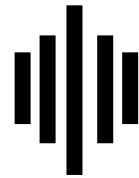




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i zu & i = dh ; kst uk Scheme of Question Paper

fo" k; %& xf. kr

i wkkzd % 100

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¼½ 'kfk.kd mnns ; ds vuq kj eku

(A) Weightage as per Educational objective:

l 0 Ø0	mnns ;	vd	ifr'kr
1-	Kku (Knowledge)	20	20%
2-	vocksk (Understanding)	60	60%
3-	vuq; kx , oa dskty (Application & Skill)	20	20%
	; kx	50	100%

¼½ bdkbkj vdkd dk eku

l 0Ø0	bdkbz dk uke	bdkbz ij vkcfr vd	i zu&i = ds ik: i vuq kj vkcfr vd
1-	cht xf. kr	26	26
2-	okf. kft; d xf. kr	08	08
3-	funz kkd T; kfefr	07	07
4-	f=dks kfefr	15	15
5-	{k=fefr	10	10
6-	T; kfefr	19	19
7-	dEl; Wj	05	05
8-	l ká[; dh	10	10
9-			
10-			
11-			
12-			

¼ ½ d fBukb Lrj (Difficulty Level)

l 0 00	mnñs ;	vad	ifr'kr
1-	l jy (Easy)	20	20%
2-	vñ r (Average)	60	60%
3-	dfBu (Difficult)	20	20%
		ksx	100
			100%

¼½ izui = fn'kk funñk , oa fodYi ; kstuk %

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

- oLrfu"B izu ea ¼05½ cgfodYih; izu rFkk ¼05½ fJDr LFkku dh ifirz@mfpr tkMk cuk, dk izu fn;k tkosk vkj ; g iR; d l ¼ ea izu Øeka 1 gskk A
- iR; d l ¼ ea 1] 2 , oa 3 vadka ds izuka ea fHkUurk jgskh A l eLr 04 vad ; k bl l s vf/kd vadks ds y?kñÜkj; rFkk nh?kznÜkj; izuka ea fodYi fn;k tkuk gSA fodYi izu ml h bdkbZ l srFkk l eku mnñs ; ka ds jgksA 04 vad ; k bl l s vf/kd vadks ds izu iR; d l ¼ ea , d l eku jgksA
- vf/kdre mÜkj l hek vfry?kñÜkj; ½ vad@30 'kCn½ ¼ vad@50 'kCn½
 y?kñÜkj; ¼ vad@75 'kCn½ ½ vad@150 'kCn½
 nh?kznÜkj; ¼ vad ; k vf/kd@250 'kCn½

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fo" k; %& xf.kr

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bdkbz l -Ø-	bdkbz	bdkbz ij vkcivR vd	vadokj izu							dy izu
			1 vad	2 vad	3 vad	4 vad	5 vad	6 vad	6 vad ; k bl l s vf/kd	
1	cht xf.kr	26	2	2	3	&	1	1	&	7\$1
2	okf.kT; xf.kr	08	&	&	1	&	1	&	&	02
3	funzkkad T; kfefr	07	1	1	&	1	&	&	&	02
4	f=dks kfefr	15	2	1	1	2	&	&	&	04
5	{ks=fefr	10	1	1	1	1	&	&	&	03
6	T; kfefr	19	2	1	&	1	1	1	&	04
7	dEI; Wj	05	1	2	&	&	&	&	&	02
8	l kf[; dh	10	1	&	&	1	1	&	&	02
9										
10										
11										
12										
; ksx		100	1 ¼10½	8	6	6	4	2	&	27

Set - A

gkbz Ldwy I fvIQdV i jh{k
High School Certificate Examination
I fiy&izu i=
SAMPLE PAPER

fo"k; % (Subject) - xf.kr (Mathematics)
d{k % (Class) - nl oha (X)

I e; 3 ?k.Vk (Time- 3 Hrs)
i vk{d 100 (M.M.)

(Instruction) & fun{ k{

- 1- I Hkh izu gy djuk vfuok; zgSA
Attempt all the Question
- 2- izu Øekad 01 ea 10 vad fu/kkzjr gSA nks mi [k.M gSA [k.M ^v** ea 05 cgfodYih; izu rFkk [k.M ^c** ea 05 fjDr LFkkuka dh i firz vFkok mfpR l c{k tksM, A iR; d izu dsfy, 1 vad vkcfVr gSA
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- izu Øekad 02 I situ Øekad 09 rd vfr y?kqRrjh; izu gSA iR; d izu ij 02 vad vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- izu Øekad 10 I situ Øekad 15 rd y?kqRrjh; izu gSA iR; d izu ij 03 vad vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 50 'kCn A
Q. No. 10 to 15 are short answer type question & it carries 03 marks each. Word limit is maximum 50.
- 5- izu Øekad 16 I situ Øekad 21 rd y?kqRrjh; izu gSA iR; d izu ea vkrfjd fodYi gsvk{ iR; d izu ij 04 vad vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- izu Øekad 22 I situ Øekad 25 rd nh?kmRrjh; izu gSA iR; d izu ea vkrfjd fodYi gSvkj iR; d izu ij 05 vd vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- izu Øekad 26 I situ Øekad 27 rd nh?kmRrjh; izu gSA iR; d izu ea vkrfjd fodYi gSvkj iR; d izu ij 06 vd vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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.

izu 1 1/2 I gh fodYi pfu, %&

- (i) 7] 9] 21 dk PkRkFkkUKkkRkh gA 1/4 1/2
(a) 27 (b) 21 (c) 18 (d) 36
- (ii) 120° dk jfM,kUk Eka EkkUk gkXkk& 1/4 1/2
(a) $\pi/2$ (b) $\pi/3$ (c) $\pi/4$ (d) $2\pi/3$
- (iii) UkUkk/kz dk dks k gkXkk g& 1/4 1/2
(a) 60° (b) 90° (c) 120° (d) 180°
- (iv) 8 dk f}vk/kkj h Ikz kkYkh Eka EkkUk gkXkk& 1/4 1/2
(a) 100 (b) 1000 (c) 1010 (d) 1001
- (v) , d fLkDds dks mNkYkUks Ikj 'kh"lz vkUks dh Ikkf,kdRkk gkXkh& 1/4 1/2
(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 120° in radian is -
(a) $\pi/2$ (b) $\pi/3$ (c) $\pi/4$ (d) $2\pi/3$
- (iii) Angle of semi circle is -
(a) 60° (b) 90° (c) 120° (d) 180°
- (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) $\frac{1}{4}$

¼½ fjDRk LFkkukka dh IkRkZ dhft , &

- (i) 2 vj 10 dk LkEkRkj Ek/ k ----- gkxk A ¼½
- (ii) fukn kkd (-a, -b) ----- PkRkfkka Eka fLFkRk gkxkA ¼½
- (iii) $1 + \tan^2 \theta = \frac{3}{4}$ ----- gkxk A ¼½
- (iv) ?kuk ds dkjks dh Lkq, kk ----- gkRkh gA ¼½
- (v) 3] 4 , oka 5 LksEk- Hkq'kk OkYks fkhkq'k dks ----- fkhkq'k dgRks gA ¼½

(B) Fill in the Blanks -

- (i) Arithmetic means of 2 and 10 is
- (ii) Co-ordinate (-a, -b) lies on quadrant.
- (iii) Value 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.

Ikz Uk 2- $\frac{x^2+1}{x^2-1}$ vj $\frac{x+1}{x+2}$ dk ,kkkQYk KkRk djks A ¼½

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

Ikz Uk 3- $x^2 + 7x = -12$ ds EkYk KkRk dhftk, A ¼½

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

Ikz Uk 4 $\frac{\cos 51^\circ}{\sin 39^\circ}$ dk Ekkuk Kkrk dhfTk, A 1/2 1/2

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

Ikz Uk 5- $\sqrt{2}$ & $\sqrt{3}$ ds ChPk dh njih Kkrk dhfTk, A 1/2 1/2

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

Ikz Uk 6 , d YkK f«kHkq'kh,k flkz'Ek ds vk/kkj dh lkfjEkkk 30 LksEkh- vksj ÅPkkb 5 LksEkh- gS Rkks mLkdK lkk' Qz l"b Kkrk dhfTk, \ 1/2 1/2

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

Ikz Uk 7 $\triangle ABC$ Eka $DE \parallel BC$ RkFkk $AD = 3$ $DB = 5$ Lks-Ekh- $AC = 12$ LksEkh- gks Rkks AE dk Ekkuk Kkrk djks A 1/2 1/2

In $\triangle ABC$ $DE \parallel BC$, $AD = 3$ cm. $DB = 5$ cm. and $AC = 12$ cm. Find the value of AE.

Ikz Uk 8 vYxkfjFe dks lkfj Hkkf"krk dhfTk, A 1/2 1/2

Define algorithm.

Ikz Uk 9- 15 Eka Lks 40 dks ?kVkb,ks lkj d lk) frk Lks A 1/2 1/2

Subtract 15 from 45 by complement theory.

Ikz Uk 10 lkfjEksk $\frac{7x}{x^2+x-12}$ Eka Lks D,kk ?kVkb,ks Tkk,k fd lkfj .kkEk $\frac{4}{4+x}$ lkkIRk gkA 1/3 1/2

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

Ikz Uk 11 Jskh 3] 8]13] 18]----- dk dksk Lkk lkn 498 gA 1/3 1/2

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

Ikz Uk 12 ; fn $\frac{x+y}{x-y} = \frac{2}{3}$ gks rks $x : y$ dk eku Kkr djka 1/3 1/2

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

Ikz Uk 13 fLk) dhfTk, & 1/3 1/2

Prove that :

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

Ikz Uk 14 , d 'kdq dk 0, kklk 12 LksEkh- vksj ÅPkkbz 6 LkEkh- gS Rkks 'kdq dh fr, kd ÅPkkbz Kkrk dhfTk, A 1/3 1/2

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

Ikz Uk 15 Eksgjuk Uks Ñf" k fkdLk Ckd Eka 50000 : Ik, ks dk 2 Ok"z ds fyk, LkkOkf/k TkEkk fd, kka , fkn C, kkTk dh nj 10 IkfRk' rRk Okf"kd gks RkFkk C, kkTk IkfRk N% EkkG Ckn LkqkSTkRk gkRks gS Rkks Ikfj IkDokRk Ikj Ckd mLks fdRkuk /kuk nkk A 1/3 1/2

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.

Ikz Uk 16 a ds fdLk Ekkuk ds fyk, fCknq $1/4, 1/2, 3/4, 1$ & $2/3, 1/2, 1/3, 1/4$ Lkejs[k gkRks 1/4 1/2

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

1/4 fRk 1/2 (OR)

mLk f«kHkqk dk dWæd KKRk dhfTk, fTkLkds 'kh"kkz ds fUknz kka d $\frac{1}{4}$] $3\frac{1}{4}$ $\frac{1}{2}$] & $3\frac{1}{4}$ $\frac{1}{8}$] $5\frac{1}{2}$ gA

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

Ikz Uk 17 fdLkh f«kHkqk ds dks k LkEkkRkj Js kh Eka gS LkCkLks CkMs dks k dk Ekkuk 105° gS RkhUkka dks kka ds Ekkuk dk jSM, kUk Eka KKRk dhfTk, A 1/4 1/2

The angles of a triangle are in A.P. The biggest angle is 105° . Find the angles in radian.

1/4 fK0k 1/2 (OR)

, d f«kHkqk ds dks k 2%3% Eka gS A f«kHkqk ds dks kka ds Ekkuk jSM, kUk Eka KKRk dhfTk, A

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

Ikz Uk 18 $x = a \sec \theta$ RkFkk $y = b \tan \theta$ gks Rkks fLk) dhfTk, fd $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. 1/4 1/2

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

1/4 fK0k 1/2 (OR)

, kfn $x = a \cos \theta - b \sin \theta$ RkFkk $y = a \sin \theta + b \cos \theta$ gks Rkks 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 : $x^2 + y^2 = a^2 + b^2$.

Ikz Uk 19 mLk CkMs Lks CkMs 'kcdq dk vk, kRkuk KKRk dhfTk, Tkks mLk ?kUk Eka Lks dkVk Xk, kk gS fTkLkdh dkj Yk@kbbz 3 LksEk- gA 1/4 1/2

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

$\frac{1}{4}$ / Fk0kk $\frac{1}{2}$ (OR)

fdLkh XkksYks dk Ik"Bh₃ {k&kQYk 616 OkXkZ LkEkh- gks Rkks XkksYks dk vk₃krkuk Kkrk dhfTk, A

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

Ikz Uk 20-

nks Lkkekku₃ f«kHkq'kka ds {k&kQYk dk vUkqkkrk fdUgha nks Lk&krk Hkq'kkv'ka ds OkXkZ ds vUkqkkrk ds Ckj kCkj gkRks gA 1/4 1/2

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

$\frac{1}{4}$ / Fk0kk $\frac{1}{2}$ (OR)

FkY'lk lkekSk fykf [k, , Oka fLk) dhfTk, A

State and prove that Thales theorem.

Ikz Uk 21-

, d FkY'ks Eka 4 dkYkh] 5 YkkYk] RkFkk 7 LkQn Xkns gA ,kfn , d Xkn ,kknPN₃kk fukdkYkh Tkk₃ Rkks bLkdh lkkf₃kdRkk D₃kk gk&kh fd fukdkYkh XkbZ Xkn& (i) LkQn gk&kh (ii) LkQn₃kk 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.

$\frac{1}{4}$ / Fk0kk $\frac{1}{2}$ (OR)

vPNh lkdj LksQv'h XkbZ 52 Rkk' kka dh , d XkMMh Eka Lks , d Rkk' k₃ kknPN₃kk [k&kk TkkRkk g\$ Rkks fUkEuk dh lkkf₃kdRkk Kkrk dhfTk, A

(i) , d i ku dk rk'k gkA (ii) i ku ; k b& 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.

Ikz Uk 22 ,kfn $x = \frac{3ab}{a+b}$ gks Rkks fLk) dhfTk, fd $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$. 1/5 1/2

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

1/4 FkOkk 1/2 (OR)

RkhuK LkEkkuKkRkj Jf.k,kka ds n lknka dk ,kkkQYk ØEk'k% S_1, S_2, S_3 gA fTkukds lKfEk lkn 1] 2] 3 RkFk LkOkRkj ØEk'k% 1] 3] 5 gA Rkks 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

$$S_1 + S_2 + S_3 = \frac{3}{2}(3n+1)n$$
 1/5 1/2

Ikz Uk 23 ?kuk' ,kkEk dk EkYk OkRkuk lKfRkEkkg 12500 : l,ks gA RkFk Ekgykkbz HkUkk lKfRkEkkg 6300 : l,kk lKkRk djRk gSA ,kfn Okg LkEkku,k HkFk" ,k fUkF/k EkA lKfRkEkkg 2000 : -] tH vkbz, l - ea lKfRkEkkg 250 : - RkFk Hkj Rk, k TkhOkuk CkEkK lKfEk, kEk EkA lKfRkEk" kZ 69000 : - , oa Mkd?kj TkhOkuk CkEkK lKfEk, kEk lKfRkEk" kZ 10000 : - TkEkK djRk gSA mLkds }kjk nsk dYk vk, kdj KkRk dhfTk, A 1/5 1/2

Basic salary of Ghanshyam is Rs. 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 in 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.

¼/Fk0k½ (OR)

'kkfYkUkh dh Okf"kZd vk,k ¼EkdkUk fdjk,k HkRRkk NkM/dj½ 1]80]000 : Ik,ks gA ,kfn Okg LkkEkkU,k HkfOk" ,k fUkf/k Eka IkfRkOk"z 40000 : Ik,k½ LkEkng TkhdUk CkhEkk ,kksTkuUk Ek½ 250 : Ik,ks IkfRkEkkg RkFkk 5000 v)Z Okf"kZd TkhdUk CkhEkk IkfYkI h Eka fd'Rk TkEkk djRkh gA Kkrk dhfTk, fd 'kkfYkUkh dks vIkUks vk,kdj mLk fOkUkh,k Ok"z fdRkUkk vk,kdj nbkk 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.

Ikz Uk 24 f«kHkqk ΔLMN dh jPkUkk dhfTk, Tkqk; $MN = 5$ LksEkh] $\angle L = \angle 55^\circ$ vk½ L Lks MkYkk Xk,k 'kh"z YkÅk 3-5 LksEkh- gkA jPkUkk ds lkn 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.

$\frac{1}{2}$ / $\frac{1}{2}$ (OR)

, d PkØh, k PkRkØkqk $ABCD$ dh jPkUkk dhfTk, fTkLkEka $\angle ABC = 90^\circ$, $AC \frac{3}{4} 6$ LksEkh-] $AB \frac{3}{4} 3$ LksEkh-] $CD \frac{3}{4} 3.6$ LksEkh- jPkUkk ds lkn Hkh fyk [kkA

Construct a cyclic quadrilateral $ABCD$ in which $\angle ABC = 90^\circ$, $AC \frac{3}{4} 6$ cm., $AB \frac{3}{4} 3$ cm., $CD \frac{3}{4} 3.6$ cm. Write steps of construction.

Ikz Uk 25- fUkEuk Lkkj .kh Lks Ekf/,kdk Kkrk dhfTk, & $\frac{1}{5}$ / $\frac{1}{5}$

OkXkZ vRkj kYk	0&10	10&20	20&30	30&40	40&50
Ckkj Økkj 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

$\frac{1}{4}$ / $\frac{1}{2}$ (OR)

fUkEuk vkdfR cØu Lks cgyd Kkrk dhfTk, &

OkXkZ	0&10	10&20	20&30	30&40	40&50	50&60	60&70
Ckkj Økkj 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

Ikz Uk 26 , d Ok"Kz lKØkZ fIKRkk dh vk, kq lkqk dh vk, kq ds 8 XkØkh Fkh vkTk fIKRkk dh vk, kq lkqk dh vk, kq ds OkXkZ ds Ckj kCkj gØ Rkks mUkdh OkRkEkkuK vk, kq Kkrk dhfTk, \ $\frac{1}{5}$ / $\frac{1}{5}$

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.

½/Fk0kk½ (OR)

nks ØEkkXkRk LkEk Lkq ,kk,ks KkRk dhfTk, fTkUkds ØXkKz dk ,kkXk 164 gA

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

Ikz Uk 27

fLk) dhfTk, fd fdLkh LkEkCkkgqf«kHkqk dh fdLkh Hkqkk ds ØXkz ds fRkXkqkk mLkdh ÅPkkbz ds ØXkz ds Pkkj Xkqks ds Ckj kCkj gRkk gA ½/6½

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

½/Fk0kk½ (OR)

,kfn PAB ØÙk dh Nnd jsqkk gks Tkks ØÙk dks A vks B Ikj IkfRkPNn djRkh gS vks PT ,d Lik'kz jsqkk [k.M gks Rkks 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 : $PA.PB = (PT)^2$

ආචාර්ය මණ්ඩලයේ විභාග

මාදුරු 1 1/2 ජ්‍යෙෂ්ඨ පාඨමාලාවක, මාදුරු

- (i) $7^2 - 9^2$ හි වටිනාකම සොයන්න. 1/4 1/2
(a) 27
- (ii) 120° ක ඛණ්ඩාංකයේ ඛණ්ඩාංකය සොයන්න. 1/4 1/2
(d) $\frac{2\pi}{3}$
- (iii) $\sin^{-1}(\frac{1}{\sqrt{2}})$ හි අගය සොයන්න. 1/4 1/2
(b) 90°
- (iv) $8^{\log_2 1000}$ හි අගය සොයන්න. 1/4 1/2
(b) 1000
- (v) $\sin^{-1}(\frac{1}{\sqrt{2}})$ හි අගය සොයන්න. 1/4 1/2
(b) $\frac{1}{2}$

ඛණ්ඩාංකයේ ඛණ්ඩාංකය සොයන්න. $\sin^{-1}(\frac{1}{\sqrt{2}})$ හි අගය සොයන්න.

- (vi) $2 \cos^{-1}(\frac{1}{2})$ හි අගය සොයන්න. 1/4 1/2
- (vii) $\sin^{-1}(-a)$ හි අගය සොයන්න. 1/4 1/2
- (viii) $1 + \tan^2 \theta = \sec^2 \theta$ සාධන්න. 1/4 1/2
- (ix) $\sin^{-1}(\frac{1}{\sqrt{2}})$ හි අගය සොයන්න. 1/4 1/2
- (x) $3^{\log_3 4}$ හි අගය සොයන්න. 1/4 1/2

විභාග 2 විභාග 9 වැනි වැනි 2 වැනි

මාදුරු 2- $\frac{x^2 + 1}{x^2 - 1} + \frac{x + 1}{x + 2}$ 1/2 1/2

$$\begin{aligned}
&= \frac{(x^2 + 1)(x + 2) + (x + 1)(x^2 - 1)}{(x^2 - 1)(x + 2)} \\
&= \frac{x^3 + 2x^2 + x + 2 + x^3 - x + x^2 - 1}{x^3 + 2x^2 - x - 2} \\
&= \frac{2x^3 + 3x^2 + 1}{x^3 + 2x^2 - x - 2}
\end{aligned}$$

mùkj 3-

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

1/2 1/2

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

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

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

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

$$; k \text{ rks } (x + 3) = 0 ; k \text{ } (x + 4) = 0$$

$$x = -3 ; k \text{ } x = -4$$

vr%oxl l eh dseny &3] &4 gA

mùkj 4

$$\frac{\cos 51^\circ}{\sin 39^\circ}$$

1/2 1/2

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

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

$$= 1$$

mùkj 5-

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

1/2 1/2

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

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

$$= \sqrt{169}$$

$$PQ = 13 \quad \text{vr\%nkuka fclny/ka ds chp dh njh 13 l eh gA}$$

mùkj 6 Ykèk f«kHkq`kh,k flkz`Ek ds vk/kkj dh lkfjEkkik $\frac{3}{4}$ 30 LksEkh- vksj Åpkkbz $\frac{3}{4}$ 5 LksEkh-
 \therefore Ykèk f«kHkq`kh,k flkz`Ek lkk'okz lk"B $\frac{3}{4}$ vk/kkj dk ifjeki \times Åpkkbz
 $= 30 \times 5$
 $= 150$ oxZ LksEkh-

mùkj 7 FkYl i es l } 1/2 1/2

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

tgkj AD $\frac{3}{4}$ 3 l eh- fn; k gA

$$AB = AD + DB = 3 + 5 = 8 \text{ l eh-}$$

$$AE = ?$$

AC $\frac{3}{4}$ 12 LksEkh- fn; k gS

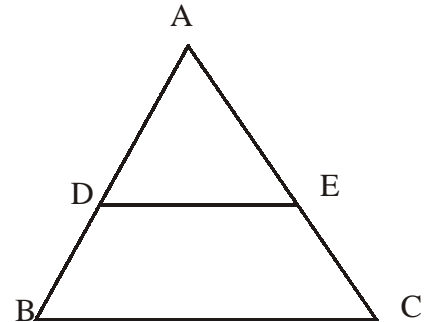
\therefore eku j [kus i j

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

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

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

$$\Rightarrow AE = 4.5 \text{ l eh-}$$



mùkj 8 vYxkfjFe ; k dyu fof/k 1/2 1/2

1/4 1/2 fdl h Hkh l eL; k dks gy djus ds fy, rkdld vuqps`kka dh Øe i) fr dks vYxkfjFe dgrs gA

1/2 1/2 fdl h l eL; k dks gy djus ds fy, fuf'pr l q; k ea funz`kka ds vuØe dks vYxkfjFe $\frac{1}{4}$ k dyu fof/k $\frac{1}{2}$ dgrs gA

mùkj 9- l keU; lk) frk lkj d lk) frk 1/2 1/2

$$\begin{array}{r} 15 \\ + 40 \\ \hline 25 \end{array}$$

i Fke pj.k 15 15 dk **9 dk ijd
 \$ 59 bl ; kx ea dkbZ gkfl y
 74 i klr ughagks`k gA vr%

f)rh; pj.k] 74 dk ij d $\frac{3}{4}$ 25

bl ea__k fplg yxkus ij okNr mRrj $\frac{3}{4}$ & 25

bl izdkj ?kVko dh ifØ; k l keku; i) fr , oaijd i) fr l siklr ifj.kke & 25
l eku iklr gkrk gA

mùkj 10 ekuk A ?kVkus ij ifj.kke $\frac{4}{4+x}$ lkkIRk gkrk gS & $\frac{1}{3}\frac{1}{2}$

$$\frac{7x}{x^2+x-12} \text{ \& A } \frac{3}{4} \frac{4}{4+x}$$

$$\frac{7x}{x^2+x-12} \text{ \& } \frac{4}{4+x} \frac{3}{4} \text{ A}$$

$$\frac{7x(4+x) - 4(x^2+x-12)}{(x^2+x-12)(4+x)} \frac{3}{4} \text{ A}$$

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

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

mùkj 11 n oka in = $T_n = a + (n - 1) d$ $\frac{1}{3}\frac{1}{2}$

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%Jskh ds 100oain dk eku 498 gkskA

mùkj 12 $\frac{x+y}{x-y} = \frac{2}{3}$ 1/3½

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

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

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

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

$$x : y = -5 : 1$$

mùkj 13 $\sec \theta - \tan \theta = \frac{1 - \sin \theta}{\cos \theta}$ 1/3½

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

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

mùkj 14 fn; k g} $2r = 12, r = 6$ 1/3½

$$\Delta BCO \text{ l } \}$$

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

$$= 6^2 + 6^2$$

$$= 36 + 36$$

$$l^2 = 72$$

$$l = 6\sqrt{2}$$

mùkj 15 fn; k g} ewy/ku $p = 50000$: lk,ks 1/3½

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

l e; $n = 2$ ok"kd ¾ 4 N%ekgh

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

$$\begin{aligned}
&= 50000 \left[1 + \frac{5}{100} \right]^4 \\
&= 50000 \left[\frac{21}{20} \right]^4 \\
&= 50000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \\
&= 60775.31 \text{ : -}
\end{aligned}$$

bl idkj ekgu dksnko"ki'pkr 60775-31 : - iklr gkskA

mùkj 16 ge tkursgsfd ; fn rhu fclnql ejs[k gsrksmul scusf=Hkqt dk {ks=Qy 'kl; gkskA

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

$$\frac{1}{2} [\{(1) \times (-2) - (a \times 4)\} + \{(a \times 16) - (-3) \times (-2)\} + \{(-3) \times (4) - (1 \times 16)\}] = 0$$

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

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

$$12a - 36 = 0$$

$$a = 3$$

¼\Fk0kk½

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

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

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

$$\text{dñnd } \frac{3}{4} \left(1, \frac{5}{3} \right)$$

mùkj 17 eku fy; k fd f=Hkqt ds dksk $(\alpha - \delta)^\circ$, α° , $(\alpha + \delta)^\circ$ gA

¼½

f=Hkqt ds rhuka dks kka 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% l cl scMk dksk 105° gA $\alpha + \delta = 105^\circ \Rightarrow 60^\circ + \delta = 105^\circ \Rightarrow \delta = 45^\circ$

l cl sNk/k dksk $(\alpha - \delta)^\circ \Rightarrow \alpha - \delta = 60^\circ - 45^\circ = 15^\circ$

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

chp dksk $= 60^\circ = \frac{\pi}{180} \times 60 = \frac{\pi}{3}$

l cl scMk dksk $= 105^\circ = \frac{\pi}{180} \times 105 = \frac{7\pi}{12}$

vHkh"V dksk $\frac{\pi}{12}$, $\frac{\pi}{3}$, oa $\frac{7\pi}{12}$ jfM; u gA

¼\Fk0k½

ekuk f=Hkqt ds dksk $\angle A$, $\angle B$ o $\angle C$ gA

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

ekuk dkbz dksk x gsrk; ge tkurs gafd $\angle A + \angle B + \angle C = 180^\circ$

$$\therefore \angle A = 2x, \angle B = 3x \text{ vkj } \angle C = 4x$$

vr% $2x + 3x + 4x = 180^\circ$

$$\Rightarrow 9x = 180^\circ$$

$$\Rightarrow x = 20^\circ$$

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

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

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

vr%f=Hkqt ds dksk 40° , 60° , 80° gsf tuds jfM; u ea 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)

¼½

I eh- (i) I s $\frac{x}{a} = \sec \theta$ RkFkk I eh- (ii) I s $\frac{y}{b} = \tan \theta$

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

$$= \sec^2 \theta - \tan^2 \theta \quad \left[\begin{array}{l} \because 1 + \tan^2 \theta = \sec^2 \theta \\ 1 = \sec^2 \theta - \tan^2 \theta \end{array} \right.$$

$$= 1$$

¼\Fk0kk½

; fn $x = a \cos \theta - b \sin \theta$ ----- ¼½

RkFkk $y = a \sin \theta + b \cos \theta$ ----- ¼½

I ehdj .k ¼½ o ¼½ dks oxL djds tkMus ij

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

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

mùkj 19

?ku I s dks V s x; s cM s I s cM s 'k d q dk vk; ru $V = \frac{1}{3} \pi r^2 h$

¼½

fn; k gñ $h = 3$ I eh-

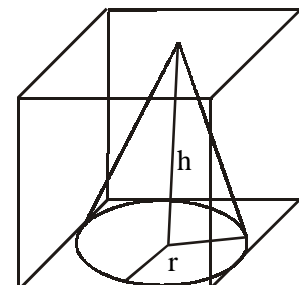
'k d q ds vk/kkj dk 0; kl = 2r = 3 I eh-

$$r = \frac{3}{2} \text{ I eh-}$$

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

$$V = \frac{9}{4} \pi \text{ ?ku I eh-} = 2.25 \pi$$

¼\Fk0kk½



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

fn; k g\$ xkys dk i "Bh; {k=Qy = 616 oxl I seh-

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

$$\Rightarrow r^2 = 7 \times 7 \Rightarrow r = 7 \text{ I seh}$$

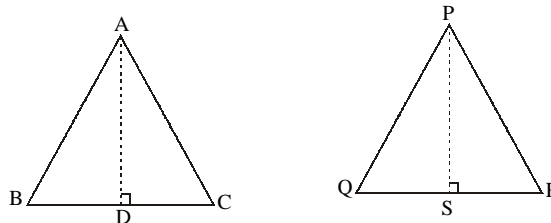
$$\begin{aligned} \therefore \text{xkys dk vk; ru} &= \frac{4}{3} \pi r^3 = \frac{4}{3} \times \pi \times (7)^3 = \frac{4}{3} \times \pi \times 7 \times 7 \times 7 \\ &= \frac{1372}{3} \pi \text{ ?ku I seh} \end{aligned}$$

mÜkj 20- i e\$ dFku %nks I e: i f=kHkq kka ds {k=kQYk dk vUkqkRk fdUgha nks LkxkRk Hkq kkvk ds OXkx ds vUkqkRk ds Ckj kCj gkBs gA 1/4 1/2

Kkr gS% nks I e: i f=Hkq ABC vk\$ PQR

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

jpuk % $AD \perp BC$ vk\$ $PS \perp QR$ [khpka



mi ifyk %

dFku	dkj .k
$\frac{\text{k=kQy } \Delta ABC}{\text{k=kQy } \Delta PQR} = \frac{\frac{1}{2} BC \times AD}{\frac{1}{2} QR \times PS}$ $\frac{\text{k=kQy } \Delta ABC}{\text{k=kQy } \Delta PQR} = \frac{BC}{QR} \times \frac{AD}{PS} \dots (i)$ <p>vc f=Hkq ADB vk\$ PSQ eh $\angle B = \angle Q$</p>	<p>I e: i Δ ds I x r dsk cjkj gA</p>

$\angle ADB = \angle PSQ$ $\triangle ADB \sim \triangle PSQ$ $\frac{AB}{PS} = \frac{AD}{PQ} \quad \dots(ii)$ <p>yfdu</p> $\frac{AB}{PQ} = \frac{BC}{QR} \quad \dots(iii)$ $\therefore \frac{AD}{PS} = \frac{BC}{QR} \quad \dots(iv)$ $\frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle PQR} = \frac{BC}{QR} \times \frac{BC}{QR} = \frac{BC^2}{QR^2}$ <p>bl idkj fl) dj l drsgdf</p> $\frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle PQR} = \frac{AB^2}{PQ^2}$ <p>vkj</p> $\frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle PQR} = \frac{AC^2}{PR^2} = \frac{AB^2}{PQ^2}$ <p>vFkkz-</p> $\frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$	<p>iR; d 90° dk gA 1/2</p> <p>AA le: irk mi ias l s</p> <p>le: i Δ dh l ar Hktk; a</p> <p>lekuj kfrd gsrh gA</p> <p>Δ ABC ~ Δ PQR</p> <p>(ii) o (iii) l s</p> <p>(i) o (iv) l s</p> <p>bfr fl) e</p>
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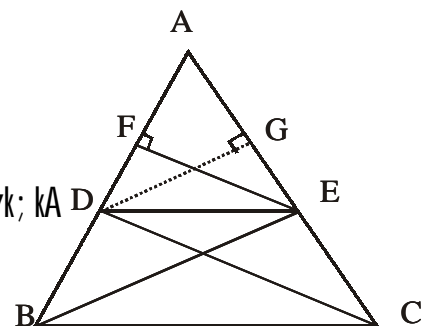
1/2 Fk0k1/2

FkYLk IkEksk & , d f=Hkt dh , d Hktk ds l ekarj [khp xbz js]kk vU; nks Hkt kvka dks ftu nks fcncq/ka ij i frPNn djrh gS os fcncq Hkt kvka dks l eku vuq kr eafokDr djrs gA

Kkr gS % Δ f=Hkt ABC ea DE||BC

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

- jpuK % (i) B dks E l s rFkk C dks D l s feyk; kA D
- (ii) $EF \perp AB$ [khp kA
- (iii) $DG \perp AE$ [khp kA



mi ifyk %

dFku	dkj . k
<p>Δ dk {ks=Qy $\frac{3}{4}$ $\frac{1}{2}$ vk/kkj \times Åpkbz</p> <p>$\frac{\Delta ADE \text{ dk } \{k\&kQy}{\Delta BDE \text{ dk } \{k\&kQy} = \frac{\frac{1}{2} AD.EF}{\frac{1}{2} BD.EF} = \frac{AD}{BD} \dots(i)$</p> <p>bl h i dkj]</p> <p>$\frac{\Delta ADE \text{ dk } \{k\&kQy}{\Delta CDE \text{ dk } \{k\&kQy} = \frac{\frac{1}{2} AE.DG}{\frac{1}{2} EC.DG} = \frac{AE}{EC} \dots(ii)$</p> <p>yfdu] $\Delta BDE \text{ dk } \{ks=Qy \frac{3}{4}$ $\Delta CDE \text{ dk } \{ks=Qy \dots(iii)$</p> <p>vr% $\frac{AD}{BD} = \frac{AE}{EC}$</p>	<p>, d gh vk/kkj vksj , d gh l ekarj j s [kkvka ds chip cus f=Hkqt dk {ks=Qy cjkcj gksrk gA</p> <p>(i), (ii), (iii) l s bfr fl) e</p>

mùkj 21- FkYks Eka xanka dh dgy l d ; k 4 \$ 5 \$ 7 $\frac{3}{4}$ 16

$$n(S) = 16$$

(i) 7 l Qn xanka ea l s dkbz , d l Qn xn fudkyh tk l drh gA

$$n(A) = 7$$

vr% LkQn xn fudkyus dh i kf; drk $P(A) = \frac{n(A)}{n(S)}$

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

(ii) LkQn ,kk dkYkh xn fudkyus dh i kf; drk

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

$$\frac{3}{4} \frac{7+4}{16} \frac{3}{4} \frac{11}{16}$$

1/2

dy I EHKkfor ?kVuk; n(S) 3/4 52

(i) i ku dk rk'k fudkyus dh ?kVuk A gks rks

$$n(A) \text{ 3/4 } 13$$

$$P(A) = \frac{n(A)}{n(S)} \text{ 3/4 } \frac{13}{52} = \frac{1}{4}$$

(ii) i ku ; k bM dk , Ddk fudkyus dh ?kVuk A gks rks

$$n(A) \text{ 3/4 } 1 + 1 = 2$$

$$P(A) = \frac{n(A)}{n(S)} \text{ 3/4 } \frac{2}{52} = \frac{1}{26}$$

mUkj 22 fn, kk gS $x = \frac{3ab}{a+b}$ gS rks $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$

1/5 1/2

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

2 dk xqkk djus ij

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

$$\frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)} \text{ ,kkkkkkkj kkkkkkk fuk, kEk Lks}$$

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

rFkk i q%

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

2 dk xqkk djus ij

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

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

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

LkEkdj . k 1/2 RkFkk 1/2 dks Tkk/Uks Ikj

$$\begin{aligned} \Rightarrow \frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} &= \frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)} \\ &= \frac{3b+a-3a-b}{b-a} \\ &= \frac{2(b-a)}{b-a} \\ &= 2 \end{aligned}$$

i Fke LkEkkkj Js kh ds fy, $a=1, d=1$

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

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

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

f}rh; LkEkkkj Js kh ds fy, $a=2, d=3$

$$S_2 = \frac{n}{2}[2 \times 2 + (n-1) \times 3]$$

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

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

r}rh; LkEkkkj Js kh ds fy, $a=3, d=5$

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

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

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

i fke] f}rh; , oa r`rh; l ekUrj Jf.k; ka dk ; ksx

$$\begin{aligned} S_1 + S_2 + S_3 &= \frac{n}{2}[n+1] + \frac{n}{2}[3n+1] + \frac{n}{2}[5n+1] \\ &= \frac{n}{2}[n+1+3n+1+5n+1] \\ &= \frac{n}{2}[9n+3] \\ &= \frac{3n}{2}[3n+1] \\ &= \frac{3}{2}(3n+1)n \end{aligned}$$

mUkj 23

?ku' ; ke dh okf"kd vk;

1/5 1/2

- 1- eny oru l svk; $12500 \times 12 \text{ ekg } \frac{3}{4} 1]50]000 : -$
- enxkbZ HkYkk l svk; $6300 \times 12 \text{ ekg } \frac{3}{4} 75600 : -$
- vr% dgy okf"kd vk; $\frac{3}{4} 2]25]600 : -$

- 2- dj ea NV ; kx; jkf'k okf"kd
- 1/a 1/2 okf"kd l keku; Hkfo"; fuf/k ea v'knku $2000 \times 12 \frac{3}{4} 24]000 : -$
- 1/b 1/2 th vkbZ , l okf"kd i hfe; e $250 \times 12 \frac{3}{4} 3]000 : -$
- 1/c 1/2 okf"kd thou chek i hfe; e $\frac{3}{4} 69]000 : -$
- 1/c 1/2 okf"kd Mkd thou chek i hfe; e $\frac{3}{4} 10]000 : -$

dj ea NW ; kx; jkf'k 1/a + b + c + d 1/2

$$24]000 \$ 3]000 \$ 69]000 \$ 10]000 \frac{3}{4} 1]06]000 : -$$

ijUrqvfk/dre NW ; kx; jkf'k 1]00]000 : - rd l hfer gA

rc dj ea NW ; kx; jkf'k $\frac{3}{4} 1]00]000 : -$

3- dj ; kx; jkf'k 2]25]600 : - & 1]00]000 : - $\frac{3}{4}$ 1]25]600 : -

4- vk; dj $\frac{3}{4}$ $\frac{1}{4}$ 1]25]600 & 1]10]000 $\frac{1}{2}$ $\frac{3}{4}$ 1]56]000 dk 10%

$$\frac{3}{4} 15,600 \times \frac{10}{100} \quad \frac{3}{4} 1560 : -$$

5- f'k{kk mi dj $\frac{3}{4}$ 1560 rd 3%

$$\frac{3}{4} 15,60 \times \frac{10}{100} \quad \frac{3}{4} 46-80 \quad \frac{3}{4} 47 : -$$

6- ns dy vk; dj $\frac{3}{4}$ 1560 \$ 47 $\frac{3}{4}$ 1607 : -

vr%?ku'; ke }kjk dy ns vk; dj $\frac{3}{4}$ 1607 : -

$\frac{1}{4}$ Fk0kk $\frac{1}{2}$

mùkj 23 'kkfyuh dh okf"kd vk;

1- dfork dh dy okf"kd vk; $\frac{3}{4}$ 1]80]000 : -

2- dj ea NV ; kx; jkf'k

$\frac{1}{4}$ okf"kd I keU; Hkfo"; fuf/k ea v'knku $\frac{3}{4}$ 40]000 : -

$\frac{1}{2}$ th vkbZ , I okf"kd i hfe; e 250×12 $\frac{3}{4}$ 3]000 : -

$\frac{1}{2}$ okf"kd thou chek i hfe; e 5000×2 $\frac{3}{4}$ 10]000 : -

dj ea NW ; kx; jkf'k $\frac{1}{4} + \frac{1}{2}$ $\frac{3}{4}$ 40]000 \$ 3]000 \$ 10]000 $\frac{3}{4}$ 53]000 : -

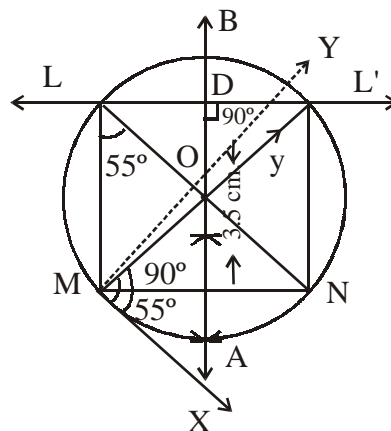
ijUrqv/kdre NW ; kx; jkf'k 1]00]000 : - rd I hfer gA

3- dj ; kx; jkf'k $\frac{3}{4}$ 1]80]000 : - & 53]000 : - $\frac{3}{4}$ 1]27]000 : -

4- vk; dj $\frac{3}{4}$ 1]27]000 : - rd dkbZ dj ughA

vr% 'kkfyuh dks dkbZ dj ughansuk i MskA

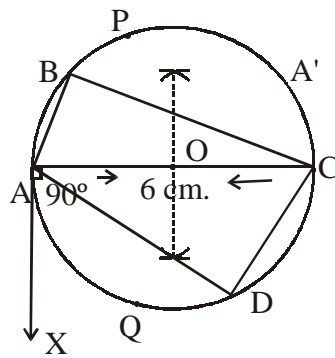
mùkj 24



jpuk dsin %&

1/2 F10k1/2

m0kj 24



jpuk ds in %&

OkXkZ vBkj kYk	0&10	10&20	20&30	30&40	40&50
Ckkj @kkj Rkk	4	8	10	11	16
I p; h ckj@jrk	4	12	22	33	49

i nka dh I d; k $N \frac{3}{4} 49$

ef/; dk I d; k $\frac{3}{4} \frac{N}{2} \frac{3}{4} 24.5$

tksfd I p; h ckj@jrk 33 ds vrxr vkrk gA

ef/; dk oxl 30&40

ef/; dk oxl dh fuEu I hek $\frac{3}{4} 30$

ef/; dk oxl dh mPp I hek $\frac{3}{4} 40$

ef/; dk oxl dh vkofRr $\frac{3}{4} 11$

ef/; dk oxl ds Bhd i gys dh I p; h vkofRr $\frac{3}{4} 22$

ef/; dk $\frac{3}{4} L_1 + \frac{(m-c)(L_2-L_1)}{f}$

$$\frac{3}{4} 30 + \frac{(24.5-22)(40-30)}{11} = 30 + \frac{2.5 \times 10}{11}$$

$$\frac{3}{4} 30 + \frac{25}{11} = 30 + 2.27$$

ef/; dk $\frac{3}{4} 32.27$

1/4vFk0kk1/2

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

I kj.kh I sLi "V gSfd I cl svf/kd ckjæjrk 37 gS tks oxL 30&40 dh gA
vr%cgyd oxL 30&40

cgyd oxL dh fuEu I hek $\frac{3}{4}$ 30

cgyd oxL dh mPp I hek $\frac{3}{4}$ 40

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

cgyd oxL dh fuEu I hek

$$\frac{3}{4} L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} (L_2 - L_1)$$

$$\frac{3}{4} 30 + \frac{37 - 21}{2 \times 37 - 21 - 31} (40 - 30) = 30 + \frac{16}{74 - 52} \times 10$$

$$\frac{3}{4} 30 + \frac{160}{22} = 30 + \frac{80}{11} = 30 + 7.27$$

$$\frac{3}{4} 37.27$$

mÜkj 26 ekuk fIKRkk dh orëku vk,kq x o"kZ vk\$ Ikqk dh orëku vk,kq y o"kZ gSgA $\frac{1}{6}\frac{1}{2}$

1 o"kZ iWZ fir k dh vk; q $\frac{3}{4}$ (x - 1) o"kZ

1 o"kZ iWZ iE dh vk; q $\frac{3}{4}$ (y - 1) o"kZ

iz ukud kj] iEke 'krZl }\$

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

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

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

$$x - 8y = -7$$

$$x = 8y - 7 \quad \dots\dots\dots(i)$$

f)rh; 'krZl s

$$x = y^2 \quad \dots\dots(ii)$$

I eh- (i) l s x dk eku j [kus i j

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

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

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

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

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

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

$$\Rightarrow y = 1^2 ; k y = 7^2 \quad \Rightarrow y = \pm 1 ; k y = \pm 7$$

D; kfd fi rk] i e dh vk; qcjkj ughagks l drh vr%fi rk dh vk; q49 o"lz vkj
i e dh vk; q7 o"lz gA

1/2 Fk0k1/2

eku igyh l e l [; k x, nll jh Øekxr l e l [; k (x + 2) gA

i / ukuq kj $x^2 + (x + 2)^2 = 164$

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

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

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

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

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

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

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

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

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

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

x dk eku __. kRed ugha gks l drkj vr% x = 8

$$\therefore \text{nr} \text{ jh dckxr l } \bar{d}; k, \text{ ags } (x + 2) = 8 + 2 = 10$$

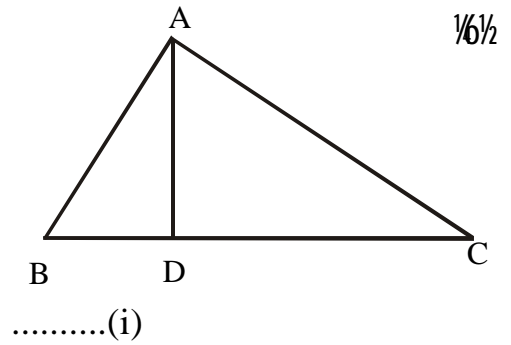
vr% vHkh"V l \bar{d}; k, j 8, 10 gkxhA

mÙkj 27 fn; k gS % LkEkCkkgq f«kHkqk ΔABC gA

$$\text{fl) djuk gS: } 3BC^2 = 4AD^2$$

mi iFRr % ΔABC ea $AB = BC = AC$

$$\text{vkj } AD \perp BC, BD = CD = \frac{BC}{2}$$



l edksk f«kHkqk ΔABD ea ikbFkkxkj l iEs l s

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

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

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

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

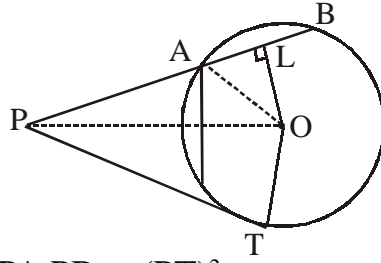
$$\Rightarrow BC^2 - \frac{BC^2}{4} = AD^2$$

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

$$\Rightarrow 3BC^2 = 4AD^2 \quad \text{fl) gqkA}$$

¼\Fk0kk½

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



$$\text{fi) djuk gS \% } PA \cdot PB = (PT)^2$$

jpuk % $OL \perp AB$ [knpk A OA, OP vksj OT dks feyk; k

$$\begin{aligned} \text{mi i fRr \% } PA \cdot PB &= (PL - AL)(PL + LB) \\ &= (PL - AL)(PL + AL) \quad (\because AL = LB) \\ &= PL^2 - AL^2 \\ &= (OP^2 - OL^2) - AL^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{I edksk } \Delta PLO \text{ ea } OP^2 &= OL^2 - PL^2 \\ &= OP^2 - OL^2 - AL^2 \\ &= OP^2 - (OL^2 + AL^2) \\ &= OP^2 - OA^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{I edksk } \Delta ALO \text{ ea } OA^2 &= OL^2 - AL^2 \\ &= OP^2 - OT^2 \\ &= PT^2 \end{aligned}$$

$$\therefore \text{I edksk } \Delta PTO \text{ ea } OP^2 = PT^2 - OP^2.$$

$$PA \cdot PB = PT^2$$

Set - B

gkbz Ldwy I fv/QdV i jh{k
High School Certificate Examination
I fiy&i zu i =
SAMPLE PAPER

fo"t; % (Subject) - xf.kr (Mathematics)
d{k % (Class) - nl oha (X)

I e; 3 ?k.Vk (Time- 3 Hrs)
i vkbd 100 (M.M.)

(Instruction) & fun?kz

- 1- I Hkh itu gy djuk vfuok; zgSA
Attempt all the Question
- 2- itu Øekad 01 ea 10 vð fu/kkZjr gSA nks dky [k.M gSA [k.M ^v** ea 05 cgfodYih; itu rFkk [k.M ^c** ea 05 fjDr LFkkuka dh i firZ vFkok mfpr I cak tkfM, A iR; d itu dsfy, 1 vð vkcfVr gSA
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- itu Øekad 02 I situ Øekad 09 rd vfr y?kqRrjh; itu gSA iR; d itu ij 02 vð vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- itu Øekad 10 I situ Øekad 15 rd y?kqRrjh; itu gSA iR; d itu ij 03 vð vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 50 'kCn A
Q. No. 10 to 15 are short answer type question & it carries 03 marks each. Word limit is maximum 50.
- 5- itu Øekad 16 I situ Øekad 21 rd y?kqRrjh; itu gSA iR; d itu ea vkrfjd fodYi gsvkj iR; d itu ij 04 vð vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- izu Øekad 22 Is izu Øekad 25 rd nh?kmRrjh; izu gSA iR; d izu ea vkrfjd fodYi gSvkj iR; d izu ij 05 vd vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- izu Øekad 26 Is izu Øekad 27 rd nh?kmRrjh; izu gSA iR; d izu ea vkrfjd fodYi gSvkj iR; d izu ij 06 vd vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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.

izu 1 1/2 I gh fodYi pfu, %&

- (i) 5 vksj 10 dk RkRkh₃k vUkMkRkh gkXkk& 1/4 1/2
(a) 15 (b) 20 (c) 25 (d) 30
- (ii) $\frac{\pi}{3}$ dk vdk Eka Ekkik gkXkk & 1/4 1/2
(a) 45° (b) 60° (c) 75° (d) 120°
- (iii) PkØh₃k PkRkØk₃k ds LkEEk₃k dks kka dk ₃kXk gkRkk g& 1/4 1/2
(a) 90° (b) 120° (c) 180° (d) 360°
- (iv) 0-125 dk f}vk/kkj h lk.kYkh Eka EkkUk gkXkk & 1/4 1/2
(a) 0.01 (b) 0.101 (c) 0.001 (d) 0.111
- (v) vdk 7]8]8]7]9]8]10] dk CkgYkd gkXkk & 1/4 1/2
(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) 45° (b) 60° (c) 75° (d) 120°
- (iii) Sum of opposite angle of cyclic quadrilateral is -
(a) 90° (b) 120° (c) 180° (d) 360°
- (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

1/2 f]DRk LFkkkka dh lkrkz dhfTk,ks

- (i) 1] 4]7] 10 dk lknkRkj &&&& gA 1/4 1/2
- (ii) fCknq 1/4]0]1/2&&&&&&& v{k lkj fLFkrk gkxkA 1/4 1/2
- (iii) $\tan(90 - \theta)$ &&&&&&&&&&&&&gkRkk gA 1/4 1/2
- (iv) ?kukkhk Eka &&&& QYkd gkRks gA 1/4 1/2
- (v) 4 Ekh- HkqTk OkYks Okkz ds fkd .kz dh YkEckbz &&&&&& gkxkA 1/4 1/2

(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.

lkz Uk 2 lkj Eqs k 0, kqkd $\frac{x+1}{x-2}$ RkFkk $\frac{x-1}{x-2}$ dk vRkj Kkrk dhfTk,ks 1/2 1/2

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

lkz Uk 3 Okkz LkEhdj .k $3x^2 - 5x + 2 = 0$ ds Ekwk Kkrk dhfTk,ks 1/2 1/2

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

lkz Uk 4 $\frac{\sin 15^\circ}{\cos 75^\circ}$ dk Ekkuk Kkrk dhfTk,ks \ 1/2 1/2

Find the value of $\frac{\sin 15^\circ}{\cos 75^\circ}$

Ikz Uk 5 fckmq (-3, 4) vksj (2, 3) ds CkhPk njjh Kkrk dhfTk,ks \ 1/2 1/2

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

Ikz Uk 06 fdLkh Ckykuk dh Apkkbz 20 LkEkh RkFkk mLkdh f«kT,kk 7 LkEkh gS Rkks mLkdh kØIk" B Kkrk dhfTk,ks \ 1/2 1/2

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

Ikz Uk 7 f«kHkqk ABC Eka AB = 8 LkEkh AP = 4 LkEkh AQ = 3 LkEkh RkFkk AC = 9 LkEkh gks Rkks Ckrkkb,ks PQ||BC gk«kk,kk Ugha \ 1/2 1/2

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

Ikz Uk 8 vYXkksj FkEk dh dkbz Pkkj f«k' k«kRkk,ka fYkf [k,ks \ 1/2 1/2

Write four characteristics of algorithm.

Ikz Uk 9 Lk«kk 110011 vksj 011101 Lks f) vk/kkj h Ikz kYkh Ik) fRk Lks Tkk«M,ka \ 1/2 1/2

Find the sum of two binary number 110011 and 011101.

Ikz Uk 10 nks Lk«kkvka dk vUk«kRk 3% g« ,fn IkR,ksd Lk«kk Eka 8 ?kV/fn,kk Tkk,ks Rkks vuq kr 2% gks TkkRk gS A Rkks Lk«kk,ka Kkrk dhfTk,ks \ 1/3 1/2

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.

Ikz Uk 11 kXkz LkEkhdj .k CkUkkb,ks fTkUkds Ek«k ØEk' k% $3 + \sqrt{3}$ 0 $3 - \sqrt{3}$ gks \ 1/3 1/2

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

Q12. If a, b, c are in continued proportion then prove that 1/3½

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

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

Q13. Mohan deposit Rs. 50000 in Krishi Vikas Bank for 2 year in fixed deposit account. If the rate of interest is 10% p.a., then calculate the maturity amount if the interest is compounded half yearly. 1/3½

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

Q14. Prove that $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \cdot \sin^2 \theta$ 1/3½

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

Q15. The ratio of volume of two sphere is 1 : 8 then find the ratio of their radius. 1/3½

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

Q16. For what value of a , the point $(1, 4), (a - 2)$ and $(-3, 16)$ will be collinear. 1/4½

For what value of a , the point $(1, 4), (a - 2)$ and $(-3, 16)$ will be collinear.

(OR)

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

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

Ikz Uk 17

fdLkh fckHkqk ds dks k LkEkkRkj Js kh Eka gS LkCkLks CkMs dks k dk Ekkuk 105° gS RkhUkka dks kka ds Ekkuk dk jSM, kUk Eka KkRk dhfTk, A 1/4 1/2

The angles of a triangle are in A.P. The biggest angle is 105° . Find the angles in radian.

1/4 Fk0k1/2 (OR)

, d fckHkqk ds dks k 2%3% Eka gS A fckHkqk ds dks kka ds Ekkuk jSM, kUk Eka KkRk dhfTk, A

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

Ikz Uk 18

$x = a \sec \theta$ RkFkk $y = b \tan \theta$ gks Rkks fLk) dhfTk, fd $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. 1/4 1/2

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

1/4 Fk0k1/2 (OR)

, kfn $x = a \cos \theta - b \sin \theta$ RkFkk $y = a \sin \theta + b \cos \theta$ gks Rkks 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 : $x^2 + y^2 = a^2 + b^2$.

Ikz Uk 19

mLk CkMs Lks CkMs 'k d q dk vk, kRkUk KkRk dhfTk, Tkks mLk ?kUk Eka Lks dkVk Xk, k k gS fTkLkdh dkj Yk0k kbZ 3 LksEkh- gS 1/4 1/2

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

1/4 Fk0k1/2 (OR)

fdLkh XkksYks dk Ik" Bk, k {k0k QYk 616 0kXkZ LkEkh- gks Rkks XkksYks dk vk, kRkUk KkRk

Q.22 If $x = \frac{3ab}{a+b}$, prove that $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$. 1/5½

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

OR

Q.23 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

$$S_1 + S_2 + S_3 = \frac{3}{2}(3n+1)n \quad \text{1/5½}$$

Q.24 Basic salary of Ghanshyam is Rs. 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 in 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? 1/5½

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.

¼/FkOkk½

'kkfYkUkh dh Okkf"kd vlk, k ½EkdkUk fdjk, kk HkRRkk NkMdj½ 1]80]000 : Ik, ks gA, kfn Okg LkkEkkU, k HkfOk" k fUkf/k Eka IkfRkOk" k 40000 : Ik, k½ LkEkUg TkOkUk CkhEkk, kksTkUkk Ek½ 250 : Ik, ks IkfRkEkkg RkFkk 5000 v) Z Okkf"kd TkOkUk CkhEkk IkfYkI h Eka fd' Rk TkEkk djRkh gA Kkrk dhfTk, fd 'kkfYkUkh dks vlkUks vlk, kdj mLk fokUkh, k Ok" k fdkUkk vlk, kdj nbkk 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.

Ikz Uk 24

f«kHkqk $\triangle LMN$ dh jPkUkk dhfTk, Tgk; $MN = 5$ LksEkh- $\angle L = \angle 55^\circ$ vlk; L Lks MkYkk Xk, kk 'kh" kZ YkGk 3-5 LksEkh- gkA jPkUkk ds lkn 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.

¼/FkOkk½ (OR)

, d PkØh, k Pkrkqkqk $ABCD$ dh jPkUkk dhfTk, fTkLkEka $\angle ABC = 90^\circ$ vdk AC ¾ 6 LksEkh-] AB ¾ 3 LksEkh- CD ¾ 3-6 LksEkh- jPkUkk ds lkn 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.

Q.25- Find the median of the following table :

1/5/2

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

Find the median of the following table :

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

1/4/Fk0k1/2 (OR)

Q.26- 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

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

Q.26- A man's age is 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages.

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.

1/4/Fk0k1/2 (OR)

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

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

Q.27- A man's age is 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages.

आपको इस प्रश्न को हल करने के लिए गणना करना है

1/6 1/2

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

1/4 (OR)

यदि PAB एक वृत्त के अंदर से गुजरने वाली एक जीवा है जो A और B पर वृत्त को काटती है, और PT एक स्पर्श रेखा है जो वृत्त को T पर स्पर्श करती है, तो $PA \cdot PB = (PT)^2$ दिखाएं।

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 : $PA \cdot PB = (PT)^2$

EkkMYk mÙkj I 1/2

Ikz Uk 1 1/2 Lkgh fùkdYIk mÙkj

- (i) 20
- (ii) 60^0
- (iii) 180^0
- (iv) 0-001
- (v) 8

1/2 fj DRk LFKkUkka dh IkRkZ dhFTk, kA

- (i) 3]
- (ii) $x - \sqrt{k}$ lkj
- (iii) $\cot \theta$
- (iv) 6 QYkd
- (v) $4\sqrt{2}$ Ekh

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

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

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

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

mÙkj 3- $3x^2 - 5x + 2 = 0$ 1/2

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

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

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

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

$$; k \text{ rks } (3x-2)=0 ; k \text{ } (x-1)=0$$

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

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

mùkj 4 $\frac{\sin 15^\circ}{\cos 75^\circ}$ 1/2 1/2

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

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

$$= 1$$

mùkj 5- fclnq 1/2 & 3] 4 1/2 vks 1/2] 3 1/2 ds chp dh njh 1/2 1/2

$$l = \text{fclnq}(x_1, y_1) \text{ vks } (x_2, y_2) \text{ ds chp dh njh}$$

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

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

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

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

$$= \sqrt{25 + 1}$$

$$= \sqrt{26}$$

mùkj 6 nRr h 3/4 20 LksEkh-

$$r \text{ } 3/4 \text{ } 7 \text{ LksEkh-}$$

$$c \text{ } 3/4 \text{ } \setminus$$

$$\begin{aligned}
 \text{cylindrical surface area } c &= 2\pi rh \\
 &= 2 \times \frac{22}{7} \times 7 \times 20 \\
 &= 44 \times 20 \\
 &= 880 \text{ sq. cm}
 \end{aligned}$$

mũkj 7

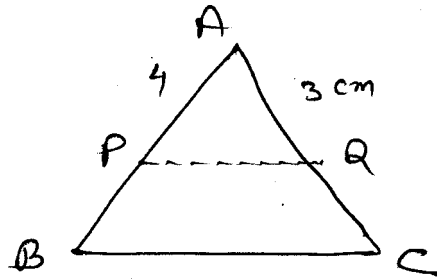
$\triangle ABC$ eũ

$AB = 8$ | eũ

$AP = 4$ | eũ

$AQ = 3$ | eũ

$AC = 9$ | eũ



1/2 1/2

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

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

I eũ (i) vũũ (ii) | sLi "V gũfd $\frac{AP}{AB} \neq \frac{AQ}{AC}$

$\therefore PQ \neq BC$

mũkj 8

vYxũfjFe dh fo' kũkrk, a

1/2 1/2

1/4 1/2 i fũferrk

1/2 1/2 fuf' prrk

1/8 1/2 fuoũk

1/4 1/2 i Hũko' kũyrk

mũkj 9-

$$\begin{array}{r}
 110011 \\
 \$ 011101 \\
 \hline
 1010000
 \end{array}$$

1/2 1/2

mùkj 10

ekuk l d; k, a 3x o 4x gS &

1/3 1/2

iR; cl ea 8 ?kVkus ij vuq kr 2 % 3 gks tkrk gS

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

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

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

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

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

; k $x = 8$

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

vr% l d; k 24 o 32 gks xh

mùkj 11

oxZl ehdj.k ds eny α, β gks rks

1/3 1/2

oxZl ehdj.k $x^2 - (\alpha + \beta)x + \alpha\beta = 0$

izukuq kj $\alpha \frac{3}{4} 3 + \sqrt{3}$

$\beta \frac{3}{4} 3 - \sqrt{3}$

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

$= 6$

$\alpha \beta \frac{3}{4} (3 + \sqrt{3})(3 - \sqrt{3})$

$= 9 - 3$

$\therefore (a + b)(a - b) = a^2 - b^2$

$= 6$

vr% oxZl ehdj.k

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

mùkj 12 a, b, c forrkujkr eãgš

1/3½

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

$\Rightarrow b = ck \quad \dots\dots (i)$

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

$$\begin{aligned} \text{L.H.S.} &= \frac{a^2 + ab + b^2}{b^2 + bc + c^2} \\ &= \frac{(ck^2)^2 + ck^2 \cdot ck + (ck)^2}{(ck)^2 + ck \cdot c + c^2} && \text{I eh- (i) \& (ii) I s} \\ &= \frac{c^2k^4 + c^2k^3 + c^2k^2}{c^2k^2 + c^2k + c^2} \\ &= \frac{c^2k^2(k^2 + k + 1)}{c^2(k^2 + k + 1)} = k^2 \quad \dots\dots (iii) \end{aligned}$$

$$\begin{aligned} \text{R.H.S.} &= \frac{a}{c} = \frac{ck^2}{c} && \text{I eh- (ii) I s} \\ &= k^2 \quad \dots\dots (iv) \end{aligned}$$

I eh- (iii) rFkk (iv) I s

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

mùkj 13 fn; k gš eyy/ku $p = 50000$: lk,ks

1/3½

C; kt dh nj $r = 10$ ifr'kr okf"kd ¾ 5 ifr'kr N%ekgh ; k v) bkr"kd
I e; $n = 2$ Ok"kd ¾ 4 N%ekgh

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

$$\begin{aligned}
&= 50000 \left[1 + \frac{5}{100} \right]^4 = 50000 \left[1 + \frac{1}{20} \right]^4 \\
&= 50000 \left[\frac{21}{20} \right]^4 \\
&= 50000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \\
&= 60775.31 \quad \therefore
\end{aligned}$$

bl idkj ekgu dks nks o'kzi' pkr 60775.31 : - iklr gkskA

mUkj 14 L.H.S. = $\tan^2 \theta - \sin^2 \theta$ 1/3 1/2

$$\begin{aligned}
&= \frac{\sin^2 \theta}{\cos^2 \theta} - \sin^2 \theta \\
&= \frac{\sin^2 \theta - \sin^2 \theta \cos^2 \theta}{\cos^2 \theta} \\
&= \frac{\sin^2 \theta (1 - \cos^2 \theta)}{\cos^2 \theta} \\
&= \frac{\sin^2 \theta \sin^2 \theta}{\cos^2 \theta} \\
&= \frac{\sin^2 \theta}{\cos^2 \theta} \sin^2 \theta \\
&= \tan^2 \theta \cdot \sin^2 \theta \quad \text{R.H.S.}
\end{aligned}$$

mUkj 15 ekuk nks xksys dh f=T; k; ao vk; ru Øe'k% 1/3 1/2

$$r_1, v_1 \text{ o } r_2, v_2 \text{ gA}$$

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

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

$$\frac{\frac{4}{3} \pi r_1^3}{\frac{4}{3} \pi r_2^3} = \frac{1}{8}$$

$$\therefore v = \frac{4}{3} \pi r^3$$

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

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

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

vr% mudh f=T; kvka ea 1 % 2 dk vuq kr gkskA

mUkj 16 I # % fclnq $(x_1, y_1), (x_2, y_2)$ vkj (x_3, y_3)

I ej[k gks dk ifrcdk

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

vr% fclnq $16\frac{1}{2}$ $4\frac{1}{2}$ a & $2\frac{1}{2}$ vkj $16\frac{1}{2}$ I ej[k gks ; fn

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

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

$$\Rightarrow -18 + 12a - 18 = 0$$

$$\Rightarrow 12a - 36 = 0$$

$$\Rightarrow a = 3$$

vr% fclnq

mUkj 16 ABC, d Δ gsfTI ds 'kh'kk' ds fun'kk' Øe'kk' $(x_1, y_1) = (4, 3), (x_2, y_2) = (2, -3), (x_3, y_3) = (-3, 5)$,

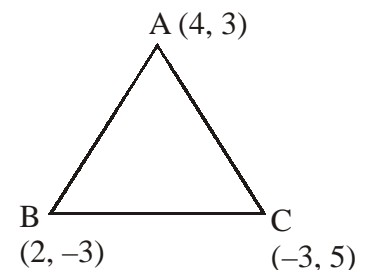
$$f=Hkqt dk d'nd (h, k) = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$$

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

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

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

d'nd $\left(1, \frac{5}{3}\right)$ gkskA



mùkj 17 eku fy; k fd f=Hkqt ds dksk $(\alpha - \delta)^\circ$, α° , $(\alpha + \delta)^\circ$ gA

¼½

f=Hkqt ds rhuka dks kka 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% l cl scMk dksk 105° gA $\alpha + \delta = 105^\circ \Rightarrow 60^\circ + \delta = 105^\circ \Rightarrow \delta = 45^\circ$

l cl sNk/k dksk $(\alpha - \delta)^\circ \Rightarrow \alpha - \delta = 60^\circ - 45^\circ = 15^\circ$

$$15^\circ = \frac{\pi}{180} \times 15 = \frac{\pi}{12} \text{ jSM; u}$$

chp dksk $\alpha = 60^\circ = \frac{\pi}{180} \times 60 = \frac{\pi}{3} \text{ jSM; u}$

l cl scMk dksk $\alpha + \delta = 105^\circ = \frac{\pi}{180} \times 105 = \frac{7\pi}{12} \text{ jSM; u}$

f=Hkqt ds vHkh"V dksk $\frac{\pi}{12}$, $\frac{\pi}{3}$, oa $\frac{7\pi}{12} \text{ jSM; u}$ gkA

¼\Fk0k½

ekuk f=Hkqt ABC ds dksk $\angle A$, $\angle B$ o $\angle C$ gA

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

ekuk dkbz dksk x gsrk ge tkurs gafd $\angle A + \angle B + \angle C = 180^\circ$

$$\therefore \angle A = 2x, \angle B = 3x \text{ vkj } \angle C = 4x$$

vr% $2x + 3x + 4x = 180^\circ$

$$\Rightarrow 9x = 180^\circ$$

$$\Rightarrow x = 20^\circ$$

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

$$\angle B = 3x = 3 \times 20^\circ = 60^\circ = 60^\circ \times \frac{\pi}{180} = \frac{\pi}{3} \text{ jSM; u}$$

$$\angle C = 4x = 4 \times 20^\circ = 80^\circ = 80^\circ \times \frac{\pi}{180} = \frac{4\pi}{18} \text{ jSM; u}$$

vr%f=Hkqt ds dksk 40° , 60° , 80° gsf tuds jSM; u ea eku Øe'k% $\frac{2\pi}{9}$, $\frac{\pi}{3}$, $\frac{4\pi}{18}$ gA

mùkj 18

$$x = a \sec \theta \quad \text{RkFkk} \quad y = b \tan \theta$$

¼1½

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

I eh- (i) o (ii) dk oxL djds (i) I s(ii) dks ?kVkus i j

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

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

¼\Fk0k½

$$\text{ekuk} \quad x = a \cos \theta - b \sin \theta \quad \dots\dots\dots \quad \frac{1}{4}1\frac{1}{2}$$

$$\text{RkFkk} \quad y = a \sin \theta + b \cos \theta \quad \dots\dots\dots \quad \frac{1}{2}2\frac{1}{2}$$

I ehdj .k ¼1½ o ¼2½ dks oxL djds t kM us i j

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

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

mùkj 19

$$\text{?ku I s dkVs } x; \text{ sCMs I sCMs 'k} \text{dq dk vk; ru } V = \frac{1}{3} \pi r^2 h$$

¼4½

$$\text{fn; k g} \quad h = 3 \text{ I eh}$$

$$\text{'k} \text{dq ds vk/kkj dk } 0; \text{ kl } = 2r = 3 \text{ I eh}$$

$$r = \frac{3}{2} \text{ I eh}$$

$$\text{eku j [kus i j]} \quad V = \frac{1}{3} \pi \left(\frac{3}{2} \right)^2 \cdot 3 = \frac{9}{4} \pi$$

$$V = 2.25 \pi \text{ ?ku I eh}$$

1/2 Fk0k1/2

ekuk xkys dh f=T; k = r

fn; k g} xkys dk i "Bh; {k=Qy = 616 oxZ I seh

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

$$\Rightarrow r^2 = 7 \times 7 \Rightarrow r = 7 \text{ I seh}$$

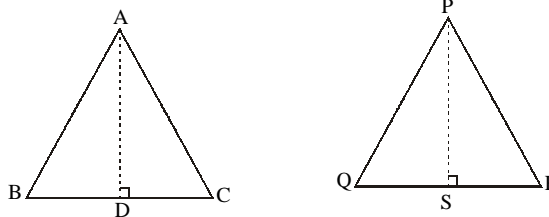
$$\begin{aligned} \therefore \text{xkys dk vk; ru} &= \frac{4}{3} \pi r^3 = \frac{4}{3} \times \pi \times (7)^3 = \frac{4}{3} \times \pi \times 7 \times 7 \times 7 \\ &= \frac{1372}{3} \pi \text{ ?ku I seh} \end{aligned}$$

mÜkj 20- i eš dFku %nks I e: i f«kHkq kka ds {k«kQYk dk vUkqkRk fdUgha nks Lk«kRk Hkq kkvk«ds OXk«k« ds vUkqkRk ds Ckj kCkj gkRks gA 1/4 1/2

Kkr gS% nks I e: i f=Hkqt ABC vkj PQR

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

jpuk % AD ⊥ BC vkj PS ⊥ QR [khp kA



mi ifYk %

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

<p>vc f=Hkqt ADB vksj PSQ eh</p> $\angle B = \angle Q$ $\angle ADB = \angle PSQ = 90^\circ$ $\Delta ADB \sim \Delta PSQ$ $\frac{AD}{PS} = \frac{AB}{PQ} \quad \dots(ii)$ <p>yfdu $\frac{AB}{PQ} = \frac{BC}{QR}$ $\dots(iii)$</p> $\therefore \frac{AD}{PS} = \frac{BC}{QR} \quad \dots(iv)$ $\frac{\text{Ar of } \Delta ABC}{\text{Ar of } \Delta PQR} = \frac{BC}{QR} \times \frac{BC}{QR} = \frac{BC^2}{QR^2}$ <p>bl idkj fl) dj l drsgifd</p> $\frac{\text{Ar of } \Delta ABC}{\text{Ar of } \Delta PQR} = \frac{AB^2}{PQ^2}$ <p>vksj $\frac{\text{Ar of } \Delta ABC}{\text{Ar of } \Delta PQR} = \frac{AC^2}{PR^2}$</p> <p>vFkkz~</p> $\frac{\text{Ar of } \Delta ABC}{\text{Ar of } \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$	<p>le: i Δ dsl ær dksk cjkckj gA iR; d 90° dk gA $\frac{1}{2}$ l s $\frac{1}{2}$ AA le: irk mi iæs l s</p> <p>le: i Δ dh l ær Hkqt k; a l ekuj kfrd gsrh gA</p> $\Delta ABC \sim \Delta PQR$ <p>(ii) o (iii) l s</p> <p>(i) o (iv) l s</p> <p>bfr fl) e</p>
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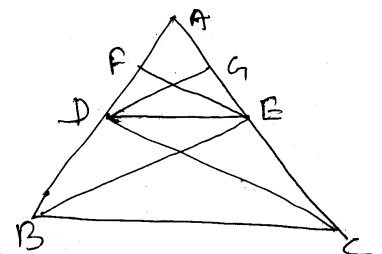
1/2 Fk0kk1/2

FkYLk HkEksk & , d f=Hkqt dh , d Hkqt k ds l ekarj [khp xbz js]kk vU; nks Hkqt kvka dks ftu nksfcanyka i j i frPNn djrh gSofcanyHkqt kvka dks l eku vuq kr eafHkDr djrs gA

Kkr gS% ΔABC ea $DE \parallel BC$

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

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



(ii) $EF \perp AB$ [khpka]

(iii) $DG \perp AE$ [khpka]

mi ifyk %

dfku	dkj . k
<p>Δ dk {ks=Qy $\frac{3}{4}$ $\frac{1}{2}$ vk/kkj \times Äpkbz</p> <p>$\frac{\Delta ADE \text{ dk } \{k\&kQy}{\Delta BDE \text{ dk } \{k\&kQy} = \frac{\frac{1}{2} AD.EF}{\frac{1}{2} BD.EF} = \frac{AD}{BD} \dots(i)$</p> <p>bl h i dkj]</p> <p>$\frac{\Delta ADE \text{ dk } \{k\&kQy}{\Delta CDE \text{ dk } \{k\&kQy} = \frac{\frac{1}{2} AE.DG}{\frac{1}{2} EC.DG} = \frac{AE}{EC} \dots(ii)$</p> <p>yfdu] $\Delta BDE \text{ dk } \{ks=Qy \frac{3}{4}$ $\Delta CDE \text{ dk } \{ks=Qy \dots(iii)$</p> <p>vr% $\frac{AD}{BD} = \frac{AE}{EC}$</p>	<p>, d gh vk/kkj vksj , d gh l ekarj j s [kkvka ds chip cus f=Hkqt dk {ks=Qy cjkcj gksrk gA</p> <p>(i), (ii), (iii) l s bfr fl) e</p>

mÜkj 21- FkYks Eka xanka dh dgy l d ; k 4 \$ 5 \$ 7 $\frac{3}{4}$ 16

$n(S) = 16$

(i) 7 l Qn xanka ea l s d kbz , d l Qn xn fudkyh tk l drh gA

$n(A) = 7$

vr% LkQn xn fudkyus dh i kf; drk $P(A) = \frac{n(A)}{n(S)}$

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

(ii) LkQn ,kk dkYkh xn fudkyus dh i kf; drk

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

$$\frac{7+4}{16} = \frac{11}{16}$$

1/16

dy I EHKkfor ?kVuk; n(S) = 52

(i) i ku dk rk'k fudkyus dh ?kVuk A gks rks

$$n(A) = 13$$

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

(ii) i ku ; k bM dk , Ddk fudkyus dh ?kVuk A gks rks

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

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

mùkj 22 fn, kk gS $x = \frac{3ab}{a+b}$ gks rks $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$

1/5

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

2 dk xqkk djus ij

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

$$\frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)} = \dots \text{fuk, kEk Lks}$$

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

rFkk i q%

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

2 dk xqkk djus ij

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

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

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

LkEkdj . k 1/2 RkFkk 1/2 dks Tkk/UKs lkj

$$\begin{aligned} \Rightarrow \frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} &= \frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)} \\ &= \frac{3b+a-3a-b}{b-a} \\ &= \frac{2(b-a)}{b-a} \\ &= 2 \end{aligned}$$

i Fke LkEkkukkkkj Jskh ds fy, $a=1, d=1$

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

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

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

f}rh; LkEkkukkkkj Jskh ds fy, $a=2, d=3$

$$S_2 = \frac{n}{2}[2 \times 2 + (n-1) \times 3]$$

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

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

r`rh; LkEkkkkkjk Jskh ds fy, $a=3, d=5$

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

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

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

i fke] f}rh; , oa r`rh; I ekUrj Jf.k; ka dk ; ksx

$$\begin{aligned} S_1 + S_2 + S_3 &= \frac{n}{2}[n+1] + \frac{n}{2}[3n+1] + \frac{n}{2}[5n+1] \\ &= \frac{n}{2}[n+1+3n+1+5n+1] \\ &= \frac{n}{2}[9n+3] \\ &= \frac{3n}{2}[3n+1] \\ &= \frac{3}{2}(3n+1)n \end{aligned}$$

- mUkj 23 ?ku' ; ke dh okf"kd vk; 1/5 1/2
- 1- eny oru I svk; 12500×12 ekg $\frac{3}{4}$ 1]50]000 : -
 egxbz HkYkk I svk; 6300×12 ekg $\frac{3}{4}$ 75600 : -
 vr% dgy okf"kd vk; $\frac{3}{4}$ 2]25]600 : -
- 2- dj eaNW ; kx; jkf'k okf"kd
- $\frac{1}{2}$ okf"kd I keku; Hkfo"; fuf/k ea v'knku 2000×12 $\frac{3}{4}$ 24]000 : -
 $\frac{1}{2}$ th vkbz , I okf"kd i hfe; e 250×12 $\frac{3}{4}$ 3]000 : -
 $\frac{1}{2}$ okf"kd thou chek i hfe; e $\frac{3}{4}$ 69]000 : -
 $\frac{1}{2}$ okf"kd Mkd thou chek i hfe; e $\frac{3}{4}$ 10]000 : -
 dj eaNW ; kx; jkf'k $\frac{1}{2}a + b + c + d\frac{1}{2}$

24]000 \$ 3]000 \$ 69]000 \$ 10]000 $\frac{3}{4}$ 1]06]000 : -

ijUrqvf/kdre NW ; kx; jkf'k 1]00]000 : - rd l hfer gA

rc dj ea NW ; kx; jkf'k $\frac{3}{4}$ 1]00]000 : -

3- dj ; kx; jkf'k 2]25]600 : - & 1]00]000 : - $\frac{3}{4}$ 1]25]600 : -

4- vk; dj $\frac{3}{4}$ $\frac{1}{4}$ 1]25]600 & 1]10]000 $\frac{1}{2}$ $\frac{3}{4}$ 15600 dk 10%

$$\frac{3}{4} 15,600 \times \frac{10}{100} \quad \frac{3}{4} 1560 : -$$

5- f'k{k mi dj $\frac{3}{4}$ 1560 rd 3%

$$\frac{3}{4} 1560 \times \frac{3}{100} \quad \frac{3}{4} 46.80 \quad \frac{3}{4} 47 : -$$

6- ns dy vk; dj $\frac{3}{4}$ 1560 \$ 47 $\frac{3}{4}$ 1607 : -

vr%?ku' ; ke }kjk dy ns vk; dj $\frac{3}{4}$ 1607 : -

$\frac{1}{4}$ Fk0k $\frac{1}{2}$

mUkj 23 'kkfyuh dh okf"kd vk;

1- dfork dh dy okf"kd vk; $\frac{3}{4}$ 1]80]000 : -

2- dj ea NV ; kx; jkf'k

$\frac{1}{2}$ okf"kd l keU; Hkfo"; fuf/k ea v'knku $\frac{3}{4}$ 40]000 : -

$\frac{1}{2}$ th vkbz , l okf"kd i hfe; e 250 x 12 $\frac{3}{4}$ 3]000 : -

dj ea NW ; kx; jkf'k $\frac{1}{2}$ + $\frac{1}{2}$ $\frac{3}{4}$ 40]000 \$ 3]000 \$ 10]000 $\frac{3}{4}$ 53]000 : -

ijUrqvf/kdre NW ; kx; jkf'k 1]00]000 : - rd l hfer gA

3- dj ; kx; jkf'k $\frac{3}{4}$ 1]80]000 : - & 53]000 : - $\frac{3}{4}$ 1]27]000 : -

4- vk; dj $\frac{3}{4}$ 1]27]000 : - rd dkbz dj ughA

vr% 'kkfyuh dks dkbz dj ugha nsuk i MxkA

mùkj 25-

1/5½

0kXkZ vBkj kYk	0&10	10&20	20&30	30&40	40&50	; kx
Ckkj Bkkj Rkk	4	8	10	11	16	49
I p; h ckjÆjrk	4	12	22	33	49	

i nka dh I d; k $N \frac{3}{4} 49$

ef/; dk I d; k $\frac{3}{4} \frac{N}{2} \frac{3}{4} 24.5$

tksfd I p; h ckjÆjrk 33 ds vrxr vkrk gA

ef/; dk oxl 30&40

ef/; dk oxl dh fuEu I hek $\frac{3}{4} 30$

ef/; dk oxl dh mPp I hek $\frac{3}{4} 40$

ef/; dk oxl dh vkofRr $\frac{3}{4} 11$

ef/; dk oxl ds Bhd i gys dh I p; h vkofRr $\frac{3}{4} 22$

ef/; dk $\frac{3}{4} L_1 + \frac{(m-c)(L_2-L_1)}{f}$

$$\frac{3}{4} 30 + \frac{(24.5 - 22)(40 - 30)}{11} = 30 + \frac{2.5 \times 10}{11}$$

$$\frac{3}{4} 30 + \frac{25}{11} = 30 + 2.27$$

ef/; dk $\frac{3}{4}$ 32.27

$\frac{1}{2}\sqrt{f_1 f_2}$

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

I kj .kh I sLi "V gSfd I cl svf/kd ckj rjk 37 gS tks oxL 30&40 dh gA

vr%cgyd oxL 30&40

cgyd oxL dh fuEu I hek $\frac{3}{4}$ 30

cgyd oxL dh mPp I hek $\frac{3}{4}$ 40

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

cgyd oxL dh fuEu I hek

$$\frac{3}{4} L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} (L_2 - L_1)$$

$$\frac{3}{4} 30 + \frac{37 - 21}{2 \times 37 - 21 - 31} (40 - 30) = 30 + \frac{16}{74 - 52} \times 10$$

$$\frac{3}{4} 30 + \frac{160}{22} = 30 + \frac{80}{11} = 30 + 7.27$$

$$\frac{3}{4} 37 - 27$$

mUkj 26 ekuk fikRkk dh orZku vk₃ kq x o"Kz vk\$ Ikqk dh orZku vk₃ kq y o"Kz gSgA $\frac{1}{6}\frac{1}{2}$

1 o"Kz iWZ fir k dh vk; q $\frac{3}{4}$ (x - 1) o"Kz

1 o"Kz iWZ iE dh vk; q $\frac{3}{4}$ (y - 1) o"Kz

izukuđ kj] i Fke 'krZl }

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

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

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

$$x - 8y = -7$$

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

f}rh; 'krZl s

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

I eh- (i) l s_x dk eku j [kus i j

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

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

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

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

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

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

$$\Rightarrow y = 1^2 ; k y = 7^2 \quad \Rightarrow y = \pm 1 ; k y = \pm 7$$

D; křd fi rk] i e dh vk; qcjkcj ughagks l drh vr%fi rk dh vk; q49 o"řz vkš
i e dh vk; q7 o"řz gš

½\Fkřk½

eku igyh l e l ř; k x, nř jh Øekxr l e l ř; k (x + 2) gš

izukuđ kj $x^2 + (x + 2)^2 = 164$

$$\begin{aligned}
\Rightarrow & x^2 + (x^2 + 4x + 4) = 164 \\
\Rightarrow & 2x^2 + 4x + 4 = 164 \\
\Rightarrow & 2(x^2 + 2x + 2) = 164 \\
\Rightarrow & x^2 + 2x + 2 - 82 = 0 \\
\Rightarrow & x^2 + 2x - 80 = 0 \\
\Rightarrow & x^2 - 8x + 10x - 80 = 0 \\
\Rightarrow & x(x - 8) + 10(x - 8) = 0 \\
\Rightarrow & (x - 8)(x + 10) = 0 \\
& x - 8 = 0 ; k x + 10 = 0 \\
& x = 8 ; k x = -10
\end{aligned}$$

x dk eku __.kkRed ugha gks l drkj vr% x = 8

$$\therefore \text{nw jh dckxr l } \underline{d}; k, \text{ ags } (x + 2) = 8 + 2 = 10$$

vr% vHkh"V l } ; k, j 8, 10 gkakhA

mUkj 27 fn; k gS% LkEkCkkgq f«kHkqT k ΔABC gSftl dh AD Apkbl gA

1/6 1/2

$$\text{fl) djuk gS: } 3BC^2 = 4AD^2$$

mi i fRr % ΔABC ea $AB = BC = AC$

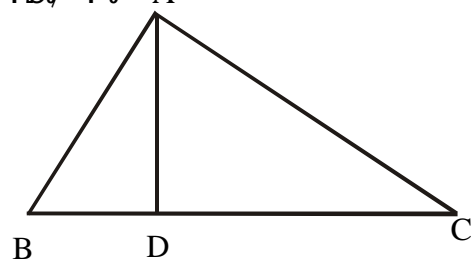
$$\text{vkj } AD \perp BC, BD = CD = \frac{BC}{2} \quad \dots\dots\dots(i)$$

l edks k f«kHkqT k ΔABD ea i kbFkkxkj l iEs l s A

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

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

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



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

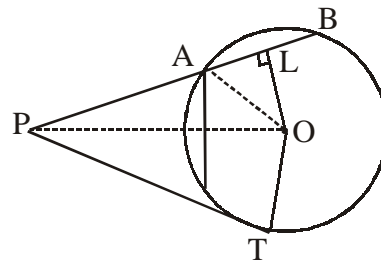
$$\Rightarrow BC^2 - \frac{BC^2}{4} = AD^2$$

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

$$\Rightarrow 3BC^2 = 4AD^2 \quad \text{fl) g\%kA}$$

¼\Fk0kk½

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



$$\text{fl) djuk gS } PA \cdot PB = (PT)^2$$

j\puk %OL \perp AB [k\p k A OA, OP v\k j OT dks feyk; k

$$\begin{aligned} \text{mi i fRr } PA \cdot PB &= (PL - AL)(PL + LB) \\ &= (PL - AL)(PL + AL) \quad (\because AL = LB) \\ &= PL^2 - AL^2 \\ &= (OP^2 - OL^2) - AL^2 \end{aligned}$$

$$\begin{aligned} \therefore \text{I edkSk } \Delta PLO \text{ ea } OP^2 &= OL^2 + PL^2 \\ &= OP^2 - OL^2 - AL^2 \\ &= OP^2 - (OL^2 + AL^2) \\ &= OP^2 - OA^2 \end{aligned}$$

$$\therefore \text{I edkSk } \Delta ALO \text{ ea } OA^2 = OL^2 + AL^2$$

$$= OP^2 - OT^2$$

$$= PT^2$$

$$\therefore \text{In right } \triangle PTO \text{ we } OP^2 = PT^2 + OT^2.$$

$$PA.PB = PT^2$$

Set - C

gkbz Ldwy I fv/QdV i jh{k
High School Certificate Examination
I fiy&i zu i=
SAMPLE PAPER

fo"k; % (Subject) - xf.kr (Mathematics)
d{kk % (Class) - nl oha (X)

I e; 3 ?k.Vk (Time- 3 Hrs)
i vkkd 100 (M.M.)

(Instruction) & fun?kz

- 1- I Hkh itu gy djuk vfuok; zgSA
Attempt all the Question
- 2- itu Øekad 01 ea 10 vð fu/kkfr gSA nks dky [k.M gSA [k.M ^v** ea 05
cgfodYih; itu rFkk [k.M ^c** ea 05 fjDr LFkkuka dh i firz vFkok mfpr
I cak tkfM, A iR; d itu dsfy, 1 vð vkcfVr gSA
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- itu Øekad 02 I situ Øekad 09 rd vfr y?kqRrjh; itu gSA iR; d itu
ij 02 vð vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- itu Øekad 10 I situ Øekad 15 rd y?kqRrjh; itu gSA iR; d itu ij 03
vð vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 50 'kCn A
Q. No. 10 to 15 are short answer type question & it carries 03 marks
each. Word limit is maximum 50.
- 5- itu Øekad 16 I situ Øekad 21 rd y?kqRrjh; itu gSA iR; d itu ea
vkrfjd fodYi gsvkj iR; d itu ij 04 vð vkcfVr gSA mRrj dh vf/kdre
'kCn I hek 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- izu Øekad 22 Is izu Øekad 25 rd nh?kmRrjh; izu gSA iR; d izu ea vkrfjd fodYi gSvkj iR; d izu ij 05 vd vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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- izu Øekad 26 Is izu Øekad 27 rd nh?kmRrjh; izu gSA iR; d izu ea vkrfjd fodYi gSvkj iR; d izu ij 06 vd vkcfVr gSA mRrj dh vf/kdre 'kCn I hek 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.

iz u 1 1/2 I gh fodYi pfu, %&

(i) 6 vkj 54 dk Ek/ ,kkUkkRkh gkXkA

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

(ii) 50° dk vák Ekkk gkXkA

- (a) 30° (b) 60° (c) 45° (d) 90°

(iii) OkÙk dks dkbZ TkhOkk fdRkUks fCkUnq/ka lkj dkVRkh gSA

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

(iv) 0.625 dk f) vk/kkj h lkz kkYkh Eka EkkUk gkXkA

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

(v) 3] 6] 2] 7] 5] 9] 8 dk Ekkf/ ,kdk gkXkA

- (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 50° in degree is -

- (a) 30° (b) 60° (c) 45° (d) 90°

(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

$\frac{1}{2}$ f j DRk LFkkukka dh IkRkZ dhfTk, A

- (i) 1 vksj 50 ds Ek/k fdk"kek lknka dh Lkd,kk &&&& gkxkh A
- (ii) YkEck fdkHkq"kh,k fi zEk Eka dYk QYkd $\frac{1}{4}$ "B $\frac{1}{2}$ dh Lkd,kk &&&& gkxkh gA
- (ii) mLk fckUnq dk HkqTk &&&&&& gkxkk Tkks y-v{k Eka fLFkRk gA
- (iv) $\sin(90 - \theta)$ $\frac{3}{4}$ &&&&& gkxkA
- (v) 8 EkhVj vksj 6 EkhVj HkqTk OkkYks vk,kRk ds fkd.kz dh YkEckbz &&&&& gkxkA

(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.

izu 2 $\frac{x+1}{x-2}$ vksj $\frac{x-1}{x-2}$ dk ,kkxkQYk KkRk dhfTk, A

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

izu 3 Okkiz LkEkhdj.k $15x^2 + x - 2 = 0$ ds Ekvkka dk ,kkxkQYk , Oka XkqkukQYk KkRk dhfTk, A

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

izu 4 $\frac{\operatorname{cosec} 39^\circ}{\sec 51^\circ}$ dk Ekkuk Kkrk dhfTk, A

Find the value of $\frac{\operatorname{cosec} 39^\circ}{\sec 51^\circ}$

izu 5 fCUnq $\frac{1}{2}$ $3\frac{1}{2}$ vks $\frac{1}{4}$ $1\frac{1}{2}$ ds CkhPk dh njh Kkrk dhfTk, A

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

izu 6 , d 'kqdsvk/kkj dh fØ, k 7 LkEkh vks ÅPkkb 15 LkEkh gSRkks 'kqdsvk, kRkuk Kkrk dhfTk, A

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

izu 7 f«khkqk DEF Eka DE vks DF ij fCUnqP vks Q bl iðkj gSfd DP = 5 LkEkh QF = 24 LkEkh DE = 13 LkEkh RkFk DF = 39 LkEkh fn [kkb; s PQ||EF-

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

lkz Uk 8 vYXkksj FkEk dsfu: i .k dk nks iðkj fyf[k, A

Write two types of or developed an algorithm.

izu 9 45 Eka Lks 15 dks lkjd vad fLk) kURk Lks ?kVkb, kA

Subtract 15 from 45 by complement theory.

izu 10 , kfn $R = \frac{x^3 + 1}{x - 1}$ vks $S = \frac{x^2 - x + 1}{x + 1}$ gks Rkks $\frac{R}{S}$ 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 $\frac{R}{S}$

izu 11 , kfn $a : b = c : d$ gks Rkks fLk) dhfTk, fd $\frac{a}{b} = \frac{a + c}{b + d}$

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

izu 12 D₃kk 302 Js kh 3]8]13]&&&&& dk dkbz lkn gA

Is 302 a term of the series 3, 8, 13,

izu 13 EkukkT₃k d₄kkj Uks 100 : - l₅fRkEkk₆g dh nj Lks 2 Ok"lz ds fyk, vkOkRkhz T₇kEkk [kkRkk [kk₈kkA]₉kfn C₁₀kkTk dh nj 5½ l₁₁fRk' kRk Okf"kb₁₂l gks Rkks mLks nks Ok"lz C₁₃kn fdRkUkh jdEk dh l₁₄kfIRk g₁₅kkhA

Manoj KUMar opened a recurring 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.

izu 14 LkOkLk₁fEkd₂k $\sin^4 \theta + \cos^2 \theta = 1 - 2\sin^2 \theta \cdot \cos^2 \theta$ dks fLk) dhfTk, A

Prove that : $\sin^4 \theta + \cos^2 \theta = 1 - 2\sin^2 \theta \cdot \cos^2 \theta$

izu 15 mLk CkMs Lks CkMs Xkk₁ks dk vk₂kRkUk KkRk dhfTk, Tkks mLk ?kUk Lks dkV/k Tk₃ks 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.

lkz Uk 16 a ds fdLk EkkUk ds fyk, fCk₁ng ¼]4½]¼a, &2½ vk₂ ¼&3]16½ Lkejs₃[k gk₄ks& ¼4½

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

¼/FkOkk½ (OR)

mLk f₁kkHk₂q₃k dk d₄baed KkRk dhfTk, fTkLkds 'kh"kk₅ ds fUkn₆ kkd ¼4] 3¼ ¼2] &3¼ ¼&3] 5½ gA

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

Ikz Uk 17

fdLkh fckHkqk ds dks k LkEkkRkj Js kh Eka gS LkCkLks CkMs dks k dk Ekkuk 105° gS RkhUkka dks kka ds Ekkuk dk jSM, kUk Eka KkRk dhfTk, A 1/4 1/2

The angles of a triangle are in A.P. The biggest angle is 105° . Find the angles in radian.

1/4 Fk0k1/2 (OR)

, d fckHkqk ds dks k 2%3% Eka gS A fckHkqk ds dks kka ds Ekkuk jSM, kUk Eka KkRk dhfTk, A

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

Ikz Uk 18

$x = a \sec \theta$ RkFkk $y = b \tan \theta$ gks Rkks fLk) dhfTk, fd $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. 1/4 1/2

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

1/4 Fk0k1/2 (OR)

, kfn $x = a \cos \theta - b \sin \theta$ RkFkk $y = a \sin \theta + b \cos \theta$ gks Rkks 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 : $x^2 + y^2 = a^2 + b^2$.

Ikz Uk 19

mLk CkMs Lks CkMs 'k d q dk vk, kRkUk KkRk dhfTk, Tkks mLk ?kUk Eka Lks dkVk Xk, k k gS fTkLkdh dkj Yk0k kbZ 3 LksEkh- gS 1/4 1/2

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

1/4 Fk0k1/2 (OR)

fdLkh XkksYks dk Ik" Bk, k {k0kQYk 616 0kXkZ LkEkh- gks Rkks XkksYks dk vk, kRkUk KkRk

Q.22 If $x = \frac{3ab}{a+b}$, prove that $\frac{2x+3a}{2x-3a} + \frac{2x+3b}{2x-3b} = 2$. 1/5½

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

OR

Three A.P.s have n terms and their first terms are 1, 2, 3 respectively and common differences are 1, 3, 5, then prove that

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

$$S_1 + S_2 + S_3 = \frac{3}{2}(3n+1)n \quad \text{1/5½}$$

Q.23 Basic salary of Ghanshyam is Rs. 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 in 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? 1/5½

Basic salary of Ghanshyam is Rs. 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 in 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.

½/Fk0kk½ (OR)

'kkfYkUkh dh Okkf"kd vk₃k ½EkdkUk fdjk₃kk HkRRkk NkM/dj½ 1]80]000 : Ik₃ks gA₃ kfn Okg LkkEkkU₃k HkfOk" k fUkf/k Eka IkfRkOk"kd 40000 : Ik₃kd LkEkUg TkhdUk CkhEkk₃ kksfUkk Ek 250 : Ik₃ks IkfRkEkkg RkFkk 5000 v) Z Okkf"kd TkhdUk CkhEkk IkfYki h Eka fd' Rk TkEkk djRkh gA Kkrk dhfTk, fd 'kkfYkUkh dks vIkUks vk₃kdj mLk fOkUk₃k Ok"kd fdRkUkk vk₃kdj nbkk gkxkA

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.

Ikz Uk 24 f«khkqk $\triangle LMN$ dh jPkUkk dhfTk, Tkgk; $MN = 5$ LksEkh-] $\angle L = \angle 55^\circ$ vkg L Lks MkYkk Xk₃kk 'kh"kd YkAk 3-5 LksEkh- gkA jPkUkk ds lkn 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.

½/Fk0kk½ (OR)

, d PkØh₃k PkRkqkqk $ABCD$ dh jPkUkk dhfTk, fTkLkEka $\angle ABC = 90^\circ$ vAk AC ¾ 6 LksEkh-] AB ¾ 3 LksEkh-] CD ¾ 3-6 LksEkh- jPkUkk ds lkn Hkh fYk[kkA

Construct a cyclic quadrilateral $ABCD$ in which $\angle ABC = 90^\circ$, AC ¾ 6

cm., $AB \frac{3}{4}$ 3 cm., $CD \frac{3}{4}$ 3.6 cm. Write steps of construction.

Q. 25- Find the median of the following table :

1/5/2

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

Find the median of the following table :

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

1/5/2 (OR)

Q. 26- 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

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

Q. 26- 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.

1/5/2 (OR)

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

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

Q.27

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

(OR)

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 : $PA.PB = (PT)^2$

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'kZ mÙkj Lk&I h

mÙkj 1¼½

- (i) (b) 18
- (ii) (c) 45°
- (iii) (a) 2
- (iv) (d) 0.101
- (v) (b) 6

¼½

- (i) 24
- (ii) 5
- (iii) 0
- (iv) $\cos \theta$
- (v) 10 l eh

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 $15x^2 + x - 2 = 0$ ea $a = 15, b = 1, c = -2$

Ekvkkk dkk ,kkkkQYk $\frac{3}{4}$ $\alpha + \beta = \frac{-b}{a} = \frac{-1}{15}$

Ekvkkk dkk Xkq kUkQYk $\frac{3}{4}$ $\alpha \cdot \beta = \frac{c}{a} = \frac{-2}{15}$

mùkj 4

$$\frac{\operatorname{cosec} 39^\circ}{\sec 75^\circ}$$

$$= \frac{\operatorname{cosec}(90^\circ - 51^\circ)}{\sec 51^\circ}$$

$$= \frac{\sec 51^\circ}{\sec 51^\circ}$$

$$= 1$$

mùkj 5 fclunq $\frac{1}{2}$ $\frac{3}{2}$ vkj $\frac{1}{4}$ $\frac{1}{4}$ ds ckhPk dh njih

I = fclunq (x_1, y_1) vkj (x_2, y_2) ds chp dh njih

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

$$= \sqrt{(4 - 2)^2 + (1 - 3)^2}$$

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

$$= \sqrt{4 + 4}$$

$$= \sqrt{8} \quad \frac{3}{4} \quad 2\sqrt{2}$$

mùkj 6 'kdq dk vk, kRkuk $\frac{3}{4} \frac{1}{3} \pi r^2 h$

tgka $r = 7$ LkEkh $h = 15$ LkEkh

eku j [kus ij

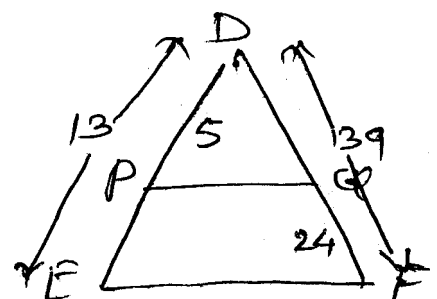
$$\frac{3}{4} \frac{1}{3} \pi (7)^2 \cdot 15 \quad \frac{3}{4} \quad 245\pi$$

mùkj 7 fp= I s $PE = DE - DP$

$$PE = 13 - 5 = 8 \text{ LkEkh}$$

$$\frac{DE}{EP} = \frac{DF}{QF} \Rightarrow \frac{13}{39} = \frac{8}{24} \Rightarrow \frac{1}{3} = \frac{1}{3}$$

$\therefore PQ \parallel EF$



mùkj 8 vYXkkfjFEk ds fuk: lk.k ds lkdkj

- (i) Xk.khRkh,k lRkhd %& Xk.khRkh,k lRkhd Tk\$ks/kuk] __.k] xqkk dsfy, \$] &] × dk mlk,kkdk fd,kk TkkRkk gS
- (ii) fuk/kkzj .k vFkdk fukfnzVhdj .k lRkhd%& fofHkÉ Pkj ka dks dkbz fuk/kkzj Rk Ekkuk lknkuk djUks ds fYk, fuk/kkzj .k lRkhd (←) dk lkzkkdk fd,kk TkkRkk gS
- (iii) LkEckU/k LkRkd lRkhd&

lRkhd vfhkllk,k mnkgj .k
 < Lks Nks/k $a < b$ a Nks/k gS b Lk

mùkj 9 l keku; fof/k lkjd fof/k

$\frac{45}{815}$	$\frac{45}{\$ 84}$	
30	129	15 dk ijd 84
	29	
	\$ 1	
	30	

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,kk gS $\frac{a}{b} = \frac{c}{d}$ (i)

$$= \frac{a}{c} = \frac{b}{d} \quad \frac{1}{4} \text{ dKURkj kUKqkRk Lk\frac{1}{2}}$$

$$= \frac{a+c}{c} = \frac{b+d}{d} \quad \frac{1}{3} \text{ kkkkkkUKqkRk Lk\frac{1}{2}}$$

$$= \frac{a+c}{b+d} = \frac{c}{d} \quad \dots\dots(ii) \frac{1}{4} \text{ dKURkj kUKqkRk Lk\frac{1}{2}}$$

I ehdj .k (i) , oa(ii) I s

$$\frac{a}{b} = \frac{a+c}{b+d}$$

mùkj 12 Ekkukk 302 Jskh 3]8]13] &&&&&&& dk n Okka lkn gA

$$T_n = 302, a = 3, d = 8 - 3 = 5, n = ?$$

$$n \text{ oka i n } T_n = a + (n - 1) d$$

$$302 = 3 + (n - 1) 5$$

$$302 = 3 + 5n - 5$$

$$302 - 3 + 5 = 5n$$

$$304 = 5n$$

$$n = \frac{304}{5}$$

$\frac{304}{5}$ i wkkd I d; k ugha g\$vr% 302 Jskh dk dkbZ in ugha gA

mùkj 13 C; kt $\frac{3}{4}$ $\frac{\text{ekfl d tek} \times \text{nj}}{100} \times \frac{\text{ekg } \frac{1}{2} \text{kg } \$ 1\frac{1}{2}}{24}$

$$= \frac{100 \times 11}{100 \times 2} \times \frac{24(24+1)}{24}$$

$$= \frac{11}{2} \times 25 = \frac{275}{2} = 137.5 \#$$

$$\text{feJ/ku } \frac{3}{4} 100 \times 24 + 137.5 = 2400 + 137.5 = 2537.5 \#$$

mùkj 14 L.H.S. = $\sin^4 \theta + \cos^4 \theta$

$$= (\sin^2 \theta)^2 + (\cos^2 \theta)^2$$

$$= (\sin^2 \theta)^2 + (\cos^2 \theta)^2 + 2\sin^2 \theta \cos^2 \theta - 2\sin^2 \theta \cos^2 \theta$$

$$= (\sin^2 \theta + \cos^2 \theta)^2 - 2\sin^2 \theta \cos^2 \theta$$

$$= 1 - 2\sin^2 \theta \cos^2 \theta \quad \text{R.H.S.}$$

mùkj 15 XkkYks dh 0, kklk $\frac{3}{4}$ 6 LksEkh-
f«kT, kk $\frac{3}{4}$ 3 LkEkh-

$$\text{XkkYks dk vk, kRkUk } \frac{3}{4} \frac{4}{3} \pi r^3$$

$$\frac{3}{4} \frac{4}{3} \pi (3)^3 \frac{3}{4} 36\pi \text{ ?kUk LkEkh}$$

vr% XkkYks dk vk, kRkUk 36π ?kUk LkEkh gkxkA

mùkj 16 I = %fclnq $(x_1, y_1), (x_2, y_2)$ vkj (x_3, y_3) I ejj[k gñ rksf=Hkqt dk {ks=Qy 'kU; gksxkA

$$\Delta \text{ dk } \{ks=Qy \frac{3}{4} \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] = 0$$

vr% fclnq $\frac{1}{2} [4\frac{1}{2} \frac{1}{2} a] + 2\frac{1}{2} vkj \frac{1}{2} 3] 16\frac{1}{2}$ I ejj[k gkxk; fn

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

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

$$\Rightarrow -18 + 12a - 18 = 0$$

$$\Rightarrow 12a - 36 = 0$$

$$\Rightarrow a = 3$$

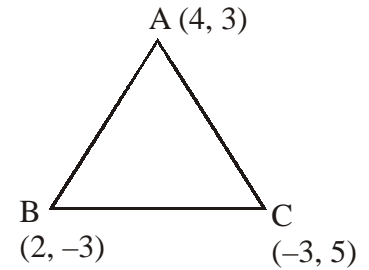
mùkj 16 ABC, d Δ gsf t l ds 'kh"kkā ds funz kka d Øe' k% (x₁, y₁) = (4, 3), (x₂, y₂) = (2, -3), (x₃, y₃) = (-3, 5),

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

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

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

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



dñæd 3/4 (1, 5/3) gkskA

mùkj 17 eku fy; k fd f=Hkqt ds dks k (α - δ)°, α°, (α + δ)° gñ 1/4 1/2

f=Hkqt ds rhuka dks kka dh eki 180° gñ

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

$$vr\% l cl scMk dks k 105^\circ gñ \alpha + \delta = 105^\circ \Rightarrow 60^\circ + \delta = 105^\circ \Rightarrow \delta = 45^\circ$$

$$l cl sNk\%k dks k (\alpha - \delta)^\circ \Rightarrow \alpha - \delta = 60^\circ - 45^\circ = 15^\circ$$

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

$$chp dks k = 60^\circ = \frac{\pi}{180} \times 60 = \frac{\pi}{3}$$

$$l cl scMk dks k = 105^\circ = \frac{\pi}{180} \times 105 = \frac{7\pi}{12}$$

$$vHk\%V dks k \frac{\pi}{12}, \frac{\pi}{3}, \text{ oA } \frac{7\pi}{12} j\%M; u gñ$$

ekuk f=Hkqt ds dks k ∠A, ∠B o ∠C gñ

$$i\%l ukuq kj \angle A : \angle B : \angle C = 2 : 3 : 4$$

ekuk dksk x gsrk ge tkurs gafd $\angle A + \angle B + \angle C = 180^\circ$

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

$$\text{vr\%} \quad 2x + 3x + 4x = 180^\circ$$

$$\Rightarrow 9x = 180^\circ$$

$$\Rightarrow x = 20^\circ$$

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

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

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

vr%f=Hkqt ds dsk $40^\circ, 60^\circ, 80^\circ$ gsf tuds jfM; u eaeku Øe'k% $\frac{2\pi}{9}, \frac{\pi}{3}, \frac{4\pi}{9}$ gA

mÜkj 18

$$x = a \sec \theta \quad \text{RkFkk} \quad y = b \tan \theta$$

¼½

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

I eh- (i) o (ii) dk oxldjds (i) I s(ii) dks ?kVkus i j

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

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

¼½Fk0k½

$$\text{fn; k gS} \quad x = a \cos \theta - b \sin \theta \quad \text{-----} \quad \text{¼½}$$

$$\text{RkFkk} \quad y = a \sin \theta + b \cos \theta \quad \text{-----} \quad \text{¼½}$$

I ehdj .k ¼½ o ¼½ dks oxldjds tkM;us i j

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

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

mŭkj 19 ?ku l s d k V s x ; s c M s l s c M s ' k d q d k v k ; r u v = $\frac{1}{3}\pi r^2 h$ 1/4 1/2

f n ; k g s h = 3 l e h
 ' k d q d s v k / k j d k 0 ; k l = 2r = 3 l e h

$$r = \frac{3}{2} \text{ l e h}$$

eku j [kus i j] $V = \frac{1}{3}\pi \left(\frac{3}{2}\right)^2 \cdot 3 = \frac{9}{4}\pi$

$$V = 2.25\pi \text{ ?ku l e h}$$

1/4 1/2

ekuk x l s y s d h f = T ; k = r

f n ; k g s x l s y s d k i " B h ; { k s = Q y = 616 o x l l e h

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

$$\Rightarrow r^2 = 7 \times 7 \Rightarrow r = 7 \text{ l e h}$$

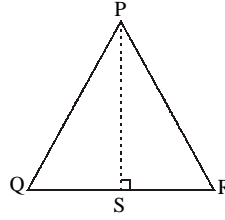
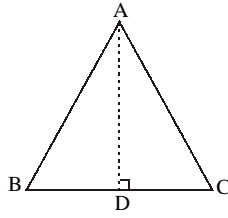
$$\begin{aligned} \therefore \text{ x l s y s d k v k ; r u } &= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \pi \times (7)^3 \\ &= \frac{4}{3} \times \pi \times 7 \times 7 \times 7 \\ &= \frac{1372}{3}\pi \text{ ?ku l e h} \end{aligned}$$

mŭkj 20- i e s d f k u % n k s l e : i f « k H k q k k a d s { k s k Q y k d k v u k k k k k f d l u g h a n k s L k k k k k
 H k q k k v k a d s O x k k z d s v u k k k k k d s C k j k c k j g k k k g a 1/4 1/2

K k r g s % n k s l e : i f = H k q t A B C v k j P Q R

f l) d j u k g s % $\frac{\{k s k Q y \Delta A B C\}}{\{k s k Q y \Delta P Q R\}} = \frac{A B^2}{P Q^2} = \frac{B C^2}{Q R^2} = \frac{A C^2}{P R^2}$

प्रमाण : $AD \perp BC$ वरून $PS \perp QR$ [कथना]



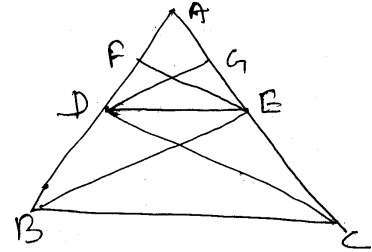
प्रमाण :

दफ्त	दकज .क
$\frac{\text{क्षेत्रफल } \Delta ABC}{\text{क्षेत्रफल } \Delta PQR} = \frac{\frac{1}{2} BC \times AD}{\frac{1}{2} QR \times PS}$	
$\frac{\text{क्षेत्रफल } \Delta ABC}{\text{क्षेत्रफल } \Delta PQR} = \frac{BC}{QR} \times \frac{AD}{PS} \dots (i)$	
<p>वक फलकत $\angle ADB$ वरून $\angle PSQ$ क</p> <p>$\angle B = \angle Q$</p> <p>$\angle ADB = \angle PSQ$</p> <p>$\Delta ADB \sim \Delta PSQ$</p> <p>$\frac{AD}{PS} = \frac{AB}{PQ} \dots (ii)$</p>	<p>ले: Δ दसल ँर दकक ककक गळ</p> <p>र: 90° ळक लस $\frac{1}{2}$</p> <p>आ ले: रक मररस लस</p> <p>ले: Δ दहल ँर फकतक; ँ</p> <p>लेकुं कफरद ककरह गळ</p>
<p>यफदु $\frac{AB}{PQ} = \frac{BC}{QR} \dots (iii)$</p>	$\Delta ABC \sim \Delta PQR$
<p>$\therefore \frac{AD}{PS} = \frac{BC}{QR} \dots (iv)$</p>	(ii) 0 (iii) लस
$\frac{\text{क्षेत्रफल } \Delta ABC}{\text{क्षेत्रफल } \Delta PQR} = \frac{BC}{QR} \times \frac{BC}{QR} = \frac{BC^2}{QR^2}$	(i) 0 (iv) लस
<p>बल रदकज फल) दक लदरस गळद</p> <p>$\frac{\text{क्षेत्रफल } \Delta ABC}{\text{क्षेत्रफल } \Delta PQR} = \frac{AB^2}{PQ^2}$</p> <p>वरून $\frac{\text{क्षेत्रफल } \Delta ABC}{\text{क्षेत्रफल } \Delta PQR} = \frac{AC^2}{PR^2}$</p>	
<p>वरून $\frac{\text{क्षेत्रफल } \Delta ABC}{\text{क्षेत्रफल } \Delta PQR} = \frac{AB^2}{PQ^2} = \frac{BC^2}{QR^2} = \frac{AC^2}{PR^2}$</p>	बफर फल) क

1/2 Fk0k1/2

Fk0Lk IkEksk & , d f=Hkqt dh , d Hkqt k ds l ekarj [khpq xbz js]kk vl; nks Hkqt kvka dks ftu nks fcanyka ij i frPNn djrh gS ofcany Hkqt kvka dks l eku vuq kr eafokDr djrs gA

Kkr gS % $\Delta f=Hkqt ABC$ ea $DE \parallel BC$



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

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

(ii) $EF \perp AB$ [khpka

(iii) $DG \perp AC$ [khpka

mi ifyk %

dFku	dkj . k
<p>Δ dk {ks=Qy $\frac{3}{4}$ $\frac{1}{2}$ vk/kkj \times Åpkbz</p> <p>$\frac{\Delta ADE \text{ dk } \{kskQy\}}{\Delta BDE \text{ dk } \{kskQy\}} = \frac{\frac{1}{2} AD \cdot EF}{\frac{1}{2} BD \cdot EF} = \frac{AD}{BD} \dots(i)$</p> <p>bl h i dkj]</p> <p>$\frac{\Delta ADE \text{ dk } \{kskQy\}}{\Delta CDE \text{ dk } \{kskQy\}} = \frac{\frac{1}{2} AE \cdot DG}{\frac{1}{2} EC \cdot DG} = \frac{AE}{EC} \dots(ii)$</p> <p>yfdul] $\Delta BDE \text{ dk } \{ks=Qy \frac{3}{4}$ $\Delta CDE \text{ dk } \{ks=Qy \dots(iii)$</p> <p>vr% $\frac{AD}{BD} = \frac{AE}{EC}$</p>	<p>, d gh vk/kkj vlj , d gh l ekarj js]kkvka ds chp cus f=Hkqt dk {ks=Qy cjkj gsrk gA</p> <p>(i), (ii), (iii) l s bfr fl) e</p>

mÜkj 21- FkYks Eka xanka dh dgy l q; k 4 \$ 5 \$ 7 $\frac{3}{4}$ 16

$n(S) = 16$

- (i) 7 I Qn xnkæal s dkbZ, d I Qn xn fudkyh tk I drh gñ
 $n(A) = 7$

vr% LkQn xn fudkyus dh i kf; drk $P(A) = \frac{n(A)}{n(S)}$

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

- (ii) LkQn ,kk dkYkh xn fudkyus dh i kf; drk

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

$$\frac{3}{4} \frac{7+4}{16} \frac{3}{4} \frac{11}{16}$$

$$\frac{1}{2} \sqrt{10} \frac{1}{2}$$

dy I EHkkfor ?kVuk; a $n(S) \frac{3}{4} 52$

- (i) i ku dk rk'k fudkyus dh ?kVuk A gks rks

$$n(A) \frac{3}{4} 13$$

$$P(A) = \frac{n(A)}{n(S)} \frac{3}{4} \frac{13}{52} = \frac{1}{4}$$

- (ii) i ku ; k bM dk bDdk fudkyus dh ?kVuk A gks rks

$$n(A) \frac{3}{4} 1 + 1 = 2$$

$$P(A) = \frac{n(A)}{n(S)} \frac{3}{4} \frac{2}{52} = \frac{1}{26}$$

mUkj 22 fn, kk gS $x = \frac{3ab}{a+b}$

$$\frac{1}{5} \frac{1}{2}$$

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

2 dk xqkk djus ij

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

$$\frac{3b+a}{b-a} + \frac{3a+b}{-(b-a)}$$

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

rFkk i q%

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

2 dk xqkk djus ij

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

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

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

LkEkhdj . k 1/2 RkFkk 1/2 dks Tkk/Us Ikj

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

$$\frac{3b+a-3a-b}{b-a}$$

$$\frac{2(b-a)}{b-a}$$

$$2$$

$$\frac{1}{2}$$

i Fke LkEkKkkkj Js kh ds fy, $a=1, d=1$

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

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

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

f}rh; LkEkkukkkkj Jskh dsfy, $a=2, d=3$

$$S_2 = \frac{n}{2}[2 \times 2 + (n-1) \times 3]$$

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

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

r}rh; LkEkkukkkkj Jskh dsfy, $a=3, d=5$

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

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

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

i fke] f}rh; , oa r}rh; l ekUrj Jf.k; ka dk ; kx

$$\begin{aligned} S_1 + S_2 + S_3 &= \frac{n}{2}[n+1] + \frac{n}{2}[3n+1] + \frac{n}{2}[5n+1] \\ &= \frac{n}{2}[n+1+3n+1+5n+1] \\ &= \frac{n}{2}[9n+3] \\ &= \frac{3n}{2}[n+1] \\ &= \frac{3}{2}(3n+1)n \end{aligned}$$

mUkj 23 ?ku' ; ke dh okf"kd vk; 1/5 1/2

- 1- eny oru 12500 × 12 ekg 3/4 1]50]000 : -
- egxkbZ HkYkk 6300 × 12 ekg 3/4 75600 : -

vr% dgy okf'kd vk; $\frac{3}{4}$ 2]25]600 : -

- 2- dj ea NV ; kx; jkf'k okf'kd
 $\frac{1}{2}$ okf'kd I keku; Hkfo"; fuf/k ea v'knku $2000 \times 12 \frac{3}{4}$ 24]000 : -
 $\frac{1}{2}$ th vkbz , I okf'kd i hfe; e $250 \times 12 \frac{3}{4}$ 3]000 : -
 $\frac{1}{2}$ okf'kd thou chek i hfe; e $\frac{3}{4}$ 69]000 : -
 $\frac{1}{2}$ okf'kd Mkd thou chek i hfe; e $\frac{3}{4}$ 10]000 : -

dj ea NW ; kx; jkf'k $\frac{1}{2}a + b + c + d\frac{1}{2}$

$24]000 \$ 3]000 \$ 69]000 \$ 10]000 \frac{3}{4}$ 1]06]000 : -

ijUrqvfk/dre NW ; kx; jkf'k 1]00]000 : - rd I hfer gA

rc dj ea NW ; kx; jkf'k $\frac{3}{4}$ 1]00]000 : -

- 3- dj ; kx; vk; 2]25]600 : - & 1]00]000 : - $\frac{3}{4}$ 1]25]600 : -

- 4- vk; dj $\frac{3}{4}$ $\frac{1}{4}$ 2]25]600 & 1]10]000 $\frac{1}{2}$ $\frac{3}{4}$ 15600 dk 10%

$$\frac{3}{4} 15,600 \times \frac{10}{100} \quad \frac{3}{4} 1560 : -$$

- 5- f'k{kk mi dj $\frac{3}{4}$ 1560 rd 3%

$$\frac{3}{4} 15,60 \times \frac{10}{100} \frac{3}{4} 46-80 \quad \frac{3}{4} 47 : -$$

- 6- nş dgy vk; dj $\frac{3}{4}$ 1560 \$ 47 $\frac{3}{4}$ 1607 : -

vr% ?ku' ; ke }kj dgy nş vk; dj $\frac{3}{4}$ 1607 : -

$\frac{1}{2}$ FkKk $\frac{1}{2}$

mÜkj 23 'kkfyuh dh okf'kd vk;

- 1- dfork dh dgy okf'kd vk; $\frac{3}{4}$ 1]80]000 : -

- 2- dj ea NV ; kx; jkf'k

$\frac{1}{2}$ okf'kd I keku; Hkfo"; fuf/k ea v'knku $\frac{3}{4}$ 40]000 : -

$\frac{1}{2}$ okf'kd I eng thou chek i hfe; e $250 \times 12 \frac{3}{4}$ 3]000 : -

dj ea NW ; kx; jkf'k $\frac{1}{2}a + b\frac{1}{2}$ $\frac{3}{4}$ 40]000 \$ 3]000 \$ 10]000 $\frac{3}{4}$ 53]000 : -

jpuk dsin %&

mùkj 25-

1/5½

0kXkZ v&kj kYk	0&10	10&20	20&30	30&40	40&50	; ksx
Ckkj &kkj Rkk	4	8	10	11	16	49
I p; h ckj&jrk	4	12	22	33	49	

inkadh I d; k $N \frac{3}{4} 49$ rc

ef/; dk I d; k $\frac{3}{4} \frac{N}{2} \frac{3}{4} 24-5$

tksfd I p; h ckj&jrk 33 ds vrxr vkrk gA

ef/; dk oxl 30&40

ef/; dk oxl dh fuEu I hek $\frac{3}{4} 30$

ef/; dk oxl dh mPp I hek $\frac{3}{4} 40$

ef/; dk oxl dh vkofRr $\frac{3}{4} 11$

ef/; dk oxl ds Bhd i gys dh I p; h vkofRr $\frac{3}{4} 22$

$$ef; dk \frac{3}{4} L_1 + \frac{(m-c)(L_2 - L_1)}{f}$$

$$\frac{3}{4} 30 + \frac{(24.5 - 22)(40 - 30)}{11} = 30 + \frac{2.5 \times 10}{11}$$

$$\frac{3}{4} 30 + \frac{25}{11} = 30 + 2.27$$

$$ef; dk \frac{3}{4} 32.27$$

1/2 Fk0k1/2

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

I kj .kh I sLi "V gSfd I cl svf/kd ckj@jrk 37 gS tksoxl 30&40 dh gA
vr%cgyd oxl 30&40

cgyd oxl dh fuEu I hek 3/4 30

cgyd oxl dh mPp I hek 3/4 40

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

cgyd

$$\frac{3}{4} L_1 + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} (L_2 - L_1)$$

$$\frac{3}{4} 30 + \frac{37 - 21}{2 \times 37 - 21 - 31} (40 - 30) = 30 + \frac{16}{74 - 52} \times 10$$

$$\frac{3}{4} 30 + \frac{160}{22} = 30 + \frac{80}{11} = 30 + 7.27$$

$$\frac{3}{4} 37.27$$

mùkj 26 ekuk fikRkk dh orëku vk,qx o"kz vks} lkqk dh orëku vk,qy o"kz gSgA 1/6½

1 o"kz iDZ fir k dh vk; q¾ (x - 1) o"kz

1 o"kz iDZ iE dh vk; q¾ (y - 1) o"kz

iz ukud kj] iEke 'krZl }

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

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

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

$$x - 8y = - 7$$

$$x = 8y - 7 \quad \dots\dots\dots(i)$$

f}rh; 'krZl s

$$x = y^2 \quad \dots\dots\dots(ii)$$

I eh- (i) I sx dk eku j[kus i j

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

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

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

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

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

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

$$\Rightarrow y = 1^2 ; k y = 7^2 \quad \Rightarrow y = \pm 1 ; k y = \pm 7$$

D; kd fir k] iE dh vk; qcjkj ughagks I drh vr%fir k dh vk; q49 o"kz vks}

iE dh vk; q7 o"kz gA

eku igyh l e l d; k x, n jh Øekxr l e l d; k (x + 2) gA

$$\begin{aligned}
 \text{iz ukud kj} \quad & x^2 + (x + 2)^2 = 164 \\
 \Rightarrow & x^2 + x^2 + 4x + 4 = 164 \\
 \Rightarrow & 2x^2 + 4x + 4 = 164 \\
 \Rightarrow & 2(x^2 + 2x + 2) = 164 \\
 \Rightarrow & x^2 + 2x + 2 - 82 = 0 \\
 \Rightarrow & x^2 + 2x - 80 = 0 \\
 \Rightarrow & x^2 - 8x + 10x - 80 = 0 \\
 \Rightarrow & x(x - 8) + 10(x - 8) = 0 \\
 \Rightarrow & (x - 8)(x + 10) = 0 \\
 & x - 8 = 0 ; k x + 10 = 0 \\
 & x = 8 ; k x = -10
 \end{aligned}$$

x dk eku __.kkRed ugha gks l drk] vr% x = 8

∴ n jh dækxr l d; k, a gA (x + 2) = 8 + 2 = 10

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

mÜkj 27 fn; k gS% LkEkCkkgq ΔABC gA ftl dh Åpkbz AD gA

1/2

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

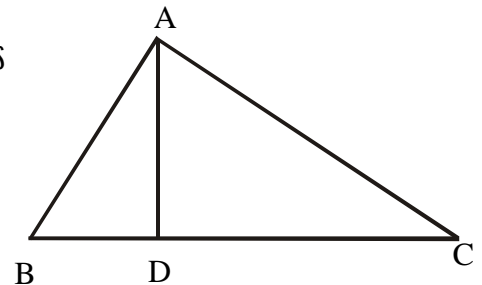
mi iFrR % ΔABC ea AB = BC = AC

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

l edksk ΔABD ea ikbFkkxkj l iEs l s

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

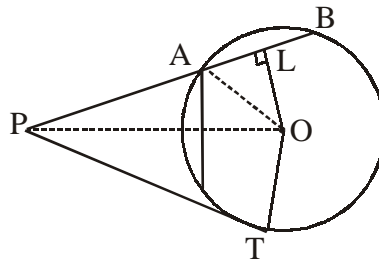
$$\Rightarrow AB^2 = AD^2 + \left(\frac{BC}{2}\right)^2$$



$$\begin{aligned}
\Rightarrow AB^2 &= AD^2 + \frac{BC^2}{4} \\
\Rightarrow BC^2 &= AD^2 + \frac{BC^2}{4} \quad (\because AB = BC) \\
\Rightarrow BC^2 - \frac{BC^2}{4} &= AD^2 \\
\Rightarrow 4BC^2 - BC^2 &= 4AD^2 \\
\Rightarrow 3BC^2 &= 4AD^2 \quad \text{fl) gq/kA}
\end{aligned}$$

¼/Fk0kk½

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



fl) djuk gS % $PA \cdot PB = (PT)^2$

jpuK % $OL \perp AB$ [kpk A OA, OP vkj OT dks feyk; k

$$\begin{aligned}
\text{mi i fRr } \% PA \cdot PB &= (PL - AL)(PL + LB) \\
&= (PL - AL)(PL + AL) \quad (\because AL = LB) \\
&= PL^2 - AL^2 \\
&= (OP^2 - OL^2) - AL^2
\end{aligned}$$

\therefore I edkSk ΔPLO ea $OP^2 = OL^2 + PL^2$

$$\begin{aligned}
&= OP^2 - OL^2 - AL^2 \\
&= OP^2 - (OL^2 + AL^2)
\end{aligned}$$

$$= OP^2 - OA^2$$

$$\therefore \text{In } \triangle ALO \text{ by } OA^2 = OL^2 + AL^2.$$

$$= OP^2 - OT^2$$

$$= PT^2$$

$$\therefore \text{In } \triangle PTO \text{ by } OP^2 = PT^2 + OT^2.$$

$$PA.PB = PT^2$$