj

i'u & i= dh ;ktuk

Scheme of Question Paper

fo"k;%& xf.kr

i.kkd % 100

le; % 3 ?kaVs

ijh{kk % gkbLdy

¼v½ 'k{kf.kd mnn';ksa dk vuqikr eku

(A) Weightage as per Educational objective:

lq Ø0	mnn';		vad	izfr'kr
1-	Kku (Knowledge)		20	20%
2-	vocks/k (Understanding)		60	60%
3-	vuqi;ksx ,oa dk'ky (Application & Skill)		20	20%
		;ksx	50	100%

¼c½ bdkbokj vadksa dk eku

lq Ø0	bdkbZ dk uke	bdkbZ ij vkcafVr vad	i'u&i= dk ik:i vuqikr vkcafVr vad
1-	cht xf.kr	26	26
2-	okf.kfT;d xf.kr	08	08
3-	fun'kkd T;kfefr	07	07
4-	f=dks.kfefr	15	15
5-	{ks=fefr	10	10
6-	T;kfefr	19	19
7-	dEI;wVj	05	05
8-	lkf[;dh	10	10
9-			
10-			
11-			
12-			

¼l½ dfBukbZ Lrj (Difficulty Level)

lO ØO	mnn';	vd	ifr'kr
1-	ljy (Easy)	20	20%
2-	vkSlr (Average)	60	60%
3-	dfBu (Difficult)	20	20%
	;kx	100	100%

¼n½ i'ui= fn'kk fun'k ,oa fodYi ;kstuk %&

(Instruction's & Scheme of Option for Question Paper)

- oLrfu"B i'u e ¼05½ cgfodYih; i'u rFkk ¼05½ fjDr LFkkuksa dh ifr@mfpr tkMsa cuk, dk i'u fn;k tkoxk vkj ;g iR;d lV e i'u Øekd 1 gkxk A
- iR;d lV e 1] 2 ,oa 3 vdk d i'uksa e fHkUurk jgxh A leLr 04 vd ;k bl l vf/kd vdk d y?kmÙkjh; rFkk nh?kmÙkjh; i'uk e fodYi fn;k tkuk g A fodYi i'u mlh bdkbZ l rFkk leku mnn';k d jgx A 04 vd ;k bl l vf/kd vdk d i'u iR;d lV e ,d leku jgx A
- vf/kdre mÙkj lhek vfry?kmÙkjh; ½2 vd@30 'kCn½ ¼3 vd@50 'kCn½
  y?kmÙkjh; ¼4 vd@75 'kCn½ ¼5 vd@150 'kCn½
  nh?kmÙkjh; ¼6 vd ;k vf/kd@250 'kCn½

i'u & i= dk CyfiUV

Blue Print of Question Paper

fo"k;&& xf.kr

i.kkd & 100

le; & 3 ?kV

ijh{kk & gkbLdy

bdkb l-Ø-	bdkb	bdkb ij vkcfVr vd	vdokj i'u							dy i'u
			1 vd	2 vd	3 vd	4 vd	5 vd	6 vd	6 vd ;k bl l vf/kd	
1	cht xf.kr	26	2	2	3	&	1	1	&	7$1
2	okf.kT; xf.kr	08	&	&	1	&	1	&	&	02
3	fun'kkd T;kfefr	07	1	1	&	1	&	&	&	02
4	f=dk.kfefr	15	2	1	1	2	&	&	&	04
5	{k=fefr	10	1	1	1	1	&	&	&	03
6	T;kfefr	19	2	1	&	1	1	1	&	04
7	dEI;Vj	05	1	2	&	&	&	&	&	02
8	lkf[;dh	10	1	&	&	1	1	&	&	02
9										
10										
11										
12										
	;kx	100	1 ¼10½	8	6	6	4	2	&	27

Set - A

gkbLdy lfVfQdV ijh{kk

High School Certificate Examination

lEiy&i'u i=

SAMPLE PAPER

fo"k; %& (Subject) - xf.kr (Mathematics) **le; 3 ?k.Vk (Time- 3 Hrs)**

d{kk %& (Class) - nloh (X) **i.kkd 100 (M.M.)**

(Instruction) & ¼fun'k½

1- lHkh i'u gy djuk vfuok;Z g A

Attempt all the Question

2- i'u Øekd 01 e 10 vd fu/kkfjr g A nk mi[k.M g A [k.M ^^v** e 05 cgfodYih; i'u rFkk [k.M ^^c** e 05 fjDr LFkkuk dh ifr vFkok mfpr lc/k tkfM, A iR;d i'u d fy, 1 vd vkcfVr g A

Q. No. 01 Carries 10 Marks. There are two sub-section, Section A is Multiple choice carries 05 marks and section B is fill in the blanks or match the column carries 05 marks.

3- i'u Øekd 02 l i'u Øekd 09 rd vfr y?kqRrjh; i'u g A iR;d i'u ij 02 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 30 'kCn A

Q. No. 2 to 09 are very short answer type question & it carries 02 marks each. Word limit is maximum 30.

4- i'u Øekd 10 l i'u Øekd 15 rd y?kqRrjh; i'u g A iR;d i'u ij 03 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 50 'kCn A

Q. No. 10 to 15 are short answer type question & it carries 03 marks each. Word limit is maximum 50.

5- i'u Øekd 16 l i'u Øekd 21 rd y?kqRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 04 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 75 'kCn A

Q. No. 16 to 21 are short answer type question & it carries 04 marks each. Each question has internal choice. Word limit is maximum 75.

6- i'u Øekd 22 l i'u Øekd 25 rd nh?kmRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 05 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 100 'kCn A

Q. No. 22 to 25 are long answer type question & it carries 05 marks each. Each question has internal choice. Word limit is maximum 100.

7- i'u Øekd 26 l i'u Øekd 27 rd nh?kmRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 06 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 150 'kCn A

Q. No. 26 to 27 are long answer type question & it carries 06 marks each. Each question has internal choice. Word limit is maximum 150.

i'u 1¼v½ lgh fodYi pfu, %&

(i) 7] 9] 21 dk PkRkFkkUkIkkRkh gA ¼1½

(a) 27 (b) 21 (c) 18 (d) 36

(ii) 120º dk jfM,kUk Ek EkkUk gkXkk& ¼1½

(a) $\pi/2$ (b) $\pi/3$ (c) $\pi/4$ (d) $2\pi/3$

(iii) 0kÙkk/k dk dk.k gkRkk g& ¼1½

(a) 60º (b) 90º (c) 120º (d) 180º

(iv) 8 dk f}vk/kkjh Ik.kkYkh Ek EkkUk gkXkk& ¼1½

(a) 100 (b)1000 (c) 1010 (d) 1001

(v) ,d fLkDd dk mNkYkUk Ikj 'kh"k vkUk dh Ikkf,kdRkk gkXkh& ¼1½

(a) 1 (b) $1/2$ (c) $2/3$ (d) $1/4$

(A) Choose the correct answer -

(i) Fourth proportional of 7, 9 and 21 is -

(a) 27 (b) 21 (c) 18 (d) 36

(ii) Value of 120º in radian is -

(a) $\pi/2$ (b) $\pi/3$ (c) $\pi/4$ (d) $2\pi/3$

(iii) Angle of semi circle is -

(a) 60º (b) 90º (c) 120º (d) 180º

(iv) Valur of 8 in Binary number is -

(a) 100 (b)1000 (c) 1010 (d) 1001

(v) The probability of getting heads in a throw of a coin is -

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{1}{4}$

¼Ck½ fjDRk LFkkUkk dh IkfRk dhft ,&

(i) 2 vkj 10 dk LkEkkRkj Ekk/;k ---------- gkXkk A ¼1½

(ii) fUkn'kkd (–a, –b) ---------- PkRkFkkLk Ek fLFkRk gkXkkA ¼1½

(iii) $1+\tan^2\theta$ ¾ ---------- gkXkk A ¼1½

(iv) ?kUk d dkjk dh Lk[;kk ---------- gkRkh gA ¼1½

(v) 3] 4 ,0k 5 Lk-Ekh- HkTkk 0kkYk f«kHkTk dk ---------- f«kHkTk dgRk gA ¼1½

(B) Fill in the Blanks -

(i) Arithmetic means of 2 and 10 is .....

(ii) Co-ordinate (–a, –b) lies on ..... quadrant.

(iii) Vlaue of $1+\tan^2\theta$ .....

(iv) Number of edges in cube is .....

(v) Triangle whose sides are 3 cm., 4 cm. and 5 cm. called ..... triangle.

Ik'Uk 2- $\frac{x^2+1}{x^2-1}$ vkj $\frac{x+1}{x+2}$ dk ;kkXkQYk KkRk djk A ¼2½

Find the sum of $\frac{x^2+1}{x^2-1}$ and $\frac{x+1}{x+2}$

Ik'Uk 3- $x^2+7x=-12$ d EkYk KkRk dhfTk, A ¼2½

Find the roots of $x^2+7x=-12$

Ik'Uk 4 $\frac{\cos 51^o}{\sin 39^o}$ dk EkkUk KkRk dhfTk, A ¼2½

Find the value of $\frac{\cos 51^o}{\sin 39^o}$

Ik'Uk 5- ¼&2]6½ vkj ¼3]&6½ d CkhPk dh njh KkRk dhfTk, A ¼2½

Find the distance between (–2, 6) and (3, –6).

Ik'Uk 6 ,d YkCk f«kHkTkh,k flkTEk d vk/kkj dh Ikfj EkkIk 30 Lk-Ekh- vkj ÅPkkb 5 Lk-Ekh- g Rkk mLkdk Ikk'Ok Ik"B KkRk dhfTk, \ ¼2½

Find the lateral surface of prism whose height is 5 cm. and perimeter of base is 30 cm.

Ik'Uk 7 Δ ABC Ek DE||BC RkFkk AD ¾ 3 DB ¾ 5 Lk -Ekh- AC ¾ 12 Lk-Ekh- gk Rkk AE dk EkkUk KkRk djk A ¼2½

In Δ ABC] DE||BC, AD = 3cm. DB = 5 cm. and AC = 12 cm. Find the value of AE.

Ik'Uk 8 vYxkfjFe dk Ikfj Hkkf"kRk dhfTk, A ¼2½

Define algorithm.

Ik'Uk 9- 15 Ek Lk 40 dk ?kVkb,k Ikjd Ik)fRk Lk A ¼2½

Subtract 15 from 45 by complement theory.

Ik'Uk 10 Ikfj Ek,k 0,kTk d $\frac{7x}{x^2+x-12}$ Ek Lk D,kk ?kVk,kk Tkk,k fd Ikfj.kkEk $\frac{4}{4+x}$ IkkIRk gkA ¼3½

What should be subtract from $\frac{7x}{x^2+x-12}$ to get $\frac{4}{4+x}$.

lk'Uk 11 J.kh 3] 8]13] 18]---------- dk dkUk Lkk lkn 498 gA ¼3½

Which term of the series 3, 8, 13, 18 ..... is 498.

lk'Uk 12 ;fn $\frac{x+y}{x-y}=\frac{2}{3}$ gk rk $x:y$ dk eku Kkr djkA ¼3½

If $\frac{x+y}{x-y}=\frac{2}{3}$ then find the value of $x:y$.

lk'Uk 13 fLk) dhfTk, & ¼3½

Prove that :

$$\sec\theta-\tan\theta=\frac{1-\sin\theta}{\cos\theta}$$

lk'Uk 14 ,d 'kd dk 0;kkLk 12 Lk-Ekh- vkj ÅPkkb 6 LkEkh- g Rkk 'kd dh fr;d ÅPkkb KkRk dhfTk, A ¼3½

The diameter of a cone is 12 cm. and height 6 cm. Find the slant height of the cone.

lk'Uk 15 EkkgUk Uk Ñf"k f0kdkLk Ckd Ek 50000 : lk;k dk 2 0k"k d fYk, Lkk0kf/k TkEkk fd;kkA ;kfn C;kkTk dh nj 10 lkfRk'kRk 0kkf"kd gk RkFkk C;kkTk lkfRk N% Ekkg Ckkn Lk;kkfTkRk gkRk g Rkk lkfjkD0kkRkk lkj Ckd mLk fdRkUkk /kUk nXkk A ¼3½

Mohan deposit Rs. 50000 in Krishi Vikas Bank for 2 year in fixed deposite account. If the rate of interest is 10% p.a., then calculate the maturity amount if the interest is compounded half yearly.

lk'Uk 16 *a* d fdLk EkkUk d fYk, fCkn ¼1]4½]¼*a*, &2½ vkj ¼&3]16½ Lkej[k gkXk& ¼4½

For what value of *a*, the point (1, 4), (*a* –2) and (–3, 16) will be colliner.

¼vFk0kk½ (OR)

mLk f«kHkTk dk dUæd KkRk dhfTk, fTkLkd 'kh"kk d fUkn'kkd ¼4] 3½] ¼2] &3½] ¼&3] 5½ gA

Find the centroid of a triangle whose vertices are (4, 3), (2, –3) and (–3, 5).

lk'Uk 17 fdLkh f«kHkTk d dk.k LkEkkRkj J.kh Ek g LkCkLk CkM dk.k dk EkkUk 105^{o} g RkhUkk dk.kk d EkkUk dk jfM¸kUk Ek KkRk dhfTk, A ¼4½

The angles of a triangle are in A.P. The biggest angle is 105^{o}. Find the angles in radian.

¼vFkOkk½ (OR)

,d f«kHkTk d dk.k 2%3%4 Ek g A f«kHkTk d dk.kk d EkkIk jfM¸kUk Ek KkRk dhfTk,A

The angles of a triangle are in the ratio 2 : 3 : 4. Find the measures of angles in radian.

lk'Uk 18 $x = a\sec\theta$ RkFkk $y = b\tan\theta$ gk Rkk fLk) dhfTk, fd $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$· ¼4½

If $x = a\sec\theta$ and $y = b\tan\theta$ then prove that : $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

¼vFkOkk½ (OR)

¸kfn $x = a\cos\theta - b\sin\theta$ RkFkk $y = a\sin\theta + b\cos\theta$ gk Rkk fLk) dhfTk, fd $x^2 + y^2 = a^2 + b^2$·

If $x = a\cos\theta - b\sin\theta$ and $y = a\sin\theta + b\cos\theta$ then prove that : $x^2 + y^2 = a^2 + b^2$·

lk'Uk 19 mLk CkM Lk CkM 'kd dk vk¸kRkUk KkRk dhfTk, Tkk mLk ?kUk Ek Lk dkVk Xk¸kk g fTkLkdh dkj YkCkkb 3 Lk-Ekh- gA ¼4½

Find the volume of the greatest cone which can be cut from a cube whose edge is 3 cm.

¼vFkOkk½ (OR)

fdLkh XkkYk dk Ik"Bh¸k {k«kQYk 616 0kXk LkEkh- gk Rkk XkkYk dk vk¸kRkUk KkRk dhfTk, A

The curved surface of sphere is 616 cm.^{2} then find the volume of sphere.

Ik'Uk 20- nk LkkEkkU¸k f«kHkTkk d {k«kQYk dk vUkIkkRk fdUgh nk LkXkRk HkTkkvk d 0kXkk d vUkIkkRk d Ckjk Cj gkRk gA ¼4½

Prove that the ratio of the areas of two similar triangles is equl to the ratio of the squares of any two corresponding sides.

¼vFkOkk½ (OR)

FkYLk IkEk¸k fYkf[k, ,0k fLk) dhfTk, A

State and prove that Thales theorem.

Ik'Uk 21- ,d FkYk Ek 4 dkYkh] 5 YkkYk] RkFkk 7 LkQn Xkn gA ¸kfn ,d Xkn ¸kknPN¸kk fUkdkYkh Tkk¸k Rkk bLkdh Ikkf¸kd Rkk D¸kk gkXkh fd fUkdkYkh Xkb Xkn& (i) LkQn gkXkh (ii) LkQn ¸kk dkYkh A

A bag contains 6 black, 5 red and 7 white balls. If one ball is drawn at random. What is probability that the ball drawn will be - (i) White, (ii) White or black.

¼vFkOkk½ (OR)

vPNh Ikdkj Lk QVh Xkb 52 Rkk'kk dh ,d XkMMh Ek Lk ,d Rkk'k ¸kknPN¸kk [khPkk TkkRkk g] Rkk fUkEUk dh Ikkf¸kd Rkk KkRk dhfTk, A

(i) ,d iku dk rk'k gkA (ii) iku ;k bV dk ,Ddk gkA

From a well shuffled pack of 52 cards, one card drawn at random. Find the probability of the following -

(i) One card is of heart

(ii) Ace of heart or diamond.

Ik'Uk 22 ;kfn $x=\frac{3ab}{a+b}$ gk Rkk fLk) dhfTk, fd $\frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=2$- ¼5½

If $x=\frac{3ab}{a+b}$, then prove that $\frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=2$

¼vFkOkk½ (OR)

RkhUk LkEkkUkkRkj Jf.k;kk d *n* Iknk dk ;kXkQYk ØEk'kh S_1, S_2, S_3 gA fTkUkd IkFkEk Ikn 1] 2] 3 RkFkk LkkOkURkj ØEk'kh 1] 3] 5 gA Rkk fLk) dhfTk, fd &

$$S_1+S_2+S_3=\frac{3}{2}(3n+1)n$$

If S_1, S_2, S_3 be the sum of n terms of three A.P. and their first terms are 1, 2, 3 respectively and common difference are 1, 3, 5, then prove that

$$S_1+S_2+S_3=\frac{3}{2}(3n+1)n$$ ¼5½

Ik'Uk 23 ?kUk';kkEk dk EkYk 0kRkUk IkfRkEkkg 12500 :Ik;k g RkFkk EkgXkkb HkÙkk IkfRkEkkg 6300 :Ik;kk IkkIRk djRkk g A ;kfn 0kg LkkEkkU;k Hkf0k";k fUkf/k Ek IkfRkEkkg 2000 :-] th- vkb-, l- e IkfRkEkkg 250 :- RkFkk HkkjRkh;k TkhOkUk CkhEkk IkhfEk;kEk Ek IkfRkOk"k 69000 :- ,o Mkd?kj TkhOkUk CkhEkk IkhfEk;kEk IkfRkOk"k 10000 :- TkEkk djRkk g A mLkd }kjk n;k dYk vk;kdj KkRk dhfTk, A ¼5½

Basic salary of Ghanshyam is R.s 12500 per month and D.A. is Rs. 6300 per month. He invests Rs. 2000 per month in G.P.F., Rs. 250 per month is G.I.S. and Rs. 69000 yearly as annual premium to L.I.C. and also Rs. 10000 yearly in post office L.I.C. premium. Calculate the in-

come tax paid by him?

Rate of income tax :

upto Rs. 1,10,000	nil
From Rs. 1,10,001 to 1,50,000	10%
From Rs. 1,50,001 to 2,50,000	20%
above Rs. 2,50,000	30%

Educational cess : 3% of the total payable income tax and surcharge.

¼vFkOkk½ (OR)

'kkfYkUkh dh 0kkf"kd vk;k ¼Ekdkuk fdjk;kk HkRRkk NkMdj½ 1]80]000 :Ik;k gA ;fn 0kg LkkEkkU;k Hkf0k"k fUkf/k Ek IkfRk0k"k 40000 :Ik;k] LkEkg TkhOkUk CkhEkk ;kkTkUkk Ek] 250 :Ik;k IkfRkEkkg RkFkk 5000 v) 0kkf"kd TkhOkUk CkhEkk IkkfYk lh Ek fd'Rk TkEkk djRkh gA KkRk dhfTk, fd 'kkfYkUkh dk vlkUk vk;kdj mLk f0kÙkh;k 0k"k fdRkUkk vk;kdj nUkk gkXkkA

The annual income of Mrs. Shalini (Excluding HRA) is Rs. 180000. If she deposite Rs. 40000 per year in G.P.F., Rs. 250 per month in G.I.S. and Rs. 5000 half yearly premium towards L.I.C. Calculate her income tax payable in the financial year.

Rate of income tax :

upto Rs. 1,10,000	nil
From Rs. 1,10,001 to 1,50,000	10%
From Rs. 1,50,001 to 2,50,000	20%
above Rs. 2,50,000	30%

Educational cess : 3% of the total payable income tax and surcharge.

Ik'Uk 24 f«kHkTk ΔLMN dh jPkUkk dhfTk, Tkgk $MN = 5$ Lk-Ekh-] $\angle L = \angle 55^\circ$ vkj L Lk MkYkk Xk;kk 'kh"k YkCk 3-5 Lk-Ekh- gkA jPkUkk d Ikn Hkh fYkf[k, A

Contrust ΔLMN in which $MN = 5$ cm., $\angle L = 55^\circ$ and perpendicular

from *L* is 3.5 cm. Write steps of construction.

¼vFkOkk½ (OR)

,d PkØh;k PkRkHkTk *ABCD* dh jPkUkk dhfTk, fTkLkEk $\angle ABC = 90^{o}$, *AC* ¾ 6 Lk-Ekh-] *AB* ¾ 3 Lk-Ekh-] *CD* ¾ 3-6 Lk-Ekh- jPkUkk d lkn Hkh fYk[kkA

Construct a cyclic quadrilateral *ABCD* in which $\angle ABC = 90^{o}$, *AC* ¾ 6 cm., *AB* ¾ 3 cm., *CD* ¾ 3.6 cm. Write steps of construction.

lk'Uk 25- fUkEUk Lkkj.kh Lk Ekkf/;kdk KkRk dhfTk, & ¼5½

OkXkk vRkjkYk	0&10	10&20	20&30	30&40	40&50
Ckkj Ckkj Rkk	4	8	10	11	16

Find the medium of the following table :

Class	0–10	10–20	20–30	30–40	40–50
Frequency	4	8	10	11	16

¼vFkOkk½ (OR)

fUkEUk vkdfr cVu Lk cgyd KkRk dhfTk, &

OkXkk	0&10	10&20	20&30	30&40	40&50	50&60	60&70
Ckkj Ckkj Rkk	8	15	21	37	31	14	12

Find the mode of the following table :

Class	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	8	15	21	37	31	14	12

lk'Uk 26 ,d Ok"k IkOk fIkRkk dh vk;q Ik«k dh vk;q d 8 XkUkh Fkh vkTk fIkRkk dh vk;q Ik«k dh vk;q d OkXk d Ckjk Ckj gA Rkk mUkdh OkRkEkkUk vk;q KkRk dhfTk,\ ¼6½

One year ago, a man was 8 times as old as his son. Now his age is equal

to the square of his son's age. Find their present ages.

¼vFkOkk½ (OR)

nk ØEkkXkRk LkEk Lk[¸kk¸k KkRk dhfTk, fTkUkd 0kXkk dk ¸kkXk 164 gA

The sum of squares of two consecutive even numbers is 164. Find the numbers.

Ik'Uk 27 fLk) dhfTk, fd fdLkh LkEkCkkg f«kHkTk dh fdLkh HkTkk d 0kXk d fRkXkUkk mLkdh ÅPkkb d 0kXk d Pkkj XkUk d Ckjk Ckj gkRkk gA ¼6½

Prove that three times the square of any side of an equilateral triangle is equal to four times the square of the altitude.

¼vFkOkk½ (OR)

¸kfn *PAB* 0kÙk dh Nnd j[kk gk Tkk 0kÙk dk *A* vkj *B* Ikj IkfRkPNn djRkh g vkj *PT* ,d LIk'k j[kk [k.M gk Rkk fLk) dhfTk, *PA.PB* = $(PT)^2$

If *PAB* is a secant to a circle which intersecting the circle at *A* and *B* and *PT* is a tangent segment, then show that : *PA.PB* = $(PT)^2$

^lEiy mRrj* lV & ,

mÙkj 1¼v½ Ckgf0kdYIkh¸k mÙkj

(i) 7] 9] 21 dk PkRkFkkUkIkkRkh gA ¼1½

(a) 27

(ii) 120 v'k dk jfM¸kUk Ek EkkUk gkXkk& ¼1½

(d) $2\pi/3$

(iii) 0kÙkk/k dk dk.k gkRkk g& ¼1½

(b) 90^o

(iv) 8 dk f}vk/kkjh Ik.kkYkh Ek EkkUk gkXkk& ¼1½

(b)1000

(v) ,d fLkDd dk mNkYkUk Ikj 'kh"k vkUk dh Ikkf¸kdRkk gkXkh& ¼1½

(b) $1/2$

¼Ck½ fjDRk LFkkUkk dh IkfRk ¸kk mfPkRk LkCk/k TkkMk&

(vi) 2 vkj 10 dk LkEkkRkj Ekk/¸k **6** gkXkk A ¼1½

(vii) fUkn'kkd (–a, –b) **r'rh;** PkRkFkkLk Ek fLFkRk gkXkkA ¼1½

(viii) $1+\tan^2\theta$ ¾ $\sec^2\theta$ gkXkk A ¼1½

(ix) ?kUk d dkjk dh Lk[¸kk **12** gkRkh gA ¼1½

(x) 3] 4 ,0k 5 Lk-Ekh- HkTkk 0kkYk f«kHkTk dk **ledk.k** f«kHkTk dgRk gA ¼1½

i'u 2 l i'u 9 rd ¼iR;sd 2 vad½

mÙkj 2- $\dfrac{x^2+1}{x^2-1}+\dfrac{x+1}{x+2}$ ¼2½

$$= \frac{(x^2+1)(x+2)+(x+1)(x^2-1)}{(x^2-1)(x+2)}$$

$$= \frac{x^3+2x^2+x+2+x^3-x+x^2-1}{x^3+2x^2-x-2}$$

$$= \frac{2x^3+3x^2+1}{x^3+2x^2-x-2}$$

mÙkj 3- $x^2+7x=-12$ ½2½

$x^2+7x+12=0$

$x^2+3x+4x+12=0$

$x(x+3)+4(x+3)=0$

$(x+3)(x+4)=0$

;k rk $(x+3)=0$;k $(x+4)=0$

$x=-3$;k $x=-4$

vr% ox leh- d ey &3] &4 gA

mÙkj 4 $\frac{\cos 51^\circ}{\sin 39^\circ}$ ½2½

$$= \frac{\cos(90^o-39^o)}{\sin 39^o} \qquad \because \cos(90^o-\theta)=\sin\theta$$

$$= \frac{\sin 39^o}{\sin 39^o}$$

$$= 1$$

mÙkj 5- $PQ = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$ ½2½

$$= \sqrt{(3+2)^2+(-6-6)^2}$$

$$= \sqrt{25+144}$$

$$= \sqrt{169}$$

$PQ = 13$ vr% nkuk fcUnvk d chp dh njh 13 leh- gA

mÙkj 6 YkCk f«kHkTkh,k fIkTEk d vk/kkj dh Ikfjekk ¾ 30 Lk-Ekh- vkj ÅPkkb ¾ 5 Lk-Ekh-

∴ YkCk f«kHkTkh,k fIkTEk Ikk'Ok Ik"B ¾ vk/kkj dk ifjeki × Åpkb

= 30×5

= 150 ox Lk-Ekh-

mÙkj 7 FkY l ie; l] ½2½

$$\frac{AD}{AB} = \frac{AE}{AC}$$

tgk AD ¾ 3 leh- fn;k gA

$AB = AD + DB = 3 + 5 = 8$ leh-

AE = ?

AC ¾ 12 Lk-Ekh- fn;k g

∴ eku j[ku ij

$$\Rightarrow \quad \frac{3}{8} = \frac{AE}{12}$$

$$\Rightarrow \quad AE \times 8 = 3 \times 12$$

$$\Rightarrow \quad AE = \frac{3 \times 12}{8} = \frac{9}{2}$$

$$\Rightarrow \quad AE = 4.5 \text{ leh-}$$

mÙkj 8 vYxkfjFe ;k dyu fof/k ½2½

½1½ fdlh Hkh leL;k dk gy dju d fy, rkfdd vun'kk dh Øe i)fr dk vYxkfjFe dgr gA

½2½ fdlh leL;k dk gy dju d fy, fuf'pr l[;k e fun'kk d vuØe dk vYxkfjFe ¼;k dyu fof/k½ dgr gA

mÙkj 9- lkekU; Ik)fRk Ikjd Ik)fRk ½2½

15		iFke pj.k	15	15 dk **9 dk ijd
&40			$ 59	bl ;kx e dkb gkfly
&25			74	ikIr ugh gkrk gA vr%

f}rh; pj.k] 74 dk ijd ¾ 25

ble _.k fpUg yxku ij okNr mRrj ¾ &25

bl idkj ?kVko dh ifØ;k lkekU; i)fr ,o ijd i)fr l ikIr ifj.kke &25 leku ikIr gkrk gA

mÙkj 10 ekuk A ?kVku ij ifj.kke $\frac{4}{4+x}$ lkkIRk gkrk g & ¼3½

$\frac{7x}{x^2+x-12}$ & A ¾ $\frac{4}{4+x}$

$\frac{7x}{x^2+x-12}$ & $\frac{4}{4+x}$ ¾ A

$\frac{7x(4+x)-4(x^2+x-12)}{(x^2+x-12)(4+x)}$ ¾ A

$\frac{28x+7x^2-4x^2-4x+48}{(x+4)(x-3)(4+x)}$ ¾ A

$\frac{3(x^2+8x+16)}{(x+4)(x-3)(4+x)}$ ¾ A

mÙkj 11 n ok in $= T_n =$ $a + (n-1)\,d$ ¼3½

fn;k g& $T_n = 498$, $a = 3$, $d = 8 - 3 = 5$, $n = ?$

$498 = 3 + (n-1)\,5$

$498 = 3 + 5n - 5$

$500 = 5n$

$100 = n$

vr% J.kh d 100o in dk eku 498 gkxkA

mÙkj 12 $\frac{x+y}{x-y}=\frac{2}{3}$ ¼3½

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

$3x+3y=2x-2y$

$3x-2x=2y-3y$

$\frac{x}{y}=\frac{-5}{1}$

$x:y=-5:1$

mÙkj 13 $\sec\theta-\tan\theta=\frac{1-\sin\theta}{\cos\theta}$ ¼3½

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

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

mÙkj 14 fn;k g] $2r=12,\ r=6$ ¼3½

ΔBCO l]

$l^2=h^2+r^2$

$=62+62$

$=36+36$

$l^2=72$

$l=6\sqrt{2}$

mÙkj 15 fn;k g] ey/ku $p=50000$:Ik,k ¼3½

C;kt dh nj $r=10$ ifr'kr okf"kd ¾ 5 ifr'kr N‰ekgh ;k v)Zokf"kd

le; $n=2$ 0k"k ¾ 4 N‰ekgh

feJ/ku $A=P\left[1+\frac{r}{100}\right]^n$ l

$$= 50000\left[1+\frac{5}{100}\right]^4$$

$$= 50000\left[\frac{21}{20}\right]^4$$

$$= 50000\times\frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}$$

$$= 60775.31 \text{ :-}$$

bl idkj ekgu dk nk o"k i'pkr 60775-31 :- ikIr gkxkA

mÙkj 16 ge tkurs gS fd ;fn rhu fcUnq lej[k gksa rks mUgsa cus f=Hkqt dk {ks=Qy 'kwU; gksxkA

Δ dk {ks=Qy ¾ $\frac{1}{2}[(x_1y_2-x_2y_1)+(x_2y_3-x_3y_2)+(x_3y_1-x_1y_3)] = 0$

$$\frac{1}{2}[\{(1)\times(-2)-(a\times4)\}+\{(a\times16)-(-3)\times(-2)\}+\{(-3)\times(4)-(1\times16)\}]=0$$

$$\frac{1}{2}[(-2-4a)+(16a-6)+(-12-16)] = 0$$

$$\frac{1}{2}[12a-36] = 0$$

$$12a - 36 = 0$$

$$a = 3$$

¼vFkok½

mÙkj 16 f=Hkqt dk dUnz $(h, k) = \left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

$$h = \frac{x_1+x_2+x_3}{3} = \frac{4+2+(-3)}{3} = \frac{3}{3} = 1$$

$$k = \frac{y_1+y_2+y_3}{3} = \frac{3+(-3)+5}{3} = \frac{5}{3}$$

dUæd ¾ $\left(1, \frac{5}{3}\right)$

mÙkj 17 eku fy;k fd f=Hkt d dk.k $(\alpha-\delta)^o, \alpha^o, (\alpha+\delta)^o$ gA ¼4½

f=Hkt d rhuk dk.kk dh eki 180^o gA

$\Rightarrow \quad (\alpha-\delta)^o + \alpha^o + (\alpha+\delta)^o = 180^o \quad \Rightarrow 3\alpha = 180^o \quad \Rightarrow \alpha = 60^o$

vr% lcl cMk dk.k 105^o gA $\alpha+\delta = 105^o \Rightarrow 60^o + \delta = 105^o \Rightarrow \delta = 45^o$

lcl NkVk dk.k $(\alpha-\delta)^o \Rightarrow \quad \alpha-\delta = 60^o - 45^o = 15^o$

$$15^o = \frac{\pi}{180} \times 15 = \frac{\pi}{12}$$

chp dk.k $= \quad 60^o = \frac{\pi}{180} \times 60 = \frac{\pi}{3}$

lcl cMk dk.k $= \quad 105^o = \frac{\pi}{180} \times 105 = \frac{7\pi}{12}$

vHkh"V dk.k $\frac{\pi}{12}, \frac{\pi}{3}$,o $\frac{7\pi}{12}$ jfM;u gA

¼vFkZkk½

ekuk f=Hkt d dk.k $\angle A$, $\angle B$ o $\angle C$ gA

$\angle A : \angle B : \angle C = 2 : 3 : 4$

ekuk dkb dk.k x g rk] ge tkur g fd $\angle A+\angle B+\angle C = 180^o$

$\therefore \quad \angle A = 2x, \ \angle B = 3x$ vkj $\angle C = 4x$

vr% $2x + 3x + 4x = 180^o$

$\Rightarrow \quad 9x = 180^o$

$\Rightarrow \quad x = 20^o$

vr% $\angle A = 2x = 2 \times 20^o = 40^o = 40^o \times \frac{\pi}{180} = \frac{2\pi}{9}$ jfM;u

$\angle B = 3x = 3 \times 20^o = 60^o = 60^o \times \frac{\pi}{180} = \frac{\pi}{3}$ jfM;u

$\angle C = 4x = 4 \times 20^o = 80^o = 80^o \times \frac{\pi}{180} = \frac{4\pi}{9}$ jfM;u

vr% f=Hkt d dk.k $40^o, 60^o, 80^o$ g ftud jfM;u e eku Øe'k% $\frac{2\pi}{9}, \frac{\pi}{3}, \frac{4\pi}{9}$ gA

mÙkj 18 ;fn $x = a\sec\theta$ .....(i) RkFkk $y = b\tan\theta$ .....(ii) ¼4½

lehdj.k (i) l $\frac{x}{a} = \sec\theta$ RkFkk lehdj.k (ii) l $\frac{y}{b} = \tan\theta$

$= \frac{x^2}{a^2} - \frac{y^2}{b^2}$

$= \sec^2\theta - \tan^2\theta \qquad \left[\because 1+\tan^2\theta = \sec^2\theta \right.$
$\left. 1 = \sec^2\theta - \tan^2\theta \right]$

= 1

¼vFkok½

;fn $x = a\cos\theta - b\sin\theta$ ---------- ¼1½

RkFkk $y = a\sin\theta + b\cos\theta$ ---------- ¼2½

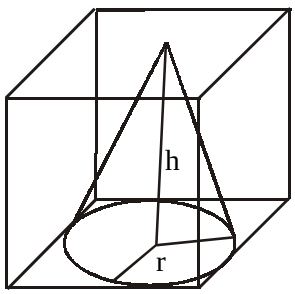
lehdj.k ¼1½ o ¼2½ dk ox djd tksM+u ij

$x^2 + y^2 = a^2\left(\cos^2\theta + \sin^2\theta\right) + b^2\left(\cos^2\theta + \sin^2\theta\right)$
$- 2ab\cos\theta\sin\theta + 2ab\sin\theta\cos\theta$

$x^2 + y^2 = a^2 + b^2 \qquad \left[\because \sin^2\theta + \cos^2\theta = 1\right.$

mÙkj 19 ?ku l dkV x; cM l cM 'kd dk vk;ru V $= \frac{1}{3}\pi\, r^2 h$ ¼4½

fn;k g] h = 3 lehdj.k
'kd d vk/kkj dk 0;k l = 2r = 3 lehdj.k



$r = \frac{3}{2}$ lehdj.k

eku j[ku ij] $V = \frac{1}{3}\pi\left(\frac{3}{2}\right)^2.3$

$V = \frac{9}{4}\pi$?ku lehdj.k = 2.25π

¼vFkok½

ekuk xky dh f=T;k = r

fn;k g] xky dk i"Bh; {k=Qy = 616 ox l-eh-

$\Rightarrow \quad 4\pi r^2 = 616 \quad \Rightarrow \quad 4 \times \frac{22}{7} \times r^2 = 616 \quad \Rightarrow \quad r^2 = \frac{7 \times 616}{4 \times 22}$

$\Rightarrow \quad r^2 = 7 \times 7 \quad \Rightarrow \quad r = 7$ l-eh-

$\therefore$ xky dk vk;ru = $\frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times (7)^3 = \frac{4}{3} \times \pi \times 7 \times 7 \times 7$

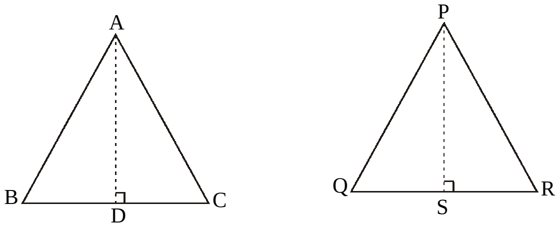
$= \frac{1372}{3}\pi$?ku l-eh-

mÙkj 20- **i:e; dFku** %nk le:i f«kHkTkk d {k«kQYk dk vUkIkkRk fdUgh nk LkXkRk HkTkkvk d OkXkk d vUkIkkRk d CkjkCkj gkRk gA ¼4½

Kkr g % nk le:i f=Hkt ABC vkj PQR

fl) djuk g % $\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$

jpuk % AD ⊥ BC vkj PS ⊥ QR [khpkA



miifÙk %

dFku	dkj.k
$\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR}} = \frac{\frac{1}{2} BC \times AD}{\frac{1}{2} QR \times PS}$ $\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR}} = \frac{BC}{QR} \times \frac{AD}{PS}$ ..... (i) vc f=Hkt ADB vkj PSQ e] $\angle B = \angle Q$	le:i Δ d lxr dk.k cjkcj gA

$\angle ADB = \angle PSQ$	iR;d 90^0 dk gA ¼jpuk l½
$\Delta ADB \sim \Delta PSQ$	AA le:irk miiey; l
$\frac{AB}{PS} = \frac{AD}{PQ}$ ...(ii)	le:i Δ dh lxr Hktk;| lekuikfrd gkrh gA
yfdu $\frac{AB}{PQ} = \frac{BC}{QR}$ ...(iii)	$\Delta ABC \sim \Delta PQR$
$\therefore \quad \frac{AD}{PS} = \frac{BC}{QR}$ ...(iv)	(ii) o (iii) l
$\frac{\{k«kQy\ \Delta ABC}{\{k«kQy\ \Delta PQR} = \frac{BC}{QR} \times \frac{BC}{QR} = \frac{BC^2}{QR^2}$ bl idkj fl) dj ldr g fd $\frac{\{k«kQy\ \Delta ABC}{\{k«kQy\ \Delta PQR} = \frac{AB^2}{PQ^2}$ vkj $\frac{\{k«kQy\ \Delta ABC}{\{k«kQy\ \Delta PQR} = \frac{AC^2}{PR^2} = \frac{AB^2}{PQ^2}$ vFkkr $\frac{\{k«kQy\ \Delta ABC}{\{k«kQy\ \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$	(i) o (iv) l bfr fl)e

¼vFkok½

FkYkk lkEk,k & ,d f=Hkt dh ,d Hktk d lekrj [khph xb j[kk vU; nk Hktkvk dk ftu nk fcnvk ij ifrPNn djrh g o fcn Hktkvk dk leku vuikr e foHkDr djr gA

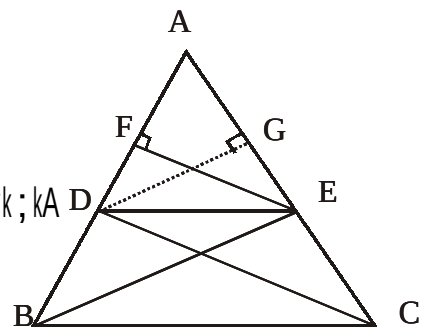
Kkr g% Δ f=Hkt ABC e DE||BC

fl) djuk g% $\frac{AD}{DB} = \frac{AE}{EC}$

jpuk % (i) B dk E l rFkk C dk D l feyk;kA

(ii) EF $\perp$ AB [khpkA

(iii) DG $\perp$ AE [khpkA



miifÝk %

dFku	dkj.k
Δ dk {k=Qy ¾ $\frac{1}{2}$ vk/kkj × Åpkbb	
$\frac{\Delta ADE \text{ dk } \{k\text{«}k Qy}{\Delta BDE \text{ dk } \{k\text{«}k Qy} = \frac{\frac{1}{2} AD.EF}{\frac{1}{2} BD.EF} = \frac{AD}{BD}$ ...(i)	
blh idkj]	
$\frac{\Delta ADE \text{ dk } \{k\text{«}k Qy}{\Delta CDE \text{ dk } \{k\text{«}k Qy} = \frac{\frac{1}{2} AE.DG}{\frac{1}{2} EC.DG} = \frac{AE}{EC}$ ...(ii)	
yfdu] Δ BDE dk {k=Qy ¾ Δ CDE dk {k=Qy ...(iii)	,d gh vk/kkj vkj ,d gh lekarj j[kkvk d chp cu f=Hkt dk {k=Qy cjkcj gkrk gA
vr% $\frac{AD}{BD} = \frac{AE}{EC}$	(i), (ii), (iii) l bfr fl)e

mÙkj 21- FkYk Ek xnk dh dy l[;k 4 $ 5 $ 7 ¾ 16

$$n(S) = 16$$

(i) 7 lQn xnk e l dkb ,d lQn xn fudkyh tk ldrh gA

$$n(A) = 7$$

vr% LkQn xn fudkyu dh ikf;drk $P(A) = \frac{n(A)}{n(S)}$

$$P(A) = \frac{7}{16}$$

(ii) LkQn ¸kk dkYkh xn fudkyu dh ikf;drk

$$P(A) = \frac{7}{16} + \frac{4}{16}$$

¾ $\frac{7+4}{16}$ ¾ $\frac{11}{16}$

¼vFkZkkk½

dy lEHkkfor ?kVuk; $n(S) = 52$

(i) iku dk rk'k fudkyu dh ?kVuk A gk rk

$$n(A) = 13$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

(ii) iku ;k bV dk ,Ddk fudkyu dh ?kVuk A gk rk

$$n(A) = 1 + 1 = 2$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

mÙkj 22 fn,kk g $x = \frac{3ab}{a+b}$ g rk $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$ ¼5½

$$\frac{x}{3a} = \frac{b}{a+b}$$

2 dk x.kk dju ij

$$\frac{2x}{3a} = \frac{2b}{a+b}$$

$$\frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)}$$,kkXkkRkjkUkIkkRk fUk,kEk Lk

$$\frac{2x+3a}{2x-3a} = \frac{3b+a}{b-a} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

rFkk iuh

$$\frac{x}{3b} = \frac{a}{a+b}$$

2 dk x.kk dju ij

$$\frac{2x}{3b} = \frac{2a}{a+b}$$

$$\frac{2x+3b}{2x-3b}=\frac{2a+(a+b)}{2a-(a+b)}$$,kkXkkRkj kUkIkkRk fUk,kEk Lk

$$\frac{2x+3b}{2x-3b}=\frac{3a+b}{a-b}=\frac{3a+b}{-(b-a)}$$ ..... (2)

LkEkh dj.k ¼1½ RkFkk ¼2½ dk TkkMUk Ikj

$$\Rightarrow \quad \frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=\frac{3b+a}{b-a}+\frac{3a+b}{-(b-a)}$$

$$¾ \frac{3b+a-3a-b}{b-a}$$

$$¾ \frac{2(b-a)}{b-a}$$

¾ 2

¼vFkok½

iFke LkEkkUkkRkj J.kh d fy, $a=1, d=1$

$$S_1 = \frac{n}{2}[2\times1+(n-1)\times1]$$

$$S_1 = \frac{n}{2}[2+n-1]$$

$$S_1 = \frac{n}{2}[n+1]$$

f}rh; LkEkkUkkRkj J.kh d fy, $a=2, d=3$

$$S_2 = \frac{n}{2}[2\times2+(n-1)\times3]$$

$$S_2 = \frac{n}{2}[4+3n-3]$$

$$S_2 = \frac{n}{2}[3n+1]$$

rrh; LkEkkUkkRkj J.kh d fy, $a=3, d=5$

$$S_3 = \frac{n}{2}[2\times3+(n-1)\times5]$$

$$S_3 = \frac{n}{2}[6+5n-5]$$

$$S_3 = \frac{n}{2}[5n+1]$$

iFke] f}rh; ,o rrh; lekUrj Jf.k;k dk ;kx

$$S_1+ S_2+ S_3 = \frac{n}{2}[n+1] + \frac{n}{2}[3n+1] + \frac{n}{2}[5n+1]$$

$$= \frac{n}{2}[n+1+3n+1+5n+1]$$

$$= \frac{n}{2}[9n+3]$$

$$= \frac{3n}{2}[3n+1]$$

$$= \frac{3}{2}(3n+1)n$$

mÙkj 23 ?ku';ke dh okf"kd vk; ¼5½

1- ey oru l vk; 12500 × 12 ekg ¾ 1]50]000 :-

egxkb HkÝkk l vk; 6300 × 12 ekg ¾ 75600 :-

vr% dy okf"kd vk; ¾ 2]25]600 :-

2- dj e NV ;kX; jkf'k okf"kd

¼a½ okf"kd lkekU; Hkfo"; fuf/k e v'knku 2000 x 12 ¾ 24]000 :-

¼b½ th vkb ,l okf"kd ihfe;e 250 x 12 ¾ 3]000 :-

¼c½ okf"kd thou chek ihfe;e ¾ 69]000 :-

¼c½ okf"kd Mkd thou chek ihfe;e ¾ 10]000 :-

dj e NV ;kX; jkf'k ¼a + b + c + d½

24]000 $ 3]000 $ 69]000 $ 10]000 ¾ 1]06]000 :-

ijUr vf/kdre NV ;kX; jkf'k 1]00]000 :- rd lhfer gA

rc dj e NV ;kX; jkf'k ¾ 1]00]000 :-

3- dj ;kX; jkf'k 2]25]600 :- & 1]00]000 :- ¾ 1]25]600 :-

4- vk;dj ¾ ¼1]25]600 & 1]10]000½ ¾ 1]56]000 dk 10%

$$¾\ 15,600 \times \frac{10}{100} \qquad ¾\ 1560\ :-$$

5- f'k{kk midj ¾ 1560 rd 3%

$$¾\ 15,60 \times \frac{10}{100} ¾46\text{-}80 \qquad ¾\ 47\ :-$$

6- n; dy vk;dj ¾ 1560 $ 47 ¾ 1607 :-

vr% ?ku'';ke }kjk dy n; vk;dj ¾ 1607 :-

¼vFkZkk½

mÙkj 23 'kkfyuh dh okf"kd vk;

1- dforkdh dy okf"kd vk; ¾ 1]80]000 :-

2- dj e NV ;kX; jkf'k

¼a½ okf"kd lkekU; Hkfo"; fuf/k e v'knku ¾ 40]000 :-

¼b½ th vkbZ ,l okf"kd ihfe;e 250 x 12 ¾ 3]000 :-

¼b½ okf"kd thou chek ihfe;e 5000 x 2 ¾ 10]000 :-

dj e NV ;kX; jkf'k ¼a + b½ ¾ 40]000 $ 3]000 $ 10]000 ¾ 53]000 :-

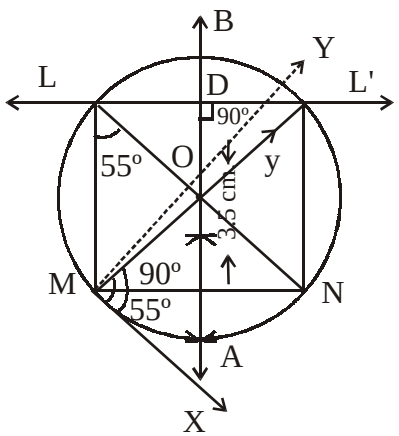
ijUrq vf/kdre NV ;kX; jkf'k 1]00]000 :- rd lhfer gA

3- dj ;kX; jkf'k ¾ 1]80]000 :- & 53]000 :- ¾ 1]27]000 :-

4- vk;dj ¾ 1]27]000 :- rd dkbZ dj ughA

vr% 'kkfyuh dk dkbZ dj ugh nuk iMxkA

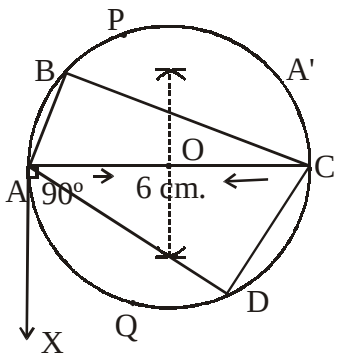
mÙkj 24



jpuk d in %&

¼vFkZkkk½

mÙkj 24



jpuk d in %&

mÙkj 25- ¼5½

OkXk vRkjkYk	0&10	10&20	20&30	30&40	40&50
CkkjckkjRkk	4	8	10	11	16
lp;h ckjcjrk	4	12	22	33	49

ink dh l[;k N ¾ 49

ef/;dk l[;k ¾ $\frac{N}{2}$ ¾ 24-5

tk fd lp;h ckjcjrk 33 d vrxr vkrk gA

ef/;dk ox 30&40

ef/;dk ox dh fuEu lhek ¾ 30

ef/;dk ox dh mPp lhek ¾ 40

ef/;dk ox dh vkofRr ¾ 11

ef/;dk ox d Bhd igy dh lp;h vkofRr ¾ 22

ef/;dk ¾ $L_1 + \frac{(m-c)(L_2-L_1)}{f}$

¾ $30 + \frac{(24.5-22)(40-30)}{11} = 30 + \frac{2.5\times10}{11}$

¾ $30 + \frac{25}{11} = 30 + 2.27$

ef/;dk ¾ 32.27

¼vFkOkk½

OkXk	0&10	10&20	20&30	30&40	40&50	50&60	60&70
CkkjckkjRkk	8	15	21	37	31	14	12

lkj.kh l Li"V g fd lcl vf/kd ckjcjrk 37 g tk ox 30&40 dh gA

vr% cgyd ox 30&40

cgyd ox dh fuEu lhek ¾ 30

cgyd ox dh mPp lhek ¾ 40

$f_1 = 37, \quad f_0 = 21, \quad f_2 = 31$

cgyd ox dh fuEu lhek

¾ $L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2}(L_2 - L_1)$

¾ $30 + \frac{37-21}{2\times 37 - 21 - 31}(40-30) = 30 + \frac{16}{74-52}\times 10$

¾ $30 + \frac{160}{22} = 30 + \frac{80}{11} = 30 + 7.27$

¾ 37-27

mÙkj 26 ekuk flkRkk dh oreku vk;q x o"k vkj lkS dh oreku vk;q y o"k g gA ¼6½

1 o"k io firk dh vk; ¾ (x –1) o"k

1 o"k io i= dh vk; ¾ (y –1) o"k

i'ukulkj] iFke 'kr l]

$(x-1) = (y-1).8$

$x - 1 = 8y - 8$

$x - 8y = -8 + 1$

$x - 8y = -7$

$x = 8y - 7$ .....(i)

f}rh; 'kr l

$$x = y^2 \quad \text{.....(ii)}$$

leh- (i) l x dk eku j[ku ij

$$8y - 7 = y^2$$

$$\Rightarrow \quad y^2 - 8y + 7 = 0$$

$$\Rightarrow \quad y^2 - y - 7y + 7 = 0$$

$$\Rightarrow \quad y(y-1) - 7(y-1) = 0$$

$$\Rightarrow \quad (y-1)(y-7) = 0$$

$$\Rightarrow \quad (y-1) = 0 \text{ ;k } (y-7) = 0 \qquad \Rightarrow \quad y = 1 \text{ ;k } y = 7$$

$$\Rightarrow \quad y = 1^2 \text{ ;k } y = 7^2 \qquad \Rightarrow \quad y = \pm 1 \text{ ;k } y = \pm 7$$

D;kfd firk] i= dh vk; cjkcj ugh gk ldrh vr% firk dh vk; 49 o"k vkj i= dh vk; 7 o"k gA

¼vFkZkk½

eku igyh le l[;k x, nljh Øekxr le l[;k (x + 2) gA

i'uku lkj $x^2 + (x+2)^2 = 164$

$$\Rightarrow \quad x^2 + (x^2 + 4x + 4) = 164$$

$$\Rightarrow \quad 2x^2 + 4x + 4 = 164$$

$$\Rightarrow \quad 2(x^2 + 2x + 2) = 164$$

$$\Rightarrow \quad x^2 + 2x + 2 - 82 = 0$$

$$\Rightarrow \quad x^2 + 2x - 80 = 0$$

$$\Rightarrow \quad x^2 - 8x + 10x - 80 = 0$$

$$\Rightarrow \quad x(x-8) + 10(x-8) = 0$$

$$\Rightarrow \quad (x-8)(x+10) = 0$$

$x - 8 = 0$;k $x + 10 = 0$

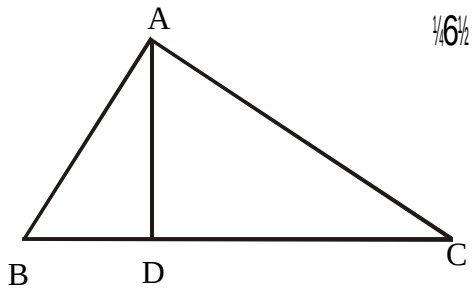
$x = 8$;k $x = -10$

x dk eku _.kkRed ugh gk ldrk] vr% $x = 8$

$\therefore$ nljh dekxr l[;k, g $(x + 2) = 8 + 2 = 10$

vr% vHkh"V l[;k, 8, 10 gkxhA

mÙkj 27 fn;k g % LkEkCkkg f«kHkTk ΔABC gA ¼6½



fl) djuk g : $3BC^2 = 4AD^2$

miifRr % ΔABC e $AB = BC = AC$

vkj $AD \perp BC, BD = CD = \frac{BC}{2}$ .....(i)

ledk.k f«kHkTk ΔABD e ikbFkkxkjl ie; l

$\Rightarrow \quad AB^2 = AD^2 + BD^2$

$\Rightarrow \quad AB^2 = AD^2 + \left(\frac{BC}{2}\right)^2$

$\Rightarrow \quad AB^2 = AD^2 + \frac{BC^2}{4}$

$\Rightarrow \quad BC^2 = AD^2 + \frac{BC^2}{4}$ $(\because AB = BC)$

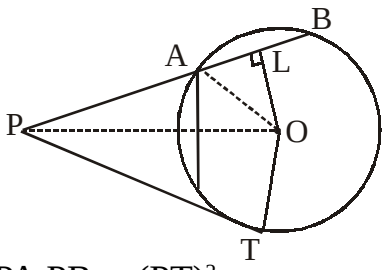
$\Rightarrow \quad BC^2 - \frac{BC^2}{4} = AD^2$

$\Rightarrow \quad 4BC^2 - BC^2 = 4AD^2$

$\Rightarrow \quad 3BC^2 = 4AD^2$ fl) gvkA

¼vFkOkk½

mÙkj 27 fn;k g C(O, r) g PAB Nnd j[kk rFkk PT Li'k j[kk gA



fl) djuk g % PA.PB = $(PT)^2$

jpuk % OL $\perp$ AB [khpk A OA, OP vkj OT dk feyk;k

miifRr % PA.PB = (PL – AL) (PL + LB)

= (PL – AL) (PL + AL) ($\because$ AL = LB)

= $PL^2 – AL^2$

= $(OP^2 – OL^2)$ AL^2

$\because$ ledk.k ΔPLO e $OP^2 = OL^2 – PL^2$.

= $OP^2 – OL^2 – AL^2$

= $OP^2 – (OL^2 + AL^2)$

= $OP^2 – OA^2$

$\because$ ledk.k ΔALO e $OA^2 = OL^2 – AL^2$.

= $OP^2 – OT^2$

= PT^2

$\because$ ledk.k ΔPTO e $OP^2 = PT^2 – OP^2$.

PA.PB = PT^2

Set - B

gkbLdy lfVfQdV ijh{kk

High School Certificate Examination

lEiy&i'u i=

SAMPLE PAPER

fo"k; %& (Subject) - xf.kr (Mathematics) **le; 3 ?k.Vk (Time- 3 Hrs)**

d{kk %& (Class) - nloh (X) **i.kkd 100 (M.M.)**

(Instruction) & ¼fun'k½

1- lHkh i'u gy djuk vfuok;Z g A

Attempt all the Question

2- i'u Øekd 01 e 10 vd fu/kkfjr g A nk dky[k.M g A [k.M ^^v** e 05 cgfodYih; i'u rFkk [k.M ^^c** e 05 fjDr LFkkuk dh ifr vFkok mfpr lc/k tkfM, A iR;d i'u d fy, 1 vd vkcfVr g A

Q. No. 01 Carries 10 Marks. There are two sub-section, Section A is Multiple choice carries 05 marks and section B is fill in the blanks or match the column carries 05 marks.

3- i'u Øekd 02 l i'u Øekd 09 rd vfr y?kqRrjh; i'u g A iR;d i'u ij 02 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 30 'kCn A

Q. No. 2 to 09 are very short answer type question & it carries 02 marks each. Word limit is maximum 30.

4- i'u Øekd 10 l i'u Øekd 15 rd y?kqRrjh; i'u g A iR;d i'u ij 03 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 50 'kCn A

Q. No. 10 to 15 are short answer type question & it carries 03 marks each. Word limit is maximum 50.

5- i'u Øekd 16 l i'u Øekd 21 rd y?kqRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 04 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 75 'kCn A

Q. No. 16 to 21 are short answer type question & it carries 04 marks each. Each question has internal choice. Word limit is maximum 75.

6- i'u Øekd 22 l i'u Øekd 25 rd nh?kmRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 05 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 100 'kCn A

Q. No. 22 to 25 are long answer type question & it carries 05 marks each. Each question has internal choice. Word limit is maximum 100.

7- i'u Øekd 26 l i'u Øekd 27 rd nh?kmRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 06 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 150 'kCn A

Q. No. 26 to 27 are long answer type question & it carries 06 marks each. Each question has internal choice. Word limit is maximum 150.

i'u 1 ¼v½ lgh fodYi pfu, %&

(i) 5 vkj 10 dk RkRkh¸k vUkqikkRkh gkXkk& ¼1½

(a) 15 (b) 20 (c) 25 (d) 30

(ii) $\frac{\pi}{3}$ dk v'k Ek Ekkik gkXkk & ¼1½

(a) 45º (b) 60º (c) 75º (d) 120º

(iii) PkØh¸k PkRkkHkTk d LkEEk[k dk.kk dk ¸kkXk gkRkk g& ¼1½

(a) 90º (b) 120º (c) 180º (d) 360º

(iv) 0-125 dk f}vk/kkjh Ik.kkYkh Ek EkkUk gkXkk & ¼1½

(a) 0.01 (b) 0.101 (c) 0.001 (d) 0.111

(v) vd 7]8]8]7]9]8]10] dk Ckgqd gkXkk & ¼1½

(a) 7 (b) 8 (c) 9 (d) 10

Que 1 (A) Choose the correct answer -

(i) Third proportional of 5 and 10 is -

(a) 15 (b) 20 (c) 25 (d) 30

(ii) Value of $\frac{\pi}{3}$ in degree -

(a) 45º (b) 60º (c) 75º (d) 120º

(iii) Sum of opposite angle of cyclic quadrilateral is -

(a) 90º (b) 120º (c) 180º (d) 360º

(iv) Value of 0.125 in Binary number is -

(a) 0.01 (b) 0.101 (c) 0.001 (d) 0.111

(v) Mode of 7, 8, 8, 7, 9, 8 and 10 is -

(a) 7 (b) 8 (c) 9 (d) 10

¼c½ fjDRk LFkkUkksa dh lkfRkh dhfTk,k&

(i) 1] 4]7] 10 dk lknkRkj &&&&& gA ¼1½

(ii) fCkn ¼4]0½&&&&&&&& v{k lkj fLFkkRk gkXkkA ¼1½

(iii) $\tan(90-\theta)$ &&&&&&&&&&&&&&&&&gkRkk gA ¼1½

(iv) ?kUkkHk Ek &&&&& QYkd gkRk gA ¼1½

(v) 4 Ekh- HkTkk 0kkYk 0kXk d f0kd.k dh YkECkkb &&&&&&& gkXkhA ¼1½

(B) Fill in the blanks:

(i) Common difference of 1, 4, 7, 10, ... is .....

(ii) Co-ordinate (4, 0) lies on ..... axis.

(iii) Value of $\tan(90-\theta)$ is .....

(iv) Number of surface in cuboid is .....

(v) Length of diagonal of square is ..... whose side is 4 cm.

lk'Uk 2 lkfjEk,k 0,kTkd $\frac{x+1}{x-2}$ RkFkk $\frac{x-1}{x-2}$ dk vRkj KkRk dhfTk,k\ ½2½

Find the different between $\frac{x+1}{x-2}$ and $\frac{x-1}{x-2}$.

lk'Uk 3 0kXk LkEkhdj.k $3x^2-5x+2=0$ d EkYk KkRk dhfTk,k\ ½2½

Find the roots of $3x^2-5x+2=0$

lk'Uk 4 $\frac{\sin 15^\circ}{\cos 75^\circ}$ dk EkkUk KkRk dhfTk,k \ ½2½

Find the vlaue of $\frac{\sin 15^o}{\cos 75^o}$

Ik'Uk 5 fCkn (–3, 4) vkj (2, 3) d CkhPk njh KkRk dhfTk,k \ ½2½

Find the distance between (–3, 4) and (2, 3).

Ik'Uk 06 fdLkh CkYkUk dh ÅPkkb 20 LkEkh RkFkk mLkdh f«kT,kk 7 LkEkh g Rkk mLkdk OkØIk"B KkRk dhfTk,k \ ½2½

Find the curve surface of cylinder whose height is 20 cm. and radius in 78 cm.

Ik'Uk 7 f«kHkTk ABC Ek AB = 8 LkEkh] AP = 4 LkEkh] AQ = 3 LkEkh] RkFkk AC = 9 LkEkh gk Rkk CkRkkb,k PQ||BC gkXkk ,kk Ukgh \ ½2½

In Δ ABC, AB = 8 cm., AP = 4 cm., AQ = 3 cm. and AC = 9 cm. then show that PQ||BC or not.

Ik'Uk 8 vYXkkfjFkEk dh dkb Pkkj f0k'k"kRkk,k fYkf[k,k\ ½2½

Write four characterstics of algorithm.

Ik'Uk 9 Lk[,kk 110011 vkj 011101 Lk f)vk/kkjh Ik.kkYkh Ik)fRk Lk TkkfM,k \ ½2½

Find the sum of two binary number 110011 and 011101.

Ik'Uk 10 nk Lk[,kkvk dk vUkIkkRk 3%4 gA ,kfn IkR,kd Lk[,kk Ek 8 ?kVk fn,kk Tkk,k Rkk vuikr 2%3 gk TkkRkk g A Rkk Lk[,k,k KkRk dhfTk,k\ ½3½

Two numbers are in the ratio 3 : 4, if 8 is subtracted to each of them they become in the new ratio 2 : 3. Find the numbers.

Ik'Uk 11 OkXk LkEkhdj.k CkUkkb,k fTkUkd EkYk ØEk'k% $3+\sqrt{3}$ o $3-\sqrt{3}$ gk \ ½3½

Construct the quadratic equation whose roots are $3+\sqrt{3}$ and $3-\sqrt{3}$.

Ik'Uk 12 ¸kfn Lk[¸kk¸k *a, b, c* f0kRkRkkUkIkkRk Ek gk Rkk fLk) dhfTk¸k fd& ¼3½

If a, b, and c are in continued proportional then prove that

$$\frac{a^2+ab+b^2}{b^2+bc+c^2}=\frac{a}{c}.$$

Ik'Uk 13 Ekkgk Uk Ñf"k f0kdkLk Ckd Lk 50]000 :-] 2 0k"k d fYk¸k Lkk0kf/k TkEkk fd¸kkA ¸kfn C¸kkTk dh nj 10 IkfRk'kRk 0kkf"kd gk RkFkk C¸kkTk IkfRk N¼Ekkgh Lk¸kkfTkRk gkRkk g Rkk Ikfj IkD0kRkk Ikj Ckd mLk fTkRkUkk /kUk nXkkA KkRk dhfTk¸k \ ¼3½

Mohan deposit Rs. 50000 in Krishi Vikas Bank for 2 year in fixed deposite account. If the rate of interest is 10% p.a., then calculate the maturity amount if the interest is compounded half yearly.

Ik'Uk 14 fLk) dhfTk¸k $\tan^2\theta-\sin^2\theta=\tan^2\theta.\sin^2\theta$ ¼3½

Prove that $\tan^2\theta-\sin^2\theta=\tan^2\theta.\sin^2\theta$

Ik'Uk 15 nk XkkYkk d vk¸kRkUkk dk vUkIkkRk 1%8 g Rkk mUkdh f«kT¸kkvk dk vUkIkkRk KkRk dhfTk¸k \ ¼3½

The ratio of volume of two sphere is 1 : 8 then find the ratio of their radius.

Ik'Uk 16 *a* d fdLk EkkUk d fYk, fCkn ¼1]4½]¼*a*, &2½ vkj ¼&3]16½ Lkej[k gkXk& ¼4½

For what value of *a*, the point (1, 4), (*a* –2) and (–3, 16) will be colliner.

¼vFk0kk½ (OR)

mLk f«kHkTk dk dUæd KkRk dhfTk, fTkLkd 'kh"kk d fUkn'kkd ¼4] 3½] ¼2] &3½] ¼&3] 5½ gA

Find the centroid of a triangle whose vertices are (4, 3), (2, –3) and (–3, 5).

Ik'Uk 17 fdLkh f«kHkTk d dk.k LkEkkRkj J.kh Ek g LkCkLk CkM dk.k dk EkkUk 105^{o} g RkhUkk dk.kk d EkkUk dk jfM,kUk Ek KkRk dhfTk, A ¼4½

The angles of a triangle are in A.P. The biggest angle is 105^{o}. Find the angles in radian.

¼vFkOkk½ (OR)

,d f«kHkTk d dk.k 2%3%4 Ek g A f«kHkTk d dk.kk d EkkIk jfM,kUk Ek KkRk dhfTk,A

The angles of a triangle are in the ratio 2 : 3 : 4. Find the measures of angles in radian.

Ik'Uk 18 $x = a\sec\theta$ RkFkk $y = b\tan\theta$ gk Rkk fLk) dhfTk, fd $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$· ¼4½

If $x = a\sec\theta$ and $y = b\tan\theta$ then prove that : $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

¼vFkOkk½ (OR)

,kfn $x = a\cos\theta - b\sin\theta$ RkFkk $y = a\sin\theta + b\cos\theta$ gk Rkk fLk) dhfTk, fd $x^2 + y^2 = a^2 + b^2$·

If $x = a\cos\theta - b\sin\theta$ and $y = a\sin\theta + b\cos\theta$ then prove that : $x^2 + y^2 = a^2 + b^2$·

Ik'Uk 19 mLk CkM Lk CkM 'kd dk vk,kRkUk KkRk dhfTk, Tkk mLk ?kUk Ek Lk dkVk Xk,kk g fTkLkdh dkj YkCkkb 3 Lk-Ekh- gA ¼4½

Find the volume of the greatest cone which can be cut from a cube whose edge is 3 cm.

¼vFkOkk½ (OR)

fdLkh XkkYk dk Ik"Bh,k {k«kQYk 616 OkXk LkEkh- gk Rkk XkkYk dk vk,kRkUk KkRk

dhfTk, A

The curved surface of sphere is 616 cm.^{2} then find the volume of sphere.

Ik'Uk 20- nk LkkEkkU;k f«kHkTkk d {k«kQYk dk vUkIkkRk fdUgh nk LkXkRk HkTkkvk d 0kXkk d vUkIkkRk d Ckjk Ckj gkRk gA ¼4½

Prove that the ratio of the areas of two similar triangles is equl to the ratio of the squares of any two corresponding sides.

¼vFkOkk½ (OR)

FkYLk IkEk;k fYkf[k, ,Ok fLk) dhfTk, A

State and prove that Thales theorem.

Ik'Uk 21- ,d FkYk Ek 4 dkYkh] 5 YkkYk] RkFkk 7 LkQn Xkn gA ;kfn ,d Xkn ;knPN;kk fUkdkYkh Tkk;k Rkk bLkdh Ikkf;kdRkk D;kk gkXkh fd fUkdkYkh Xkb Xkn& (i) LkQn gkXkh (ii) LkQn ;kk dkYkh A

A bag contains 6 black, 5 red and 7 white balls. If one ball is drawn at random. What is probability that the ball drawn will be - (i) White, (ii) White or black.

¼vFkOkk½ (OR)

vPNh Ikdkj Lk QVh Xkb 52 Rkk'kk dh ,d XkMMh Ek Lk ,d Rkk'k ;knPN;kk [khPkk TkkRkk g] Rkk fUkEUk dh Ikkf;kdRkk KkRk dhfTk, A

(i) ,d iku dk rk'k gkA (ii) iku ;k bV dk ,Ddk gkA

From a well shuffled pack of 52 cards, one card drawn at random. Find the probability of the following -

(i) One card is of heart

(ii) Ace of heart or diamond.

Ik'Uk 22 ,kfn $x=\frac{3ab}{a+b}$ gk Rkk fLk) dhfTk, fd $\frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=2$- ¼5½

If $x=\frac{3ab}{a+b}$, then prove that $\frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=2$

¼vFkOkk½ (OR)

RkhUk LkEkkUkkRkj Jf.k,kk d *n* Ikpnk dk ,kkXkQYk ØEk'kh S_1, S_2, S_3 gA fTkUkd IkFkEk Ikpn 1] 2] 3 RkFkk LkkOkURkj ØEk'kh 1] 3] 5 gA Rkk fLk) dhfTk, fd &

If S_1, S_2, S_3 be the sum of n terms of three A.P. and their first terms are 1, 2, 3 respectively and common difference are 1, 3, 5, then prove that

$$S_1+S_2+S_3=\frac{3}{2}(3n+1)n$$ ¼5½

Ik'Uk 23 ?kUk'kkEk dk EkYk 0kRkUk IkfRkEkkg 12500 :Ik,k g RkFkk EkgXkkb HkÙkk IkfRkEkkg 6300 :Ik,kk IkkIRk djRkk g A ,kfn 0kg LkkEkkU,k HkfOk",k fUkf/k Ek IkfRkEkkg 2000 :-] th- vkb-,l- e IkfRkEkkg 250 :- RkFkk Hkkjkh,k TkhOkUk CkhEkk IkhfEk,kEk Ek IkfRkOk"k 69000 :- ,o Mkd?kj TkhOkUk CkhEkk IkhfEk,kEk IkfRkOk"k 10000 :- TkEkk djRkk g A mLkd }kjk n,k dYk vk,kdj KkRk dhfTk, A ¼5½

Basic salary of Ghanshyam is R.s 12500 per month and D.A. is Rs. 6300 per month. He invests Rs. 2000 per month in G.P.F., Rs. 250 per month is G.I.S. and Rs. 69000 yearly as annual premium to L.I.C. and also Rs. 10000 yearly in post office L.I.C. premium. Calculate the income tax paid by him?

Rate of income tax :

upto Rs. 1,10,000	nil
From Rs. 1,10,001 to 1,50,000	10%
From Rs. 1,50,001 to 2,50,000	20%
above Rs. 2,50,000	30%

Educational cess : 3% of the total payable income tax and surcharge.

¼vFkOkk½

'kkfYkUkh dh Okkf"kd vk;k ¼Ekdkuk fdjk;kk HkRRkk NkMdj½ 1]80]000 : Ik;k gA ;kfn Okg LkkEkkU;k Hkkf0k";k fUkf/k Ek IkfRk0k"k 40000 : Ik;k] LkEkg TkhOkUk CkhEkk ;kkTkUkk Ek] 250 : Ik;k IkfRkEkkg RkFkk 5000 v) Okkf"kd TkhOkUk CkhEkk IkkfYk lh Ek fd'Rk TkEkk djRkh gA KkRk dhfTk, fd 'kkfYkUkh dk vlkUk vk;kdj mLk f0kÙkh;k 0k"k fdRkUkk vk;kdj nUkk gkXkkA

The annual income of Mrs. Shalini (Excluding HRA) is Rs. 180000. If she deposite Rs. 40000 per year in G.P.F., Rs. 250 per month in G.I.S. and Rs. 5000 half yearly premium towards L.I.C. Calculate her income tax payable in the financial year.

Rate of income tax :

upto Rs. 1,10,000	nil
From Rs. 1,10,001 to 1,50,000	10%
From Rs. 1,50,001 to 2,50,000	20%
above Rs. 2,50,000	30%

Educational cess : 3% of the total payable income tax and surcharge.

Ik'Uk 24 f«kHkTk $\triangle LMN$ dh jPkUkk dhfTk, Tkgk $MN = 5$ Lk-Ekh-] $\angle L = \angle 55^\circ$ vkj L Lk MkYkk Xk;kk 'kh"k YkCk 3-5 Lk-Ekh- gkA jPkUkk d Ikn Hkh fYkf[k, A

Contrust $\triangle LMN$ in which $MN = 5$ cm., $\angle L = 55^\circ$ and perpendicular for L is 3.5 cm. Write steps of construction.

¼vFkOkk½ (OR)

,d PkØh;k PkRkHkTk $ABCD$ dh jPkUkk dhfTk, fTkLkEk $\angle ABC = 90^\circ$ v'k AC ¾ 6 Lk-Ekh-] AB ¾ 3 Lk-Ekh-] CD ¾ 3-6 Lk-Ekh- jPkUkk d Ikn Hkh fYk[kkA

Construct a cyclic quadrilateral $ABCD$ in which $\angle ABC = 90^\circ$, AC ¾ 6 cm., AB ¾ 3 cm., CD ¾ 3.6 cm. Write steps of construction.

lk'Uk 25- fUkEUk Lkkj.kh Lk Ekkf/;dk KkRk dhfTk, & ¼5½

OkXk vRkjkYk	0&10	10&20	20&30	30&40	40&50
Ckkj Ckkj Rkk	4	8	10	11	16

Find the medium of the following table :

Class	0–10	10–20	20–30	30–40	40–50
Frequency	4	8	10	11	16

¼vFkOkk½ (OR)

fUkEUk vkdfr cVu Lk cgyd KkRk dhfTk, &

OkXk	0&10	10&20	20&30	30&40	40&50	50&60	60&70
Ckkj Ckkj Rkk	8	15	21	37	31	14	12

Find the mode of the following table :

Class	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	8	15	21	37	31	14	12

lk'Uk 26 ,d Ok"k lkOk flkRkk dh vk;k lk«k dh vk;k d 8 XkUkh Fkh vkTk flkRkk dh vk;k lk«k dh vk;k d OkXk d Ckjkckj gA Rkk mUkdh OkRkEkkUk vk;k KkRk dhfTk,\ ¼6½

One year ago, a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages.

¼vFkOkk½ (OR)

nk ØEkkXkRk LkEk Lk[;kk;k KkRk dhfTk, fTkUkd OkXkk dk ;kXk 164 gA

The sum of squares of two consecutive even numbers is 164. Find the numbers.

lk'Uk 27 fLk) dhfTk, fd fdLkh LkEkCkkg f«kHkTk dh fdLkh HkTkk d OkXk d fRkXkUkk mLkdh

ÅPkkb d 0kXk d Pkkj XkUk d Ckjk Ck j gkRkk gA ¼6½

Prove that three times the square of any side of an equilateral triangle is equal to four times the square of the altitude.

¼vFkOkk½ (OR)

¸kfn *PAB* 0kÙk dh Nnd j[kk gk Tkk 0kÙk dk *A* vkj *B* Ikj IkfRkPNn djRkh g vkj *PT* ,d LIk'k j[kk [k.M gk Rkk fLk) dhfTk, *PA.PB* = $(PT)^2$

If *PAB* is a secant to a circle which intersecting the circle at *A* and *B* and *PT* is a tangent segment, then show that : *PA.PB* = $(PT)^2$

EkkMYk mÙkj lV&ch

lk'Uk 1 ¼v½ Lkgh f0kdYlk mÙkj

(i) 20

(ii) 60^0

(iii) 180^0

(iv) 0-001

(v) 8

¼c½ fjDRk LFkkUkk dh lkfRk dhfTk¸kA

(i) 3]

(ii) x–v{k lkj

(iii) $\cot\theta$

(iv) 6 QYkd

(v) $4\sqrt{2}$ Ekh

mÙkj 2- $\frac{x+1}{x-2} - \frac{x-1}{x-2}$ ¼2½

$$= \frac{(x+1)-(x-1)}{(x-2)}$$

$$= \frac{x+1-x+1}{x-2}$$

$$= \frac{2}{x-2}$$

mÙkj 3- $3x^2 - 5x + 2 = 0$ ¼2½

$3x^2 - 3x - 2x + 2 = 0$

$(3x^2 - 3x) - (2x - 2) = 0$

$3x(x-1) - 2(x-1) = 0$

$(3x-2)(x-1) = 0$

;k rk $(3x-2)=0$;k $(x-1)=0$

$x = \frac{2}{3}$;k $x = 1$

vr% gy $\frac{2}{3}$] 1

mÙkj 4 $\frac{\sin 15^\circ}{\cos 75^\circ}$ ¼2½

$= \frac{\sin(90^o - 75^o)}{\cos 75^o}$

$= \frac{\cos 75^o}{\cos 75^o}$

$= 1$

mÙkj 5- fcUn ¼&3] 4½ vkj ¼2] 3½ d chp dh njh ¼2½

l= fcUn (x_1, y_1) vkj (x_2, y_2) d chp dh njh

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(2-(-3))^2 + (3-4)^2}$

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

$= \sqrt{5^2 + 1}$

$= \sqrt{25+1}$

$= \sqrt{26}$

mÙkj 6 nRr h ¾ 20 Lk-Ekh-

r ¾ 7 Lk-Ekh-

c ¾ \

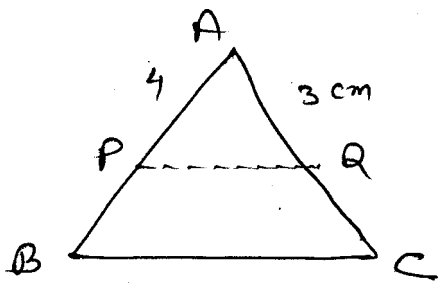
cyu dk oØi"B c = $2\pi rh$

= $2\times\frac{22}{7}\times 7\times 20$

= 44×20

= 880 ox Lk-Ekh-

mÙkj 7 ΔABC e ½2½



AB = 8 leh-

AP = 4 leh-

AQ = 3 leh-

AC = 9 leh-

$\frac{AP}{AB}=\frac{4}{8}=\frac{1}{2}$ .....(i)

$\frac{AQ}{AC}=\frac{3}{9}=\frac{1}{3}$ .....(ii)

leh (i) vkj (ii) l Li"V g fd $\frac{AP}{AB}\neq\frac{AQ}{AC}$

$\therefore PQ \neq BC$

mÙkj 8 vYxkfjFe dh fo'k"krk, ½2½

½1½ ifjferrk

½2½ fuf'prrk

½3½ fuo'k

½4½ iHkko'khyrk

mÙkj 9- ½2½

1 1 0 0 1 1

$ 0 1 1 1 0 1

1 0 1 0 0 0 0

mÙkj 10 ekuk l[;k, $3x$ o $4x$ g & ¼3½

iR;d e 8 ?kVku ij vuikr 2 % 3 gk tkrk g

vFkkr] $3x-8 : 4x-8 = 2 : 3$

;k $\dfrac{3x-8}{4x-8}=\dfrac{2}{3}$

;k $3(3x-8)=2(4x-8)$

;k $9x-24=8x-16$

;k $9x-8x=-16+24$

;k $x=8$

vr% l[;k $3x = 3\times8 = 24$ o $4x = 4 \times 8 = 32$

vr% l[;k 24 o 32 gkxh

mÙkj 11 ox lehdj.k d ey α,β gk rk ¼3½

ox lehdj.k $x^2-(\alpha+\beta)x+\alpha\beta=0$

i'ukulkj α ¾ $3+\sqrt{3}$

β ¾ $3-\sqrt{3}$

$\therefore\ \alpha+\beta$ = $\left(3+\sqrt{3}\right)+\left(3-\sqrt{3}\right)$

= 6

$\alpha\beta$ ¾ $\left(3+\sqrt{3}\right)\left(3-\sqrt{3}\right)$

= $9-3$ $\because\ (a+b)(a-b)=a^2-b^2$

= 6

vr% ox lehdj.k

$x^2-6x+6=0$

mÙkj 12 a, b, c forrkuikr e g ¼3½

ekuk $\frac{a}{b} = \frac{b}{c} = k$

$\Rightarrow \quad b = ck \qquad$ ..... (i)

;k $\quad a = bk = (ck)k = ck^2 \qquad$ ..... (ii)

L.H.S. $= \quad \frac{a^2 + ab + b^2}{b^2 + bc + c^2}$

$= \quad \frac{\left(ck^2\right)^2 + ck^2.ck + \left(ck\right)^2}{\left(ck\right)^2 + ck.c + c^2}$ leh- (i) & (ii) l

$= \quad \frac{c^2k^4 + c^2k^3 + c^2k^2}{c^2k^2 + c^2k + c^2}$

$= \quad \frac{c^2k^2\left(k^2 + k + 1\right)}{c^2\left(k^2 + k + 1\right)} = k^2 \quad$ ..... (iii)

R.H.S. $= \quad \frac{a}{c} = \frac{ck^2}{c}$ leh- (ii) l

$= \quad k^2 \qquad$ ..... (iv)

leh- (iii) rFkk (iv) l

L.H.S. $=$ R.H.S.

mÙkj 13 fn;k g] ey/ku $p = 50000$:Ik,k ¼3½

C;kt dh nj $r = 10$ ifr'kr okf"kd ¾ 5 ifr'kr N‰ekgh ;k v)okf"kd

le; $n =$ 2 0k"k ¾ 4 N‰ekgh

feJ/ku $A = P\left[1 + \frac{r}{100}\right]^n$ l

$$= 50000\left[1+\frac{5}{100}\right]^4 = 50000\left[1+\frac{1}{20}\right]^4$$

$$= 50000\left[\frac{21}{20}\right]^4$$

$$= 50000\times\frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}$$

$$= 60775.31 \quad \because$$

bl idkj ekgu dk nk o"k i'pkr 60775-31 :- ikIr gkxkA

mÙkj 14 L.H.S. = $\tan^2\theta - \sin^2\theta$ ¼3½

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

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

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

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

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

$$= \tan^2\theta.\sin^2\theta \quad \text{R.H.S.}$$

mÙkj 15 ekuk nk xky dh f=T;k; o vk;ru Øe'k% ¼3½

r_1, v_1 o r_2, v_2 gA

$v_1 : v_2 = 1 : 8, \qquad r_1 : r_2 = 3$

$$\frac{v_1}{v_2} = \frac{1}{8}$$

$$\frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \frac{1}{8} \qquad \because v = \frac{4}{3}\pi r^3$$

$$\Rightarrow \quad \frac{r_1^3}{r_2^3} = \frac{1}{8} \quad \Rightarrow \left(\frac{r_1}{r_2}\right)^3 = \frac{1}{8}$$

$$\Rightarrow \quad \left(\frac{r_1}{r_2}\right)^3 = \left(\frac{1}{2}\right)^3$$

$$\Rightarrow \quad \frac{r_1}{r_2} = \frac{1}{2} \qquad \Rightarrow \quad r_1 : r_2 = 1 : 2$$

vr% mudh f=T;kvk e 1 % 2 dk vuikr gkxkA

mÙkj 16 l= % fcUn $(x_1, y_1), (x_2, y_2)$ vkj (x_3, y_3)

lejs[k gkus dk ifrc/k

$$x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) = 0$$

vr% fcUn ¼1] 4½ ¼a] &2½ vkj ¼&3] 16½ lejs[k gkx ;fn

$\Rightarrow$ 1[(–2 – 16) + {a(16 – 4)+ (–3){4 – (–2)} =0

$\Rightarrow$ –18 + a(12) – 3 (4 + 2) = 0

$\Rightarrow$ –18 + 12a – 18 = 0

$\Rightarrow$ 12a – 36 = 0

$\Rightarrow$ a = 3

¼vFkok½

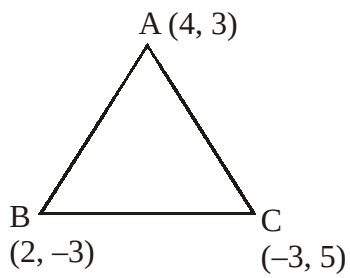
mÙkj 16 ABC ,d Δ g ftldh 'kh"kks d fun'kkad Øe'k% $(x_1, y_1) = (4, 3), (x_2, y_2) = (2, -3), (x_3, y_3) = (-3, 5)$,

f=Hkt dk dUnd $(h, k) = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$

$$h = \frac{x_1 + x_2 + x_3}{3} = \frac{4 + 2 + (-3)}{3} = \frac{3}{3} = 1$$

$$k = \frac{y_1 + y_2 + y_3}{3} = \frac{3 + (-3) + 5}{3} = \frac{5}{3}$$

$$k = \frac{3 - 3 + 5}{3} = \frac{5}{3}$$



dUæd ¾ $\left(1, \frac{5}{3}\right)$ gkxkA

mÙkj 17 eku fy;k fd f=Hkt d dk.k $(\alpha-\delta)^o, \alpha^o, (\alpha+\delta)^o$ gA ¼4½

f=Hkt d rhuk dk.kk dh eki 180^o gA

$\Rightarrow \quad (\alpha-\delta)^o + \alpha^o + (\alpha+\delta)^o = 180^o \quad \Rightarrow 3\alpha = 180^o \quad \Rightarrow \alpha = 60^o$

vr% lcl cMk dk.k 105^o gA $\alpha+\delta = 105^o \Rightarrow 60^o + \delta = 105^o \Rightarrow \delta = 45^o$

lcl NkVk dk.k $(\alpha-\delta)^o \Rightarrow \quad \alpha-\delta = 60^o - 45^o = 15^o$

$$15^o = \frac{\pi}{180} \times 15 = \frac{\pi}{12} \text{ jfM;u}$$

chp dk.k $\alpha = \quad 60^o = \frac{\pi}{180} \times 60 = \frac{\pi}{3}$ jfM;u

lcl cMk dk.k $\alpha+\delta = \quad 105^o = \frac{\pi}{180} \times 105 = \frac{7\pi}{12}$ jfM;u

f=Hkt d vHkh"V dk.k $\frac{\pi}{12}, \frac{\pi}{3}$,o $\frac{7\pi}{12}$ jfM;u gkxA

¼vFkZkk½

ekuk f=Hkt ABC d dk.k $\angle A$, $\angle B$ o $\angle C$ gA

$\angle A : \angle B : \angle C = 2 : 3 : 4$

ekuk dkb dk.k x g rk] ge tkur g fd $\angle A + \angle B + \angle C = 180^o$

$\therefore \quad \angle A = 2x, \ \angle B = 3x$ vkj $\angle C = 4x$

vr% $2x + 3x + 4x = 180^o$

$\Rightarrow \quad 9x = 180^o$

$\Rightarrow \quad x = 20^o$

vr% $\angle A = 2x = 2 \times 20^o = 40^o = 40^o \times \frac{\pi}{180} = \frac{2\pi}{9}$ jfM;u

$\angle B = 3x = 3 \times 20^o = 60^o = 60^o \times \frac{\pi}{180} = \frac{\pi}{3}$ jfM;u

$\angle C = 4x = 4 \times 20^o = 80^o = 80^o \times \frac{\pi}{180} = \frac{4\pi}{18}$ jfM;u

vr% f=Hkt d dk.k $40^o, 60^o, 80^o$ g ftud jfM;u e eku Øe'k% $\frac{2\pi}{9}, \frac{\pi}{3}, \frac{4\pi}{18}$ gA

mÙkj 18 $x = a\sec\theta$ RkFkk $y = b\tan\theta$ ¼4½

$\frac{x}{a} = \sec\theta$ .....(i) RkFkk $\frac{y}{b} = \tan\theta$ .....(ii)

leh- (i) o (ii) dk ox djd (i) l (ii) dk ?kVku ij

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = \sec^2\theta - \tan^2\theta$ $\left[\because 1+\tan^2\theta = \sec^2\theta \right.$
$\left. 1 = \sec^2\theta - \tan^2\theta \right.$

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$-

¼vFkok½

ekuk $x = a\cos\theta - b\sin\theta$ ---------- ¼1½

RkFkk $y = a\sin\theta + b\cos\theta$ ---------- ¼2½

lehdj.k ¼1½ o ¼2½ dk ox djd tkMu ij

$x^2 + y^2 = a^2\left(\cos^2\theta + \sin^2\theta\right) + b^2\left(\cos^2\theta + \sin^2\theta\right)$
$- 2ab\cos\theta\sin\theta + 2ab\sin\theta\cos\theta$

$x^2 + y^2 = a^2 + b^2$ $\left[\because \sin^2\theta + \cos^2\theta = 1\right.$

mÙkj 19 ?ku l dkV x; cM l cM 'kd dk vk;ru V $= \frac{1}{3}\pi\, r^2 h$ ¼4½

fn;k g] h = 3 leh-
'kd d vk/kkj dk 0;kl = 2r = 3 leh-

$r = \frac{3}{2}$ leh-

eku j[ku ij] $V = \frac{1}{3}\pi\left(\frac{3}{2}\right)^2.3 = \frac{9}{4}\pi$

$V = 2.25\pi$?ku leh-

¼vFkOkk½

ekuk xky dh f=T;k $= r$

fn;k g] xky dk i"Bh; {k=Qy $= 616$ ox l-eh-

$\Rightarrow \quad 4\pi r^2 = 616 \quad \Rightarrow \quad 4 \times \frac{22}{7} \times r^2 = 616 \Rightarrow \quad r^2 = \frac{7\times 616}{4\times 22}$

$\Rightarrow \quad r^2 = 7 \times 7 \quad \Rightarrow \quad r = 7$ l-eh-

$\therefore$ xky dk vk;ru $= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times (7)^3 = \frac{4}{3} \times \pi \times 7 \times 7 \times 7$

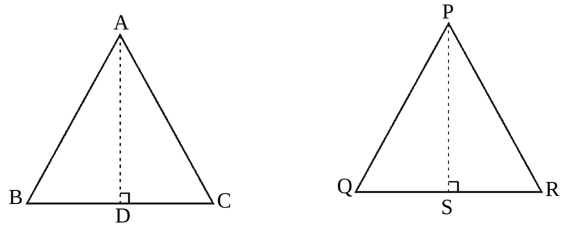
$= \frac{1372}{3}\pi$?ku l-eh-

mÙkj 20- **ize; dFku** %nk le:i f«kHkTkk d {k«kQYk dk vUkIkkRk fdUgh nk LkXkkRk HkTkkvk d OkXkk d vUkIkkRk d Ckjkckj gkRk gA ¼4½

Kkr g % nk le:i f=Hkt ABC vkj PQR

fl) djuk g % $\frac{\text{{k«kQy } \Delta ABC}{\text{{k«kQy } \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$

jpuk % $AD \perp BC$ vkj $PS \perp QR$ [khpkA



miifÙk %

dFku	dkj.k
$\frac{\text{{k«kQy } \Delta ABC}{\text{{k«kQy } \Delta PQR} = \frac{\frac{1}{2} BC \times AD}{\frac{1}{2} QR \times PS}$ $\frac{\text{{k«kQy } \Delta ABC}{\text{{k«kQy } \Delta PQR} = \frac{BC}{QR} \times \frac{AD}{PS}$ ..... (i)	

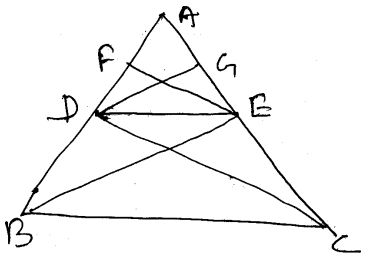
vc f=Hkt ADB vkj PSQ e]	
$\angle B = \angle Q$	le:i Δ d lxr dk.k cjkcj gA
$\angle ADB = \angle PSQ = 90^\circ$	iR;d 90^0 dk gA ¼jpuk l ½
$\Delta ADB \sim \Delta PSQ$	AA le:irk miie; l
$\frac{AD}{PS}=\frac{AB}{PQ}$ ...(ii)	le:i Δ dh lxr Hktk; lekuikfrd gkrh gA
yfdu $\frac{AB}{PQ}=\frac{BC}{QR}$ ...(iii)	$\Delta ABC \sim \Delta PQR$
$\therefore \quad \frac{AD}{PS}=\frac{BC}{PQ}$ ...(iv)	(ii) o (iii) l
$\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR}}=\frac{BC}{QR}\times\frac{BC}{QR}=\frac{BC^2}{QR^2}$	(i) o (iv) l
bl idkj fl) dj ldr g fd	
$\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR}}=\frac{AB^2}{PQ^2}$	
vkj $\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR}}=\frac{AC^2}{PR^2}$	
vFkkr	
$\frac{\text{{k«kQy } \Delta ABC}}{\text{{k«kQy } \Delta PQR}}=\frac{AB^2}{PQ^2}=\frac{BC^2}{QR^2}=\frac{AC^2}{PR^2}$	bfr fl)e

¼vFkok½

FkYLk IkEk;s k & ,d f=Hkt dh ,d Hktk d lekrj [khph xb j[kk vU; nk Hktkvk dk ftu nk fcnvk ij ifrPNn djrh g o fcn Hktkvk dk leku vuikr e foHkDr djr gA

Kkr g% ΔABC e DE||BC

fl) dju g% $\frac{AD}{DB}=\frac{AE}{EC}$



jpuk % (i) B dk E l rFkk C dk D l feyk;kA

(ii) $EF \perp AB$ [khpkA

(iii) $DG \perp AE$ [khpkA

miifÝk %

dFku	**dkj.k**
Δ dk {k=Qy ¾ $\frac{1}{2}$ vk/kkj × Åpkbb	
$\frac{\Delta ADE \text{ dk } \{k«kQy}{\Delta BDE \text{ dk } \{k«kQy} = \frac{\frac{1}{2}AD.EF}{\frac{1}{2}BD.EF} = \frac{AD}{BD}$ ...(i)	
blh idkj]	
$\frac{\Delta ADE \text{ dk } \{k«kQy}{\Delta CDE \text{ dk } \{k«kQy} = \frac{\frac{1}{2}AE.DG}{\frac{1}{2}EC.DG} = \frac{AE}{EC}$ ...(ii)	
yfdu] ΔBDE dk {k=Qy ¾ ΔCDE dk {k=Qy ...(iii)	,d gh vk/kkj vkj ,d gh lekarj j[kkvk d chp cu f=Hkt dk {k=Qy cjkcj gkrk gA
vr% $\frac{AD}{BD} = \frac{AE}{EC}$	(i), (ii), (iii) l bfr fl)e

mÙkj 21- FkYk Ek xnk dh dy l[;k 4 $ 5 $ 7 ¾ 16

$n(S) = 16$

(i) 7 lQn xnk e l dkb ,d lQn xn fudkyh tk ldrh gA

$n(A) = 7$

vr% LkQn xn fudkyu dh ikf;drk $P(A) = \frac{n(A)}{n(S)}$

$P(A) = \frac{7}{16}$

(ii) LkQn ¸kk dkYkh xn fudkyu dh ikf;drk

$P(A) = \frac{7}{16} + \frac{4}{16}$

$$¾ \frac{7+4}{16} ¾ \frac{11}{16}$$

¼vFkokk½

dy lEHkkfor ?kVuk; $n(S) ¾ 52$

(i) iku dk rk'k fudkyu dh ?kVuk A gk rk

$$n(A) ¾ 13$$

$$P(A) = \frac{n(A)}{n(S)} ¾ \frac{13}{52} = \frac{1}{4}$$

(ii) iku ;k bV dk ,Ddk fudkyu dh ?kVuk A gk rk

$$n(A) ¾ 1 + 1 = 2$$

$$P(A) = \frac{n(A)}{n(S)} ¾ \frac{2}{52} = \frac{1}{26}$$

mÙkj 22 fn,kk g $x = \frac{3ab}{a+b}$ gk rk] $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$ ¼5½

$$\frac{x}{3a} = \frac{b}{a+b}$$

2 dk x.kk dju ij

$$\frac{2x}{3a} = \frac{2b}{a+b}$$

$$\frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)}$$,kkXkkRkjkUkIkkRk fUk,kEk Lk

$$\frac{2x+3a}{2x-3a} = \frac{3b+a}{b-a} \quad \text{..... (1)}$$

rFkk iuh

$$\frac{x}{3b} = \frac{a}{a+b}$$

2 dk x.kk dju ij

$$\frac{2x}{3b}=\frac{2a}{a+b}$$

$$\frac{2x+3b}{2x-3b}=\frac{2a+(a+b)}{2a-(a+b)}$$,kkXkkRkj kUkIkkRk fUk,kEk Lk

$$\frac{2x+3b}{2x-3b}=\frac{3a+b}{a-b}=\frac{3a+b}{-(b-a)}$$ ..... (2)

LkEkh dj.k ¼1½ RkFkk ¼2½ dk TkkMUk Ikj

$$\Rightarrow \quad \frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=\frac{3b+a}{b-a}+\frac{3a+b}{-(b-a)}$$

$$¾ \frac{3b+a-3a-b}{b-a}$$

$$¾ \frac{2(b-a)}{b-a}$$

¾ 2

¼vFkok½

iFke LkEkkUkkRkj J.kh d fy, $a=1, d=1$

$$S_1 = \frac{n}{2}[2\times1+(n-1)\times1]$$

$$S_1 = \frac{n}{2}[2+n-1]$$

$$S_1 = \frac{n}{2}[n+1]$$

f}rh; LkEkkUkkRkj J.kh d fy, $a=2, d=3$

$$S_2 = \frac{n}{2}[2\times2+(n-1)\times3]$$

$$S_2 = \frac{n}{2}[4+3n-3]$$

$$S_2 = \frac{n}{2}[3n+1]$$

rrh; LkEkkUkkRkj J.kh d fy, $a=3, d=5$

$$S_3 = \frac{n}{2}[2\times 3+(n-1)\times 5]$$

$$S_3 = \frac{n}{2}[6+5n-5]$$

$$S_3 = \frac{n}{2}[5n+1]$$

iFke] f}rh; ,o rrh; lekUrj Jf.k;k dk ;kx

$$S_1+S_2+S_3 = \frac{n}{2}[n+1] + \frac{n}{2}[3n+1] + \frac{n}{2}[5n+1]$$

$$= \frac{n}{2}[n+1+3n+1+5n+1]$$

$$= \frac{n}{2}[9n+3]$$

$$= \frac{3n}{2}[3n+1]$$

$$= \frac{3}{2}(3n+1)n$$

mÙkj 23 ?ku';ke dh okf"kd vk; ¼5½

1- ey oru l vk; 12500 × 12 ekg ¾ 1]50]000 :-

egxkbZ HkÙkk l vk; 6300 × 12 ekg ¾ 75600 :-

vr% dy okf"kd vk; ¾ 2]25]600 :-

2- dj e NV ;kX; jkf'k okf"kd

¼a½ okf"kd lkekU; Hkfo"; fuf/k e v'knku 2000 x 12 ¾ 24]000 :-

¼b½ th vkbZ ,l okf"kd ihfe;e 250 x 12 ¾ 3]000 :-

¼c½ okf"kd thou chek ihfe;e ¾ 69]000 :-

¼c½ okf"kd Mkd thou chek ihfe;e ¾ 10]000 :-

dj e NV ;kX; jkf'k ¼a + b + c + d½

24]000 $ 3]000 $ 69]000 $ 10]000 ¾ 1]06]000 :-

ijUr vf/kdre NV ;kX; jkf'k 1]00]000 :- rd lhfer gA

rc dj e NV ;kX; jkf'k ¾ 1]00]000 :-

3- dj ;kX; jkf'k 2]25]600 :- & 1]00]000 :- ¾ 1]25]600 :-

4- vk;dj ¾ ¼1]25]600 & 1]10]000½ ¾ 15600 dk 10%

$$¾\ 15,600 \times \frac{10}{100}$$ ¾ 1560 :-

5- f'k{kk midj ¾ 1560 rd 3%

$$¾\ 1560 \times \frac{3}{100}$$ ¾46-80 ¾ 47 :-

6- n; dy vk;dj ¾ 1560 $ 47 ¾ 1607 :-

vr% ?ku';ke }kjk dy n; vk;dj ¾ 1607 :-

¼vFkZkk½

mÙkj 23 'kkfyuh dh okf"kd vk;

1- dfork dh dy okf"kd vk; ¾ 1]80]000 :-

2- dj e NV ;kX; jkf'k

¼a½ okf"kd lkekU; Hkfo"; fuf/k e v'knku ¾ 40]000 :-

¼b½ th vkb ,l okf"kd ihfe;e 250 x 12 ¾ 3]000 :-

dj e NV ;kX; jkf'k ¼a + b½ ¾ 40]000 $ 3]000 $ 10]000 ¾ 53]000 :-

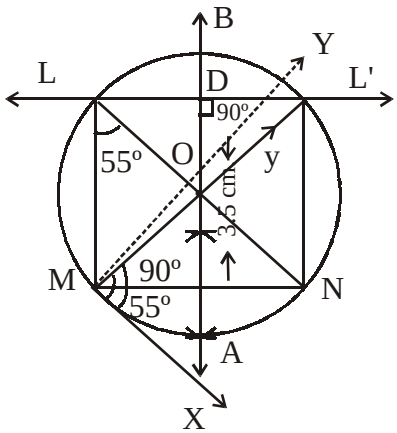
ijUr vf/kdre NV ;kX; jkf'k 1]00]000 :- rd lhfer gA

3- dj ;kX; jkf'k ¾ 1]80]000 :- & 53]000 :- ¾ 1]27]000 :-

4- vk;dj ¾ 1]27]000 :- rd dkb dj ughA

vr% 'kkfyuh dk dkb dj ugh nuk iMxkA

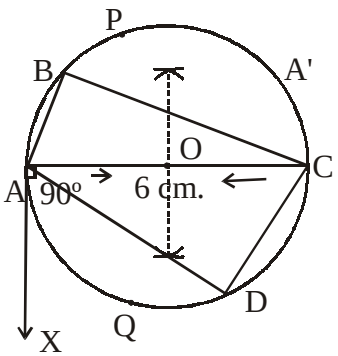
mÙkj 24



jpuk d in %&

¼vFkok½

mÙkj 24



jpuk d in %&

mÙkj 25- ¼5½

OkXk vRkjkYk	0&10	10&20	20&30	30&40	40&50	;kx
Ckkj Ckkj Rkk	4	8	10	11	16	49
lp;h ckjcjrk	4	12	22	33	49	

ink dh l[;k N ¾ 49

ef/;dk l[;k ¾ $\frac{N}{2}$ ¾ 24-5

tk fd lp;h ckjcjrk 33 d vrxr vkrk gA

ef/;dk ox 30&40

ef/;dk ox dh fuEu lhek ¾ 30

ef/;dk ox dh mPp lhek ¾ 40

ef/;dk ox dh vkofRr ¾ 11

ef/;dk ox d Bhd igy dh lp;h vkofRr ¾ 22

ef/;dk ¾ $L_1 + \frac{(m-c)(L_2-L_1)}{f}$

¾ $30 + \frac{(24.5-22)(40-30)}{11} = 30 + \frac{2.5\times10}{11}$

$$= 30 + \frac{25}{11} = 30 + 2.27$$

ef/;dk = 32.27

¼vFkZkk½

OkXk	0&10	10&20	20&30	30&40	40&50	50&60	60&70
Ckkjckkjrkk	8	15	21	37	31	14	12

lkj.kh l Li"V g fd lcl vf/kd ckjcjrk 37 g tk ox 30&40 dh gA

vr% cgyd ox 30&40

cgyd ox dh fuEu lhek = 30

cgyd ox dh mPp lhek = 40

$f_1 = 37, \quad f_0 = 21, \quad f_2 = 31$

cgyd ox dh fuEu lhek

$$= L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2}(L_2 - L_1)$$

$$= 30 + \frac{37-21}{2\times 37 - 21 - 31}(40-30) = 30 + \frac{16}{74-52}\times 10$$

$$= 30 + \frac{160}{22} = 30 + \frac{80}{11} = 30 + 7.27$$

= 37-27

mÙkj 26 ekuk flkRkk dh oreku vk,k x o"k vkj lkk dh oreku vk,k y o"k g gA ¼6½

1 o"k io firk dh vk; = (x –1) o"k

1 o"k io i= dh vk; = (y –1) o"k

i'ukuklkj] iFke 'krZ l]

$$(x-1) = (y-1).8$$

$$x-1 = 8y-8$$

$$x-8y = -8+1$$

$$x-8y = -7$$

$$x = 8y-7 \quad \text{.....(i)}$$

f}rh; 'krZ l

$$x = y^2 \quad \text{.....(ii)}$$

leh- (i) l x dk eku j[ku ij

$$8y-7 = y^2$$

$$\Rightarrow y^2-8y+7=0$$

$$\Rightarrow y^2-y-7y+7=0$$

$$\Rightarrow y(y-1)-7(y-1)=0$$

$$\Rightarrow (y-1)(y-7)=0$$

$$\Rightarrow (y-1)=0 \text{ ;k } (y-7)=0 \Rightarrow y=1 \text{ ;k } y=7$$

$$\Rightarrow y=1^2 \text{ ;k } y=7^2 \Rightarrow y=\pm 1 \text{ ;k } y=\pm 7$$

D;kfd firk] i= dh vk; cjkcj ugh gk ldrh vr% firk dh vk; 49 o"k vkj i= dh vk; 7 o"k gA

¼vFkok½

eku igyh le l[;k x, nljh Øekxr le l[;k (x + 2) gA

i'ukuklkj $x^2 + (x+2)^2 = 164$

$\Rightarrow$ $x^2 + (x^2 + 4x + 4) = 164$

$\Rightarrow$ $2x^2 + 4x + 4 = 164$

$\Rightarrow$ $2(x^2 + 2x + 2) = 164$

$\Rightarrow$ $x^2 + 2x + 2 - 82 = 0$

$\Rightarrow$ $x^2 + 2x - 80 = 0$

$\Rightarrow$ $x^2 - 8x + 10x - 80 = 0$

$\Rightarrow$ $x(x - 8) + 10(x - 8) = 0$

$\Rightarrow$ $(x - 8)(x + 10) = 0$

$x - 8 = 0$;k $x + 10 = 0$

$x = 8$;k $x = -10$

x dk eku _.kkRed ugh gk ldrk] vr% $x = 8$

$\therefore$ nljh dekxr l[;k, g $(x + 2) = 8 + 2 = 10$

vr% vHkh"V l[;k, 8, 10 gkxhA

mÙkj 27 fn;k g % LkEkCkkg f«kHkTk ΔABC g ft ldh AD Åpkb gA

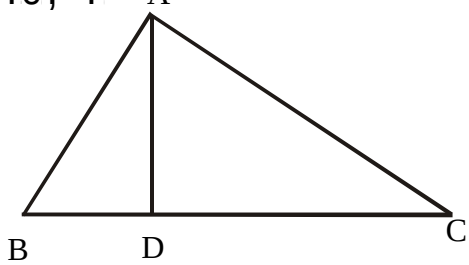
¼6½

fl) djuk g : $3BC^2 = 4AD^2$

miifRr % ΔABC e AB =BC=AC

vkj $AD \perp BC, BD = CD = \frac{BC}{2}$ .....(i)

ledk.k f«kHkTk ΔABD e ikbFkkxkjl ie; l



$\Rightarrow$ $AB^2 = AD^2 + BD^2$

$\Rightarrow$ $AB^2 = AD^2 + \left(\frac{BC}{2}\right)^2$

$\Rightarrow$ $AB^2 = AD^2 + \frac{BC^2}{4}$

$\Rightarrow \quad BC^2 = AD^2 + \frac{BC^2}{4} \qquad (\because AB = BC)$

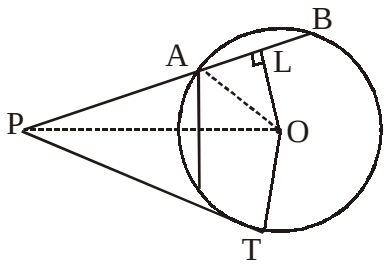
$\Rightarrow \quad BC^2 - \frac{BC^2}{4} = AD^2$

$\Rightarrow \quad 4BC^2 - BC^2 = 4AD^2$

$\Rightarrow \quad 3BC^2 = 4AD^2$ fl) gvkA

¼vFkok½

mÙkj 27 fn;k g C(O, r) g PAB Nnd j[kk rFkk PT Li'k j[kk gA



fl) djuk g % $PA.PB = (PT)^2$

jpuk % $OL \perp AB$ [khpk A OA, OP vkj OT dk feyk;k

miifRr % $PA.PB = (PL - AL)(PL + LB)$

$= (PL - AL)(PL + AL) \qquad (\because AL = LB)$

$= PL^2 - AL^2$

$= (OP^2 - OL^2) - AL^2$

$\because$ ledk.k ΔPLO e $OP^2 = OL^2 + PL^2$.

$= OP^2 - OL^2 - AL^2$

$= OP^2 - (OL^2 + AL^2)$

$= OP^2 - OA^2$

$\because$ ledk.k ΔALO e $OA^2 = OL^2 + AL^2$.

$= \quad OP^2 - OT^2$

$= \quad PT^2$

$\because$ ledk.k ΔPTO e $OP^2 = PT^2 + OP^{2.}$

$PA.PB \quad = \quad PT^2$

Set - C

gkbLdy lfVfQdV ijh{kk

High School Certificate Examination

lEiy&i'u i=

SAMPLE PAPER

fo"k; %& (Subject) - xf.kr (Mathematics) **le; 3 ?k.Vk (Time- 3 Hrs)**

d{kk %& (Class) - nloh (X) **i.kkd 100 (M.M.)**

(Instruction) & ¼fun'k½

1- lHkh i'u gy djuk vfuok;Z g A

Attempt all the Question

2- i'u Øekd 01 e 10 vd fu/kkfjr g A nk dkyZ[k.M g A [k.M ^^v** e 05 cgfodYih; i'u rFkk [k.M ^^c** e 05 fjDr LFkkuk dh ifr vFkok mfpr lc/k tkfM, A iR;d i'u d fy, 1 vd vkcfVr g A

Q. No. 01 Carries 10 Marks. There are two sub-section, Section A is Multiple choice carries 05 marks and section B is fill in the blanks or match the column carries 05 marks.

3- i'u Øekd 02 l i'u Øekd 09 rd vfr y?kqRrjh; i'u g A iR;d i'u ij 02 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 30 'kCn A

Q. No. 2 to 09 are very short answer type question & it carries 02 marks each. Word limit is maximum 30.

4- i'u Øekd 10 l i'u Øekd 15 rd y?kqRrjh; i'u g A iR;d i'u ij 03 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 50 'kCn A

Q. No. 10 to 15 are short answer type question & it carries 03 marks each. Word limit is maximum 50.

5- i'u Øekd 16 l i'u Øekd 21 rd y?kqRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 04 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 75 'kCn A

Q. No. 16 to 21 are short answer type question & it carries 04 marks each. Each question has internal choice. Word limit is maximum 75.

6- i'u Øekd 22 l i'u Øekd 25 rd nh?kmRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 05 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 100 'kCn A

Q. No. 22 to 25 are long answer type question & it carries 05 marks each. Each question has internal choice. Word limit is maximum 100.

7- i'u Øekd 26 l i'u Øekd 27 rd nh?kmRrjh; i'u g A iR;d i'u e vkrfjd fodYi g vkj iR;d i'u ij 06 vd vkcfVr g A mRrj dh vf/kdre 'kCn lhek 150 'kCn A

Q. No. 26 to 27 are long answer type question & it carries 06 marks each. Each question has internal choice. Word limit is maximum 150.

i'u 1¼v½ lgh fodYi pfu, %&

(i) 6 vkj 54 dk Ek/;kUkIkkRkh gkXkkA

(a) 9 (b) 18 (c) 12 (d) 21

(ii) 50g dk v'k EkkIk gkXkkA

(a) 30^0 (b) 60^0 (c) 45^0 (d) 90^0

(iii) 0kÙk dk dkb Tkh0kk fdRkUk fCkUnvk Ikj dkVRkh g A

(a) 2 (b) 1 (c) 3 (d) 4

(iv) 0-625 dk f)vk/kkjh Ik.kkYkh Ek EkkUk gkXkkA

(a) 0.001 (b) 1.001 (c) 0.100 (d) 0.101

(v) 3] 6] 2] 7] 5] 9] 8 dk Ekkf/;kdk gkXkkA

(a) 5 (b) 6 (c) 7 (d) 8

(A) Choose the correct answer-

(i) Mean proportional of 6 and 54 is -

(a) 9 (b) 18 (c) 12 (d) 21

(ii) Value of 50g in degree is -

(a) 30^0 (b) 60^0 (c) 45^0 (d) 90^0

(iii) The chords of a circle intersect the circle at point -

(a) 2 (b) 1 (c) 3 (d) 4

(iv) Value of 0.625 in Binary number is -

(a) 0.001 (b) 1.001 (c) 0.100 (d) 0.101

(v) Medium of 3, 6, 2, 7, 5, 9 and 8 is -

(a) 5 (b) 6 (c) 7 (d) 8

¼c½ fjDRk LFkkUkk dh IkfRk dhfTk,A

(i) 1 vkj 50 d Ek/;k f0k"kEk Iknk dh Lk[;kk &&&&& gkXkh A

(ii) YkECk f«kHkTkh;k fiTEk Ek dYk QYkd ¼Ik"B½ dh Lk[;kk &&&&& gkRkh gA

(ii) mLk fCkUn dk HkTk &&&&&&&& gkXkk Tkk y–v{k Ek fLFkRk gA

(iv) $\sin(90-\theta)$ ¾ &&&&&&& gkXkkA

(v) 8 EkhVj vkj 6 EkhVj HkTkk 0kkYk vk;kRk d f0kd.k dh YkECkkb &&&&&&& gkXkhA

(B) Fill in the Blanks -

(i) The number of terms of odd number between 1 and 50 is .....

(ii) The number of faces of a right triangular prism is .....

(ii) The coordinate of a point of y-axis are .....

(iv) Value of $\sin(90-\theta)$ is .....

(v) Length of diagonal of rectangle is ..... whose sides are 8m and 6m.

i'u 2 $\frac{x+1}{x-2}$ vkj $\frac{x-1}{x-2}$ dk ;kkXkQYk KkRk dhfTk, A

Find the sum of $\frac{x+1}{x-2}$ and $\frac{x-1}{x-2}$

i'u 3 0kXk LkEkhdj.k $15x^2+x-2=0$ d EkYkk dk ;kkXkQYk ,0k Xk.kUkQYk KkRk dhfTk,A

Find the sum product of roots of the quadratic equation $15x^2+x-2=0$

i'u 4 $\frac{\cos ec 39^o}{\sec 51^o}$ dk EkkUk KkRk dhfTk, A

Find the value of $\frac{\cos ec 39^o}{\sec 51^o}$

i'u 5 fCkUn ½2] 3½ vkj ¼4] 1½ d CkhPk dh njh KkRk dhfTk,A

Find the distance between (2, 3) and (4, 1)

i'u 6 ,d 'kd d vk/kkj dh fØ;kk 7 LkEkh vkj ÅPkkb 15 LkEkh g Rkk 'kd dk vk;ruk KkRk dhfTk,A

Find the volume of cone whose height is 15 cm. and radius of base is 7 cm.

i'u 7 f«kHkTk DEF Ek DE vkj DF ij fcUn P vkj Q bl idkj g fd DP = 5 LkEkh] QF = 24 LkEkh] DE = 13 LkEkh] RkFkk DF = 39 LkEkh fn[kkb;s PQ||EF-

In Δ DEF, DP = 5 cm., QF = 24 cm., DE = 13 cm. and DF = 39 cm. Show that PQ||EF or not.

Ik'Uk 8 vYXkkfjFkEk d fu:i.k dk nks idkj fyf[k,A

Write two types of or developed an algorithm.

i'u 9 45 Ek Lk 15 dk lkjd vd fLk)kURk Lk ?kVkb;sA

Subtract 15 from 45 by complement theory.

i'u 10 ;fn $R = \frac{x^3+1}{x-1}$ vkj $S = \frac{x^2-x+1}{x+1}$ gk Rkk $\frac{R}{S}$ dk EkkUk KkRk dhfTk,A

If $R = \frac{x^3+1}{x-1}$ and $S = \frac{x^2-x+1}{x+1}$, then find the value of $\frac{R}{S}$

i'u 11 ;fn $a : b = c : d$ gk Rkk fLk) dhfTk, fd $\frac{a}{b} = \frac{a+c}{b+d}$

If $a : b = c : d$, then prove that $\frac{a}{b} = \frac{a+c}{b+d}$

i'u 12 D;kk 302 J.kh 3]8]13]&&&&&& dk dkb Ikn gA

Is 302 a term of the series 3, 8, 13, ...

i'u 13 EkUkkTk dEkkj Uk 100 :- IkfRkEkkg dh nj Lk 2 Ok"k d fYk, vkOkRkh TkEkk [kkRkk [kkYkkA ;fn C;kkTk dh nj 5½ IkfRk'kRk Okkf"kd gk Rkk mLk nk Ok"k Ckkn fdRkUkh jdEk dh IkkfIRk gkXkhA

Manoj KUmar opened a recuring deposit account of Rs. 100 per month for 2 years. If the rate of interest is 5½% p.a., then calculate how much amount will be receive after 2 years.

i'u 14 LkOkLkfEkdk $\sin^4\theta + \cos^2\theta = 1 - 2\sin^2\theta.\cos^2\theta$ dk fLk) dhfTk,A

Prove that : $\sin^4\theta + \cos^2\theta = 1 - 2\sin^2\theta.\cos^2\theta$

i'u 15 mLk CkM Lk CkM XkkYk dk vk;kRkUk KkRk dhfTk, Tkk mLk ?kUk Lk dkVk Tkk;k fTkLkdh dkj 6 LkEkh dh gA

Find the volume of the greatest sphere which can be cut from a cube whose edge is 6 cm.

Ik'Uk 16 *a* d fdLk EkkUk d fYk, fCkn ¼1]4½]¼*a*, &2½ vkj ¼&3]16½ Lkej [k gkXk& ¼4½

For what value of *a*, the point (1, 4), (*a* –2) and (–3, 16) will be colliner.

¼vFkOkk½ (OR)

mLk f«kHkTk dk dUæd KkRk dhfTk, fTkLkd 'kh"kk d fUkn'kkd ¼4] 3½] ½2] &3½] ¼&3] 5½ gA

Find the centroid of a triangle whose vertices are (4, 3), (2, –3) and (–3, 5).

Ik'Uk 17 fdLkh f«kHkTk d dk.k LkEkkRkj J.kh Ek g LkCkLk CkM dk.k dk EkkUk 105^{o} g RkhUkk dk.kk d EkkUk dk jfM,kUk Ek KkRk dhfTk, A ¼4½

The angles of a triangle are in A.P. The biggest angle is 105^{o}. Find the angles in radian.

¼vFkOkk½ (OR)

,d f«kHkTk d dk.k 2%3%4 Ek g A f«kHkTk d dk.kk d EkkIk jfM,kUk Ek KkRk dhfTk,A

The angles of a triangle are in the ratio 2 : 3 : 4. Find the measures of angles in radian.

Ik'Uk 18 $x = a\sec\theta$ RkFkk $y = b\tan\theta$ gk Rkk fLk) dhfTk, fd $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$· ¼4½

If $x = a\sec\theta$ and $y = b\tan\theta$ then prove that : $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

¼vFkOkk½ (OR)

,kfn $x = a\cos\theta - b\sin\theta$ RkFkk $y = a\sin\theta + b\cos\theta$ gk Rkk fLk) dhfTk, fd $x^2 + y^2 = a^2 + b^2$·

If $x = a\cos\theta - b\sin\theta$ and $y = a\sin\theta + b\cos\theta$ then prove that : $x^2 + y^2 = a^2 + b^2$·

Ik'Uk 19 mLk CkM Lk CkM 'kd dk vk,kRkUk KkRk dhfTk, Tkk mLk ?kUk Ek Lk dkVk Xk,kk g fTkLkdh dkj YkCkkb 3 Lk-Ekh- gA ¼4½

Find the volume of the greatest cone which can be cut from a cube whose edge is 3 cm.

¼vFkOkk½ (OR)

fdLkh XkkYk dk Ik"Bh,k {k«kQYk 616 OkXk LkEkh- gk Rkk XkkYk dk vk,kRkUk KkRk

dhfTk, A

The curved surface of sphere is 616 cm.^{2} then find the volume of sphere.

Ik'Uk 20- nk LkkEkkU;k f«kHkTkk d {k«kQYk dk vUkIkkRk fdUgh nk LkXkRk HkTkkvk d 0kXkk d vUkIkkRk d Ckjk Ckj gkRk gA ¼4½

Prove that the ratio of the areas of two similar triangles is equl to the ratio of the squares of any two corresponding sides.

¼vFkOkk½ (OR)

FkYLk IkEk;k fYkf[k, ,Ok fLk) dhfTk, A

State and prove that Thales theorem.

Ik'Uk 21- ,d FkYk Ek 4 dkYkh] 5 YkkYk] RkFkk 7 LkQn Xkn gA ;kfn ,d Xkn ;knPN;kk fUkdkYkh Tkk;k Rkk bLkdh Ikkf;kdRkk D;kk gkXkh fd fUkdkYkh Xkb Xkn& (i) LkQn gkXkh (ii) LkQn ;kk dkYkh A

A bag contains 6 black, 5 red and 7 white balls. If one ball is drawn at random. What is probability that the ball drawn will be - (i) White, (ii) White or black.

¼vFkOkk½ (OR)

vPNh Ikdkj Lk QVh Xkb 52 Rkk'kk dh ,d XkMMh Ek Lk ,d Rkk'k ;knPN;kk [khPkk TkkRkk g] Rkk fUkEUk dh Ikkf;kdRkk KkRk dhfTk, A

(i) ,d iku dk rk'k gkA (ii) iku ;k bV dk ,Ddk gkA

From a well shuffled pack of 52 cards, one card drawn at random. Find the probability of the following -

(i) One card is of heart

(ii) Ace of heart or diamond.

Ik'Uk 22 ,kfn $x=\frac{3ab}{a+b}$ gk Rkk fLk) dhfTk, fd $\frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=2$- ¼5½

If $x=\frac{3ab}{a+b}$, then prove that $\frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=2$

¼vFkOkk½ (OR)

RkhUk LkEkkUkkRkj Jf.k,kk d *n* Iknk dk ,kkXkQYk ØEk'kh S_1, S_2, S_3 gA fTkUkd IkFkEk Ikn 1] 2] 3 RkFkk LkkOkURkj ØEk'kh 1] 3] 5 gA Rkk fLk) dhfTk, fd &

If S_1, S_2, S_3 be the sum of n terms of three A.P. and their first terms are 1, 2, 3 respectively and common difference are 1, 3, 5, then prove that

$$S_1+S_2+S_3=\frac{3}{2}(3n+1)n$$ ¼5½

Ik'Uk 23 ?kUk'kkEk dk EkYk 0kRkUk IkfRkEkkg 12500 :Ik,k g RkFkk Ekgxkkb HkÙkk IkfRkEkkg 6300 :Ik,kk IkkIRk djRkk g A ,kfn 0kg LkkEkkU,k HkfOk",k fUkf/k Ek IkfRkEkkg 2000 :-] th-vkb-,l- e IkfRkEkkg 250 :- RkFkk Hkkjkh,k TkhOkUk CkhEkk IkhfEk,kEk Ek IkfRkOk"k 69000 :- ,o Mkd?kj TkhOkUk CkhEkk IkhfEk,kEk IkfRkOk"k 10000 :- TkEkk djRkk g A mLkd }kjk n,k dYk vk,kdj KkRk dhfTk, A ¼5½

Basic salary of Ghanshyam is R.s 12500 per month and D.A. is Rs. 6300 per month. He invests Rs. 2000 per month in G.P.F., Rs. 250 per month is G.I.S. and Rs. 69000 yearly as annual premium to L.I.C. and also Rs. 10000 yearly in post office L.I.C. premium. Calculate the income tax paid by him?

Rate of income tax :

upto Rs. 1,10,000	nil
From Rs. 1,10,001 to 1,50,000	10%
From Rs. 1,50,001 to 2,50,000	20%
above Rs. 2,50,000	30%

Educational cess : 3% of the total payable income tax and surcharge.

¼vFkOkk½ (OR)

'kkfYkUkh dh Okkf"kd vk,k ¼Ekdk dUk fdjk,kk HkRRkk NkMdj½ 1]80]000 : Ik,k gA ,kfn Okg LkkEkkU,k Hkf0k"k fUkf/k Ek IkfRkOk"k 40000 : Ik,k] LkEkg TkhOkUk CkhEkk ,kkTkUkk Ek] 250 : Ik,k IkfRkEkkg RkFkk 5000 v) Okkf"kd TkhOkUk CkhEkk IkkfYk Ih Ek fd'Rk TkEkk djRkh gA KkRk dhfTk, fd 'kkfYkUkh dk vIkUk vk,kdj mLk f0kÙkh,k Ok"k fdRkUkk vk,kdj nUkk gkXkkA

The annual income of Mrs. Shalini (Excluding HRA) is Rs. 180000. If she deposite Rs. 40000 per year in G.P.F., Rs. 250 per month in G.I.S. and Rs. 5000 half yearly premium towards L.I.C. Calculate her income tax payable in the financial year.

Rate of income tax :

upto Rs. 1,10,000	nil
From Rs. 1,10,001 to 1,50,000	10%
From Rs. 1,50,001 to 2,50,000	20%
above Rs. 2,50,000	30%

Educational cess : 3% of the total payable income tax and surcharge.

Ik'Uk 24 f«kHkTk $\triangle LMN$ dh jPkUkk dhfTk, Tkgk $MN = 5$ Lk-Ekh-] $\angle L = \angle 55^\circ$ vkj L Lk MkYkk Xk,kk 'kh"k YkCk 3-5 Lk-Ekh- gkA jPkUkk d Ikn Hkh fYkf[k, A

Contrust $\triangle LMN$ in which $MN = 5$ cm., $\angle L = 55^\circ$ and perpendicular for L is 3.5 cm. Write steps of construction.

¼vFkOkk½ (OR)

,d PkØh,k PkRkHkTk $ABCD$ dh jPkUkk dhfTk, fTkLkEk $\angle ABC = 90^\circ$ v'k AC ¾ 6 Lk-Ekh-] AB ¾ 3 Lk-Ekh-] CD ¾ 3-6 Lk-Ekh- jPkUkk d Ikn Hkh fYk[kkA

Construct a cyclic quadrilateral $ABCD$ in which $\angle ABC = 90^\circ$, AC ¾ 6

cm., *AB* ¾ 3 cm., *CD* ¾ 3.6 cm. Write steps of construction.

lk'Uk 25- fUkEUk Lkkj.kh Lk Ekkf/;dk KkRk dhfTk, & ¼5½

OkXk vRkjkYk	0&10	10&20	20&30	30&40	40&50
Ckkj Ckkj Rkk	4	8	10	11	16

Find the medium of the following table :

Class	0–10	10–20	20–30	30–40	40–50
Frequency	4	8	10	11	16

¼vFkOkk½ (OR)

fUkEUk vkdfr cVu Lk cgyd KkRk dhfTk, &

OkXk	0&10	10&20	20&30	30&40	40&50	50&60	60&70
Ckkj Ckkj Rkk	8	15	21	37	31	14	12

Find the mode of the following table :

Class	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	8	15	21	37	31	14	12

lk'Uk 26 ,d Ok"k lkOk flkRkk dh vk;k lk«k dh vk;k d 8 XkUkh Fkh vkTk flkRkk dh vk;k lk«k dh vk;k d OkXk d Ckjk Ckj gA Rkk mUk dh OkRkEkkUk vk;k KkRk dhfTk,\ ¼6½

One year ago, a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages.

¼vFkOkk½ (OR)

nk ØEkkXkRk LkEk Lk[;kk;k KkRk dhfTk, fTkUkd OkXkk dk ;kXk 164 gA

The sum of squares of two consecutive even numbers is 164. Find the numbers.

Ik'Uk 27 fLk) dhfTk, fd fdLkh LkEkCkkg f«kHkTk dh fdLkh HkTkk d 0kXk d fRkXkUkk mLkdh ÅPkkb d 0kXk d Pkkj XkUk d CkjkCkj gkRkk gA ¼6½

Prove that three times the square of any side of an equilateral triangle is equal to four times the square of the altitude.

¼vFkOkk½ (OR)

¸kfn *PAB* 0kÙk dh Nnd j[kk gk Tkk 0kÙk dk *A* vkj *B* Ikj IkfRkPNn djRkh g vkj *PT* ,d LIk'k j[kk [k.M gk Rkk fLk) dhfTk, $PA.PB = (PT)^2$

If *PAB* is a secant to a circle which intersecting the circle at *A* and *B* and *PT* is a tangent segment, then show that : $PA.PB = (PT)^2$

vkn'k mÙkj LkV&lh

mÙkj 1¼v½

(i) (b) 18

(ii) (c) 45º

(iii) (a) 2

(iv) (d) 0.101

(v) (b) 6

¼c½

(i) 24

(ii) 5

(iii) 0

(iv) $\cos\theta$

(v) 10 leh-

mÙkj 2 $\frac{x+1}{x-2} + \frac{x-1}{x-2}$

$= \frac{x+1+x-1}{x-2} = \frac{2x}{x-2}$

mÙkj 3 $15x^2 + x - 2 = 0$ e $a = 15, b = 1, c = -2$

EkYkk dk ¸kkXkQYk ¾ $\alpha + \beta = \frac{-b}{a} = \frac{-1}{15}$

EkYkk dk Xk.kUkQYk ¾ $\alpha.\beta = \frac{c}{a} = \frac{-2}{15}$

mÙkj 4 $\dfrac{\cos ec 39^\circ}{\sec 75^\circ}$

$= \dfrac{\cos ec(90^\circ - 51^\circ)}{\sec 51^\circ}$

$= \dfrac{\sec 51^\circ}{\sec 51^\circ}$

$= 1$

mÙkj 5 fCkUn ¼2]3½ vkj ¼4]1½d CkhPk dh njh

l= fcUn (x_1, y_1) vkj (x_2, y_2) d chp dh njh

$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(4-2)^2 + (1-3)^2}$

$= \sqrt{(2)^2 + (-2)^2}$

$= \sqrt{4+4}$

$= \sqrt{8}$ ¾ $2\sqrt{2}$

mÙkj 6 'kd dk vk,kRkUk ¾ $\dfrac{1}{3}\pi r^2 h$

tgk r = 7 LkEkh h = 15 LkEkh

eku j[ku ij

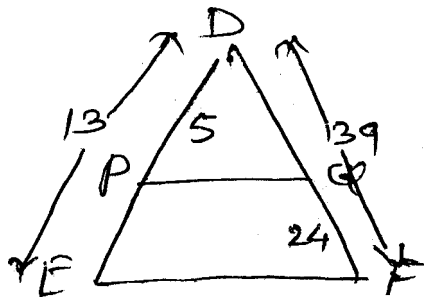
¾ $\dfrac{1}{3}\pi(7)^2.15$ ¾ 245π

mÙkj 7 fp= l PE = DE – DP

PE = 13 – 5 = 8 LkEkh]

$\dfrac{DE}{EP} = \dfrac{DF}{QF} \Rightarrow \dfrac{13}{39} = \dfrac{8}{24} \Rightarrow \dfrac{1}{3} = \dfrac{1}{3}$

$\therefore$ PQ||EF



mÙkj 8 vYXkkfjFEk d fUk:Ik.k d lkdkj

(i) Xk.khRkh;k lkRkhd %& Xk.khRkh;k lkRkhd TkLk /kUk] _.k] x.kk d fy, $] &] × dk mlk;kkXk fd;k TkkRkk gA

(ii) fUk/kkj.k vFkOkk fUkfn"Vhdj.k lkRkhd%& f0kfHké Pkjk dk dkb fUk/kkfjRk EkkUk lknkUk djUk d fYk, fUk/kkj.k lkRkhd (←) dk lk;kkXk fd;k TkkRkk gA

(iii) LkECkU/k LkPkd lkRkhd&

lkRkhd	vfHklkk;k	mnkgj.k
<	Lk NkVk	$a < b$ a NkVk g b LkA

mÙkj 9 lkekU; fof/k lkjd fof/k

45
&15
30

45
$ 84
129

29
$ 1
30

15 dk ijd 84

mÙkj 9 $\frac{R}{S} = \left(\frac{x^3+1}{x-1}\right) / \left(\frac{x^2-x+1}{x+1}\right)$

$= \frac{(x+1)(x^2-x+1)}{x-1} \times \frac{x+1}{(x^2-x+1)}$

$= \frac{(x+1)^2}{(x-1)}$

mÙkj 10 fn;k g $\frac{a}{b} = \frac{c}{d}$ .....(i)

= $\frac{a}{c}=\frac{b}{d}$ ¼, dkURkjkUkIkkRk Lk½

= $\frac{a+c}{c}=\frac{b+d}{d}$ ¼, kkXkkUkIkkRk Lk½

= $\frac{a+c}{b+d}=\frac{c}{d}$ .....(ii) ¼, dkURkjkUkIkkRk Lk½

lehdj.k (i) ,o (ii) l

$$\frac{a}{b}=\frac{a+c}{b+d}$$

mÙkj 12 EkkUkk 302 J.kh 3]8]13] &&&&&&&& dk *n* 0kk Ikn gA

$T_n = 302,\ a = 3,\ d = 8 - 3 = 5,\ n = ?$

n ok in $T_n = a + (n-1)\,d$

$302 = 3 + (n-1)\,5$

$302 = 3 + 5n - 5$

$302 - 3 + 5 = 5n$

$304 = 5n$

$n = \frac{304}{5}$

$\frac{304}{5}$ i.kkd I[;k ugh g vr% 302 J.kh dk dkbZ in ugh gA

mÙkj 13 C;kt ¾ $\frac{\text{ekfld tek} \times \text{nj}}{100} \times \frac{\text{ekg ¼ekg \$ 1½}}{24}$

= $\frac{100\times11}{100\times2}\times\frac{24(24+1)}{24}$

$= \quad \frac{11}{2} \times 25 \quad = \quad \frac{275}{2} \quad = \quad 137.5$ #-

feJ/ku ¾ $100 \times 24 + 137.5 \quad = 2400 + 137.5 \quad = 2537.5$ #-

mÙkj 14 L.H.S.= $\sin^4\theta + \cos^4\theta$

$= \quad \left(\sin^2\theta\right)^2 + \left(\cos^2\theta\right)^2$

$= \quad \left(\sin^2\theta\right)^2 + \left(\cos^2\theta\right)^2 + 2\sin^2\theta\cos^2\theta - 2\sin^2\theta\cos^2\theta$

$= \quad \left(\sin^2\theta + \cos^2\theta\right)^2 - 2\sin^2\theta\cos^2\theta$

$= \quad 1 - 2\sin^2\theta\cos^2\theta$ R.H.S.

mÙkj 15 XkkYk dh 0;kkLk ¾ 6 Lk-Ekh-

f«kT;kk ¾ 3 LkEkh-

XkkYk dk vk;kRkUk ¾ $\frac{4}{3}\pi r^3$

¾ $\frac{4}{3}\pi(3)^3$ ¾ 36π ?kUk LkEkh

vr% XkkYk dk vk;kRkUk 36π ?kUk LkEkh gkXkkA

mÙkj 16 l = % fcUnq $(x_1, y_1), (x_2, y_2)$ vkj (x_3, y_3) lejs[k gksa rks f=Hkqt dk {ks=Qy 'kU; gkxkA

Δ dk {ks=Qy ¾ $\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] = 0$

vr% fcUnq ¼1] 4½] ¼a] &2½] vkj ¼&3] 16½ lejs[k gksx ;fn

$\Rightarrow$ $1[(-2 - 16) + \{a(16 - 4) + (-3)\{4 - (-2)\} = 0$

$\Rightarrow$ $-18 + a(12) - 3(4 + 2) = 0$

$\Rightarrow$ $-18 + 12a - 18 = 0$

$\Rightarrow$ $12a - 36 = 0$

$\Rightarrow$ $a = 3$

¼vFkok½

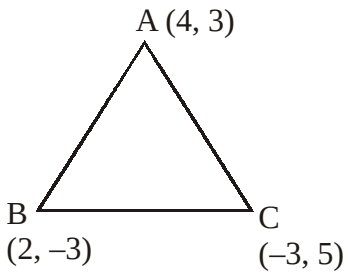
mÙkj 16 ABC ,d Δ g ftl d 'kh"kk d fun'kkd Øe'k% $(x_1, y_1) = (4, 3)$, $(x_2, y_2) = (2, -3)$, $(x_3, y_3) = (-3, 5)$,

f=Hkt dk dUnd $(h, k) = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$

$$h = \frac{x_1 + x_2 + x_3}{3} = \frac{4 + 2 + (-3)}{3} = \frac{3}{3} = 1$$

$$k = \frac{y_1 + y_2 + y_3}{3} = \frac{3 + (-3) + 5}{3} = \frac{5}{3}$$

$$k = \frac{3 - 3 + 5}{3} = \frac{5}{3}$$



dUæd ¾ $\left(1, \frac{5}{3}\right)$ gkxkA

mÙkj 17 eku fy;k fd f=Hkt d dk.k $(\alpha - \delta)^\circ$, α°, $(\alpha + \delta)^\circ$ gA ¼4½

f=Hkt d rhuk dk.kk dh eki 180° gA

$\Rightarrow$ $(\alpha - \delta)^\circ + \alpha^\circ + (\alpha + \delta)^\circ = 180^\circ$ $\Rightarrow 3\alpha = 180^\circ$ $\Rightarrow \alpha = 60^\circ$

vr% lcl cMk dk.k 105° gA $\alpha + \delta = 105^\circ \Rightarrow 60^\circ + \delta = 105^\circ \Rightarrow \delta = 45^\circ$

lcl NkVk dk.k $(\alpha - \delta)^\circ \Rightarrow$ $\alpha - \delta = 60^\circ - 45^\circ = 15^\circ$

$$15^\circ = \frac{\pi}{180} \times 15 = \frac{\pi}{12}$$

chp dk.k $= 60^\circ = \frac{\pi}{180} \times 60 = \frac{\pi}{3}$

lcl cMk dk.k $= 105^\circ = \frac{\pi}{180} \times 105 = \frac{7\pi}{12}$

vHkh"V dk.k $\frac{\pi}{12}, \frac{\pi}{3}$,o $\frac{7\pi}{12}$ jfM;u gA

¼vFkok½

ekuk f=Hkt d dk.k $\angle A$, $\angle B$ o $\angle C$ gA

i'uku lkj $\angle A : \angle B : \angle C = 2 : 3 : 4$

ekuk dkb dk.k x g rk] ge tkur g fd $\angle A+\angle B\angle C = 180^o$

$\therefore \angle A = 2x, \angle B = 3x$ vkj $\angle C = 4x$

vr% $2x + 3x + 4x = 180^o$

$\Rightarrow \quad 9x = 180^o$

$\Rightarrow \quad x = 20^o$

vr% $\angle A = 2x = 2 \times 20^o = 40^o = 40^o \times \frac{\pi}{180} = \frac{2\pi}{9}$ jfM;u

$\angle B = 3x = 3 \times 20^o = 60^o = 60^o \times \frac{\pi}{180} = \frac{\pi}{3}$ jfM;u

$\angle C = 4x = 4 \times 20^o = 80^o = 80^o \times \frac{\pi}{180} = \frac{4\pi}{18}$ jfM;u

vr% f=Hkt d dk.k $40^o, 60^o, 80^o$ g ftud jfM;u e eku Øe'k% $\frac{2\pi}{9}, \frac{\pi}{3}, \frac{4\pi}{18}$ gA

mÙkj 18 $x = a\sec\theta$ RkFkk $y = b\tan\theta$ ¼4½

$\frac{x}{a} = \sec\theta$ .....(i) RkFkk $\frac{y}{b} = \tan\theta$ .....(ii)

leh- (i) o (ii) dk ox djd (i) l (ii) dk ?kVku ij

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = \sec^2\theta - \tan^2\theta$ $\left[\because 1+\tan^2\theta = \sec^2\theta \right.$
$\left. 1 = \sec^2\theta - \tan^2\theta \right[$

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$-

¼vFkok½

fn;k g $x = a\cos\theta - b\sin\theta$ ---------- ¼1½

RkFkk $y = a\sin\theta + b\cos\theta$ ---------- ¼2½

lehdj.k ¼1½ o ¼2½ dk ox djd tkMu ij

$x^2 + y^2 = a^2\left(\cos^2\theta + \sin^2\theta\right) + b^2\left(\cos^2\theta + \sin^2\theta\right)$
$- 2ab\cos\theta\sin\theta + 2ab\sin\theta\cos\theta$

$x^2 + y^2 = a^2 + b^2$ $\left[\because \sin^2\theta + \cos^2\theta = 1\right.$

mÙkj 19 ?ku l dkV x; cM l cM 'kd dk vk;ru V $= \frac{1}{3}\pi r^2 h$ ¼4½

fn;k g] h = 3 le-
'kd d vk/kkj dk 0;k l = 2r = 3 le-

$$r = \frac{3}{2} \text{ le-}$$

eku j[ku ij] $V = \frac{1}{3}\pi\left(\frac{3}{2}\right)^2 .3 = \frac{9}{4}\pi$

$$V = 2.25\pi \text{ ?ku le-}$$

¼vFkok½

ekuk xky dh f=T;k = r

fn;k g] xky dk i"Bh; {k=Qy = 616 ox l-e-

$\Rightarrow \quad 4\pi r^2 = 616 \quad \Rightarrow \quad 4 \times \frac{22}{7} \times r^2 = 616 \Rightarrow \quad r^2 = \frac{7\times 616}{4\times 22}$

$\Rightarrow \quad r^2 = 7 \times 7 \quad \Rightarrow \quad r = 7$ l-e-

$\therefore \quad$ xky dk vk;ru $= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times (7)^3$

$$= \frac{4}{3} \times \pi \times 7 \times 7 \times 7$$

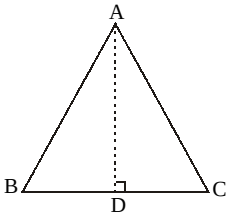
$$= \frac{1372}{3}\pi \text{ ?ku l-e-}$$

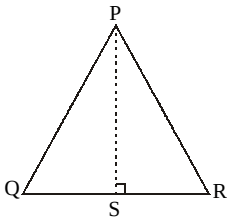
mÙkj 20- **ie;; dFku** %nk le:i f«kHkTkk d {k«kQYk dk vUkIkkRk fdUgh nk LkXkRk HkTkk vkd 0kXkk d vUkIkkRk d Ckjkckj gkRkk gA ¼4½

Kkr g % nk le:i f=Hkt ABC vkj PQR

fl) djuk g % $\frac{\{k«kQy\ \Delta ABC}{\{k«kQy\ \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$

jpuk % $AD \perp BC$ vkj $PS \perp QR$ [khpkA



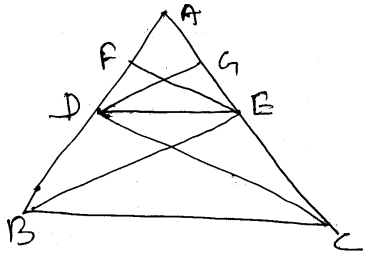


miifÿk %

dFku	dkj.k
$\frac{\text{{k«kQy } }\Delta ABC}{\text{{k«kQy } }\Delta PQR}=\frac{\frac{1}{2}BC\times AD}{\frac{1}{2}QR\times PS}$	
$\frac{\text{{k«kQy } }\Delta ABC}{\text{{k«kQy } }\Delta PQR}=\frac{BC}{QR}\times\frac{AD}{PS}$ ..... (i)	
vc f=Hkt ADB vkj f=Hkt PSQ e]	
$\angle B = \angle Q$	le:i Δd lxr dk.k cjkcj gA
$\angle ADB = \angle PSQ$	iR;d 90º ¼jpuk l½
$\Delta ADB \sim \Delta PSQ$	AA le:irk miie; l
$\frac{AD}{PS}=\frac{AB}{PQ}$ ...(ii)	le:i Δdh lxr Hktk; lekuikfrd gkrh gA
yfdu $\frac{AB}{PQ}=\frac{BC}{QR}$ ...(iii)	$\Delta ABC \sim \Delta PQR$
$\therefore \quad \frac{AD}{PS}=\frac{BC}{PQ}$ ...(iv)	(ii) o (iii) l
$\frac{\text{{k«kQy } }\Delta ABC}{\text{{k«kQy } }\Delta PQR}=\frac{BC}{QR}\times\frac{BC}{QR}=\frac{BC^2}{QR^2}$	(i) o (iv) l
bl idkj fl) dj ldr g fd	
$\frac{\text{{k«kQy } }\Delta ABC}{\text{{k«kQy } }\Delta PQR}=\frac{AB^2}{PQ^2}$	
vkj $\frac{\text{{k«kQy } }\Delta ABC}{\text{{k«kQy } }\Delta PQR}=\frac{AC^2}{PR^2}$	
vFkkr $\frac{\text{{k«kQy } }\Delta ABC}{\text{{k«kQy } }\Delta PQR}=\frac{AB^2}{PQ^2}=\frac{BC^2}{QR^2}=\frac{AC^2}{PR^2}$	bfr fl)e

¼vFkOkk½

FkYLk lkEk;k & ,d f=Hkt dh ,d Hkt k d lekrj [khph xb j[kk vU; nk Hkt kvk dk ftu nk fcnvk ij ifrPNn djrh g o fcn Hkt kvk dk leku vuikr e foHkDr djr gA



Kkr g% Δ f=Hkt ABC e DE||BC

fl) dju k g% $\frac{AD}{DB} = \frac{AE}{EC}$

jpuk % (i) B dk E l rFkk C dk D l feyk;kA

(ii) $EF \perp AB$ [khpkA

(iii) $DG \perp AE$ [khpkA

miifÙk %

dFku	**dkj.k**
Δ dk {k=Qy ¾ $\frac{1}{2}$ vk/kkj × Åpkb	
$\frac{\Delta ADE \text{ dk } \{k\text{«}kQy}{\Delta BDE \text{ dk } \{k\text{«}kQy} = \frac{\frac{1}{2}AD.EF}{\frac{1}{2}BD.EF} = \frac{AD}{BD}$ ...(i)	
blh idkj]	
$\frac{\Delta ADE \text{ dk } \{k\text{«}kQy}{\Delta CDE \text{ dk } \{k\text{«}kQy} = \frac{\frac{1}{2}AE.DG}{\frac{1}{2}EC.DG} = \frac{AE}{EC}$ ...(ii)	
yfdu] Δ BDE dk {k=Qy ¾ Δ CDE dk {k=Qy ...(iii)	,d gh vk/kkj vkj ,d gh lekrj j[kkvk d chp cu f=Hkt dk {k=Qy cjkcj gkrk gA
vr% $\frac{AD}{BD} = \frac{AE}{EC}$	(i), (ii), (iii) l bfr fl)e

mÙkj 21- FkYk Ek xnk dh dy l[;k 4 $ 5 $ 7 ¾ 16

$n(S) = 16$

(i) 7 lQn xnk e l dkb ,d lQn xn fudkyh tk l drh gA

$$n(A) = 7$$

vr% LkQn xn fudkyu dh ikf;drk $P(A) = \frac{n(A)}{n(S)}$

$$P(A) = \frac{7}{16}$$

(ii) LkQn ¸kk dkYkh xn fudkyu dh ikf;drk

$$P(A) = \frac{7}{16} + \frac{4}{16}$$

$$= \frac{7+4}{16} = \frac{11}{16}$$

¼vFkok½

dy lEHkkfor ?kVuk;a $n(S) = 52$

(i) iku dk rk'k fudkyu dh ?kVuk A gk rk

$$n(A) = 13$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{13}{52} = \frac{1}{4}$$

(ii) iku ;k bV dk bDdk fudkyu dh ?kVuk A gk rk

$$n(A) = 1 + 1 = 2$$

$$P(A) = \frac{n(A)}{n(S)} = \frac{2}{52} = \frac{1}{26}$$

mÙkj 22 fn¸kk g $x = \frac{3ab}{a+b}$ ¼5½

vr% $\frac{x}{3a} = \frac{b}{a+b}$

2 dk x.kk dju ij

$$\frac{2x}{3a}=\frac{2b}{a+b}$$

$$\frac{3b+a}{b-a}+\frac{3a+b}{-(b-a)}$$,kkXkkRkj kUkIkkRk fUk,kEk Lk

$$\frac{2x+3a}{2x-3a}=\frac{3b+a}{b-a}$$ ..... (1)

rFkk iu%

$$\frac{x}{3b}=\frac{a}{a+b}$$

2 dk x.kk dju ij

$$\frac{2x}{3b}=\frac{2a}{a+b}$$

$$\frac{2x+3b}{2x-3b}=\frac{2a+(a+b)}{2a-(a+b)}$$,kkXkkRkj kUkIkkRk fUk,kEk Lk

$$\frac{2x+3b}{2x-3b}=\frac{3a+b}{a-b}=\frac{3a+b}{-(b-a)}$$ ..... (2)

LkEkh dj.k ¼1½ RkFkk ¼2½ dk TkkMUk Ikj

$$\Rightarrow \quad \frac{2x+3a}{2x-3a}+\frac{2x+3b}{2x-3b}=\frac{3b+a}{b-a}+\frac{3a+b}{-(b-a)}$$

$$\frac{3b+a-3a-b}{b-a}$$

$$\frac{2(b-a)}{b-a}$$

2

¼vFkok½

iFke LkEkkUkkRkj J.kh d fy, $a=1, d=1$

$$S_1=\frac{n}{2}[2\times1+(n-1)\times1]$$

$$S_1=\frac{n}{2}[2+n-1]$$

$$S_1 = \frac{n}{2}[n+1]$$

f}rh; LkEkkUkkRkj J.kh d fy, $a = 2, d = 3$

$$S_2 = \frac{n}{2}[2\times 2+(n-1)\times 3]$$

$$S_2 = \frac{n}{2}[4+3n-3]$$

$$S_2 = \frac{n}{2}[3n+1]$$

rrh; LkEkkUkkRkj J.kh d fy, $a = 3, d = 5$

$$S_3 = \frac{n}{2}[2\times 3+(n-1)\times 5]$$

$$S_3 = \frac{n}{2}[6+5n-5]$$

$$S_3 = \frac{n}{2}[5n+1]$$

iFke] f}rh; ,o rrh; lekUrj Jf.k;k dk ;kx

$$S_1+ S_2+ S_3 = \frac{n}{2}[n+1] + \frac{n}{2}[3n+1] + \frac{n}{2}[5n+1]$$

$$= \frac{n}{2}[n+1+3n+1+5n+1]$$

$$= \frac{n}{2}[9n+3]$$

$$= \frac{3n}{2}[n+1]$$

$$= \frac{3}{2}(3n+1)n$$

mÙkj 23 ?ku';ke dh okf"kd vk; ¼5½

1- ey oru 12500 × 12 ekg ¾ 1]50]000 :-

egxkb HkÙkk 6300 × 12 ekg ¾ 75600 :-

vr% dy okf"kd vk; ¾ 2]25]600 :-

2- dj e NV ;kX; jkf'k okf"kd

¼a½ okf"kd lkekU; Hkfo"; fuf/k e v'knku 2000 x 12 ¾ 24]000 :-

¼b½ th vkb ,l okf"kd ihfe;e 250 x 12 ¾ 3]000 :-

¼c½ okf"kd thou chek ihfe;e ¾ 69]000 :-

¼c½ okf"kd Mkd thou chek ihfe;e ¾ 10]000 :-

dj e NV ;kX; jkf'k ¼a + b + c + d½

24]000 $ 3]000 $ 69]000 $ 10]000 ¾ 1]06]000 :-

ijUr vf/kdre NV ;kX; jkf'k 1]00]000 :- rd lhfer gA

rc dj e NV ;kX; jkf'k ¾ 1]00]000 :-

3- dj ;kX; vk; 2]25]600 :- & 1]00]000 :- ¾ 1]25]600 :-

4- vk;dj ¾ ¼1]25]600 & 1]10]000½ ¾ 15600 dk 10%

$$¾\ 15,600 \times \frac{10}{100}$$ ¾ 1560 :-

5- f'k{kk midj ¾ 1560 rd 3%

$$¾\ 15,60 \times \frac{10}{100}$$ ¾46-80 ¾ 47 :-

6- n; dy vk;dj ¾ 1560 $ 47 ¾ 1607 :-

vr% ?ku';ke }kjk dy n; vk;dj ¾ 1607 :-

¼vFkZkkk½

mÙkj 23 'kkfyuh dh okf"kd vk;

1- dfork dh dy okf"kd vk; ¾ 1]80]000 :-

2- dj e NV ;kX; jkf'k

¼a½ okf"kd lkekU; Hkfo"; fuf/k e v'knku ¾ 40]000 :-

¼b½ okf"kd leg thou chek ihfe;e 250 x 12 ¾ 3]000 :-

dj e NV ;kX; jkf'k ¼a + b½ ¾ 40]000 $ 3]000 $ 10]000 ¾ 53]000 :-

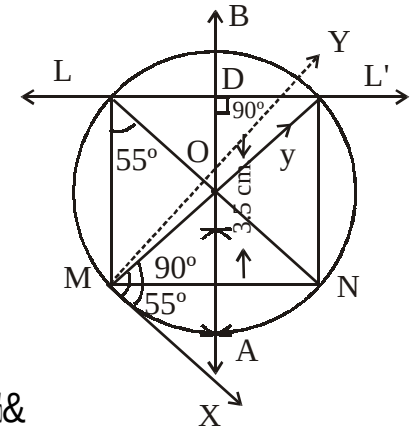
ijUr vf/kdre NV ;kX; jkf'k 1]00]000 :- rd lhfer gA

3- dj ;kX; jkf'k ¾ 1]80]000 :- & 53]000 :- ¾ 1]27]000 :-

4- vk;dj ¾ 1]27]000 :- rd dkb dj ughA

vr% 'kkfyuh dk dkb dj ugh nuk iMxkA

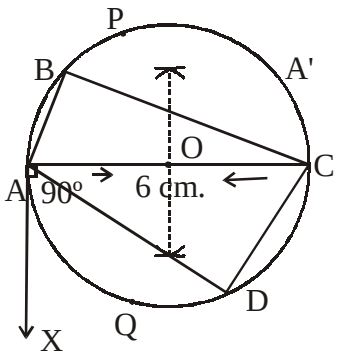
mÙkj 24



jpuk d in %&

¼vFkZkkk½

mÙkj 24



jpuk d in %&

mÙkj 25- ¼5½

OkXk vRkjkYk	0&10	10&20	20&30	30&40	40&50	;kx
Ckkj Ckkj Rkk	4	8	10	11	16	49
lp;h ckjcjrk	4	12	22	33	49	

ink dh l[;k N ¾ 49 rc

ef/;dk l[;k ¾ $\frac{N}{2}$ ¾ 24-5

tk fd lp;h ckjcjrk 33 d vrxr vkrk gA

ef/;dk ox 30&40

ef/;dk ox dh fuEu lhek ¾ 30

ef/;dk ox dh mPp lhek ¾ 40

ef/;dk ox dh vkofRr ¾ 11

ef/;dk ox d Bhd igy dh lp;h vkofRr ¾ 22

ef/;dk = $L_1 + \frac{(m-c)(L_2-L_1)}{f}$

= $30 + \frac{(24.5-22)(40-30)}{11} = 30 + \frac{2.5\times10}{11}$

= $30 + \frac{25}{11} = 30 + 2.27$

ef/;dk = 32.27

¼vFkZokk½

OkXk	0&10	10&20	20&30	30&40	40&50	50&60	60&70
Ckkj Ckkj Rkk	8	15	21	37	31	14	12

lkj.kh l Li"V g fd lcl vf/kd ckjcjrk 37 g tk ox 30&40 dh gA

vr% cgyd ox 30&40

cgyd ox dh fuEu lhek = 30

cgyd ox dh mPp lhek = 40

$f_1 = 37,\ \ f_0 = 21,\ \ f_2 = 31$

cgyd

= $L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2}(L_2 - L_1)$

= $30 + \frac{37-21}{2\times37-21-31}(40-30) = 30 + \frac{16}{74-52}\times10$

= $30 + \frac{160}{22} = 30 + \frac{80}{11} = 30 + 7.27$

= 37-27

mÙkj 26 ekuk flkRkk dh oreku vk;q x o"k vkj lk«k dh oreku vk;q y o"k g gA ¼6½

1 o"k iwo firk dh vk; ¾ (x –1) o"k

1 o"k iwo i= dh vk; ¾ (y –1) o"k

i'ukulkj] izFke 'krZ ls]

$$(x-1) = (y-1).8$$

$$x-1 = 8y-8$$

$$x-8y = -8+1$$

$$x-8y = -7$$

$$x = 8y - 7 \quad \text{.....(i)}$$

f}rh; 'krZ ls

$$x = y^2 \quad \text{.....(ii)}$$

leh- (i) ls x dk eku j[kus ij

$$8y-7 = y^2$$

$$\Rightarrow y^2-8y+7=0$$

$$\Rightarrow y^2-y-7y+7=0$$

$$\Rightarrow y(y-1)-7(y-1)=0$$

$$\Rightarrow (y-1)(y-7)=0$$

$$\Rightarrow (y-1)=0 \text{ ;k } (y-7)=0 \quad \Rightarrow y=1 \text{ ;k } y=7$$

$$\Rightarrow y=1^2 \text{ ;k } y=7^2 \quad \Rightarrow y=\pm 1 \text{ ;k } y=\pm 7$$

D;kfd firk] i= dh vk; cjkcj ugh gks ldrh vr% firk dh vk; 49 o"k vkj i= dh vk; 7 o"k gA

¼vFkokk½

eku igyh lee l[;k x, nljh Øekxr lee l[;k (x + 2) gA

i'ukulkj $x^2 + (x + 2)^2 = 164$

$\Rightarrow$ $x^2 + x^2 + 4x + 4 = 164$

$\Rightarrow$ $2x^2 + 4x + 4 = 164$

$\Rightarrow$ $2(x^2 + 2x + 2) = 164$

$\Rightarrow$ $x^2 + 2x + 2 - 82 = 0$

$\Rightarrow$ $x^2 + 2x - 80 = 0$

$\Rightarrow$ $x^2 - 8x + 10x - 80 = 0$

$\Rightarrow$ $x(x - 8) + 10(x - 8) = 0$

$\Rightarrow$ $(x - 8)(x + 10) = 0$

$x - 8 = 0$;k $x + 10 = 0$

$x = 8$;k $x = -10$

x dk eku _.kkRed ugh gk ldrk] vr% $x = 8$

$\therefore$ nljh dekxr l[;k, g $(x + 2) = 8 + 2 = 10$

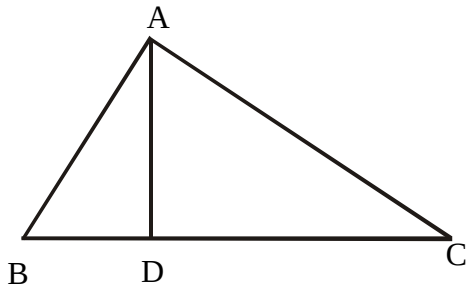
vr% vHkh"V l[;k, 8, 10 gkxhA

mÙkj 27 fn;k g % LkEkCkkg ΔABC gA ftldh Åpkbb AD gA ¼6½

fl) djuk g : $3BC^2 = 4AD^2$

miifRr % ΔABC e AB =BC=AC

vkj $AD \perp BC, BD = CD = \frac{BC}{2}$ .....(i)



ledk.k ΔABD e ikbFkkxkjl ie; l

$\Rightarrow$ $AB^2 = AD^2 + BD^2$

$\Rightarrow$ $AB^2 = AD^2 + \left(\frac{BC}{2}\right)^2$

$$\Rightarrow \quad AB^2 = AD^2 + \frac{BC^2}{4}$$

$$\Rightarrow \quad BC^2 = AD^2 + \frac{BC^2}{4} \qquad (\because AB = BC)$$

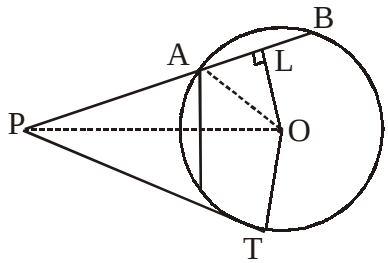
$$\Rightarrow \quad BC^2 - \frac{BC^2}{4} = AD^2$$

$$\Rightarrow \quad 4BC^2 - BC^2 = 4AD^2$$

$$\Rightarrow \quad 3BC^2 = 4AD^2$$ fl) gvkA

¼vFkOkk½

mÙkj 27 fn;k g C(O, r) g PAB Nnd j[kk rFkk PT Li'k j[kk gA



fl) djuk g % PA.PB = $(PT)^2$

jpuk % OL $\perp$ AB [khpk A OA, OP vkj OT dk feyk;k

miifRr % PA.PB = (PL – AL) (PL + LB)

= (PL – AL) (PL + AL) $(\because AL = LB)$

= $PL^2 - AL^2$

= $(OP^2 - OL^2) - AL^2$

$\because$ ledk.k ΔPLO e $OP^2 = OL^2 + PL^2$.

= $OP^2 - OL^2 - AL^2$

= $OP^2 - (OL^2 + AL^2)$

$= \quad OP^2 - OA^2$

$\because$ ledk.k Δ ALO e $OA^2 = OL^2 + AL^2$.

$= \quad OP^2 - OT^2$

$= \quad PT^2$

$\because$ ledk.k Δ PTO e $OP^2 = PT^2 + OP^2$.

$PA.PB \quad = \quad PT^2$