For First Terminal Examination -2081

Class-10

Subject: Optional MathematicsCourse Contents:

1.Algebra: Function
2.Matrix: All
3.Coordinate Geometry: conditions for lines to be parallel and perpendicular
4.Trigonometry: Multiple anglesSub- multiple angles
5.Limit and continuity :all
6. Statistics :all

For Second Terminal Examination -2081

1.Algebra: Polynomials, Function
2.Coordinate Geometry: All
3.Trigonometry: transformation of trigonometric ratio, Conditional trigonometric identities
4.Vectors: Scalar productVector Geometry
5. Limit and continuity: all
6. Statistics: all
7. Matrix:all

For Third Terminal Examination-2081Course Contents

- Algebra: sequence and series.
- Coordinate: conic section, circle
- linear programming problems.
- Quadratic equation and graphs.
- Limit and continuity.
- Trigonometry: * Solution of trigonometric equation
- Height and distance
- Transformation: All
- Revision all chapter

EMBOCS NAWALPARASI

Specification Grid for First Terminal Examination-2081

S. N	Contents	Topic	K	U	A	H. A	Total number of Questions	Total mark
1	Algebra	* Function	2	2	2	1	7	16
2	Matrix	all	1	1	1		3	6
3.	*Coordinate Geometry	conditions for lines to be parallel and perpendicular	1					1
4	Trigonometry	* Multiple angle * Sub – multiple angle	2	2	3	-	7	15
5.	Statistics	All		1	2		3	8
6.	Limit & continuity	All	1		1		2	4
		Total mark	7	6	9	1	22	50

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Specification Grid for Second Terminal Examination-2081

S. N	Contents	Topic	K	U	A	H. A	Total number of Questions	Total mark
1	Algebra	* Function * Polynomials	1	1	1	1	4	10
2	Matrix	all	1	1	1		3	6
3.	Coordinate Geometry	all	1	1	1	1	4	10
4	Trigonometry	* Multiple angle * Sub – multiple angle * Transformation of Trigonometric ratio * Conditional trigonometric identities	2	2	1		6	9
5.	Vectors	* Scalar product * Vector Geometry	1	1			2	3
6	statistics	all		1	2		3	8
7.	Limit & continuity	all	1		1		2	4
Total			7	7	7	2	24	50
Marks			7	14	21	8		50

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Specification Grid for Third Terminal Examination-2081

SN	Contents	Knowledge each of 1 marks	Understanding each of 2 marks	Application each of 3 marks	Higher ability each of 4 marks	Total questions	Total marks
1.	बीजगणित (Algebra)	2	2	2	1	7	16
2.	सीमान्त मान र निरन्तरता (Limit and continuty)	1		1		2	4
3.	मेट्रिक्स (Matrix)	1	1	1		3	6
4.	निर्देशाङ्क ज्यामिति (Co-ordinate Geometry)	2	1	1	1	5	11
5.	त्रिकोणमिति (Trogonometry)	2	2	3		7	15
6.	भेक्टर (Vectors)	1	1		1	3	7
7.	स्थानान्तरण (Transformation)	1		1	1	3	8
8.	तथ्याङ्क शास्त्र (Statistics)		1	2		3	8
	जम्मा प्रश्न सङ्ख्या (Total questions)	10	8	11	4	33	75

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Model Questions for First Terminal Examination -2081

Sub: Opt : Math **Time** **FM:50**

Class:10 **Group A 7x1=6**

1a. Define trigonometric function.

b) What is the maximum value of y=sinx.

2a) Write in sentence $\frac{lim}{x\to a+}$ f(x).

b) Write the condition of two lines parallel.

3. a) Define singular matrix.

b) Express cos2A in term cosA.

4a) Write the formula to find sin3A.

Group B 6x2=12

5a.In the f= {(1, 2) ,(2, 3) , (3, 4) } and g= (2, a), (4, c) , (3, b) , then show the composite function gof in arrow diagram and find it in ordered pair form.

b) If F(x)=8x+7 then find the value of fof(x) and fof(-2)

6a)If matrix A=$\begin{bmatrix}3 & 5\\ 1 & 2\end{bmatrix}$ Find the value of $A^{-1.}$

b) prove that: $\frac{sin2A-sinA}{1-cosA+cos2A} = tanA$.

7a) IF sinA=$\frac{1}{2}$ (m+$\frac{1}{m}$) then prove that: cos2A= -$\frac{1}{2}$ (m^2+$\frac{1}{m^2}$).

b) In a group data the quartile deviation and its Coefficient are 15 and $\frac{3}{7}$ respectively find first quartile.

Group C 9x3=27

8.IF f(x)=4x+5 , fog(x)=8x+17, find the value of $g^{-1}(7)$

9. If f(x)=2x-5 and g(x)=3x+1 are two function then find f^{-1}-(x) and $g^{-1}(x)$.

10.A real value function f:R→ R is Defined by f(x) = 2x + 3

i) find the value of f(x) at x= 4.9, 4.99, 4.999.

ii) find the value of f(5)

iii) Is this function continuous at x = 5.

11. Solve by cramers method: 8x+11=3y and 6y-15=-2x+11

12. prove that: Tan(45°+A)=sec2A+tan2A

13. prove that : $\frac{1}{sin10°} - \frac{\sqrt{3}}{cos10°} = 4$

14. prove that: $4\cos^3 20° + 4\sin^3 10° = 3(cos20° + sin10°)$

15. . Calculate the mean deviation from the median of the given data

x	0-10	10-20	20-30	30-40	40-50
f	2	3	5	4	6

16. Calculate the standard deviation from the given data.

Class interval	0-4	4-8	8-12	12-16	16-20
Frequency	10	8	12	6	4

Group D 1x4=4

17. Two functions are f(x)=$\frac{2x+5}{8}$ and g(x)=3x-4. If $(fog)^{-1}$(x) is an identity function, find the value of x.

THE END

EMBOCS NAWALPARASI

Model Questions for Secondary Terminal Examination -2081

Sub: Opt : Math **Time** **FM:50**

Class:10 **Group A 7x1=6**

1a)Define identity function.

b) Write a condition to be a continuous for a function.

2a) If matrix A=$\begin{pmatrix}3 & 5\\ 1 & 2\end{pmatrix}$ find A^{-1}.

3a) If θ be the angle between the two straight lines whose equations are as $y=m_1x+c_1$ and $y=m_2x+c_2$, then find the value of $\tan\theta$.

b) The slopes of two straight lines L1 and L2 are M1 and M2 respectively. write the condition of parallelism of lines.

4a) Express sinA in term of $\tan\frac{A}{2}$.

b) Write cosx+cosy into product form.

Group B 7x2=14

5a) If $f(x)=\frac{2x-3}{5}$, Find the value of $f^{-1}(\frac{1}{5})$.

b) Find the obtuse angle between the lines 2x-y+3=0 and x-3y+4=0.

6a)Find the value of D_1 and D_2 from the given equation y=2x, x+2y=10 by cramers rule.

b) prove that: $\frac{\sin\theta+sin\frac{\theta}{2}}{1+cos\theta+cos\theta/_2}=\tan\frac{\theta}{2}$.

7a) Find the value of $\sin75°-sin15°$.

b)The position vectors of A and B are $\underset{7i}{\rightarrow}+\underset{2j}{\rightarrow}$ and $\underset{3i}{\rightarrow}-\underset{4j}{\rightarrow}$ respectively. If the point P is the midpoint of line AB, find the position vectors of point P.

8a) In a data , the first quartile and quartile deviation are 17.5 and 20 respectively. Find the third quartile and coefficient of quartile deviation.

Group C 7x3=21

9. If f(x)=2x-4, then prove that $(fof^{-1})x$ is an identitity function.

10, If $f(x)=\begin{cases}3x+5 & x<3\\ 6x-4 & x\geq 3\end{cases}$

i) For x=2.9999, find the value of f(x)

ii) For x=3.0001 find the value of f(x)

iii) Is the function f(x) continuous at x=3.give reason

11. Prove that: 2cos4A+1= (2cosA-1) (2cosA+1) (2cos2A-1)

12. Solve the equation by matrix method. 2x-3y=7and 4y-3x= -1

13. Find the equation of a pair of line through (2,5) and perpendicular to the line 5x+2y=7

14. . Calculate the mean deviation from the mean of the given data

x	0-15	15-30	30-45	45-60	60-75
f	2	7	10	6	5

15. Calculate the standard deviation from the given data.

Class interval	0-4	4-8	8-12	12-16	16-20
Frequency	12	10	8	5	15

Group D 4x2=8

16.Find the equation of straight line passing through the point (3,2) and making angle 0f 45° $with\ line\ x-2y-3=0$

17. Solve: y^3-19y-30=0

THE END*

EMBOCS NAWALPARASI

Model Questions for Third Terminal Examination -2081

Sub: Opt : Math **Time** **FM:75**

Class:10 **Group A 10x1=10**

समूह क Group 'A' $10 \times 1 = 10$

1. त्रिकोणमितीय फलनको परिभाषा लेख्नुहोस् ।
   Define trigonometric function.
2. दुई सङ्ख्याहरू a र b बिचको अङ्कगणितीय मध्यक कति हुन्छ ?
   What is arithmetic mean between two numbers a and b.
3. अविच्छिन्न सङ्ख्याहरूको समुहको नाम लेख्नुहोस् ।
   Write the name of the set of numbers which is continuous.
4. यदि मेट्रिक्स $A = \begin{vmatrix} a & b \\ c & d \end{vmatrix}$ भए, |A| को मान कति हुन्छ ?
   If matrix $A = \begin{vmatrix} a & b \\ c & d \end{vmatrix}$ what is the value of |A|?
5. यदि दुई सिधा रेखाहरूका बिचको कोण θ र झुकाव क्रमशः m_1 र m_2 भए $\tan\theta$ को मान पत्ता लगाउने सूत्र लेख्नुहोस् ।
   If the angle between two straight lines is θ and their slopes are m_1 and m_2 respectively, write the formula to find the value of $\tan\theta$.
6. एउटा सोझीलाई समतलीय सतहले आधारसगँ समानान्तर हुने गरी प्रतिच्छेदन गर्दा कस्तो आकृति बन्छ लेख्नुहोस् ।
   Which geometric figure will be formed if a plane intersects a cone parallel to its base? Write.
7. $\sin 2A$ लाई $\tan A$ को रूपमा व्यक्त गर्नुहोस् ।
   Express $\sin 2A$ in terms of $\tan A$.
8. उन्नतांश कोणको परिभाषा लेख्नुहोस् ।
   Define angle of elevation.
9. यदि $\vec{a}$ र $\vec{b}$ बिचको कोण θ भए $\vec{a}$ र $\vec{b}$ को स्केलर गुणन के हुन्छ ?
   What is the scalar product of two vectors $\vec{a}$ and $\vec{b}$ if the angle between them is θ?
10. केन्द्रबिन्दु O र अर्धव्यास r भएको वृत्तमा कुनै विपरीत स्थानान्तरणमा P को प्रतिबिम्ब P′ भए OP, OP′ र r को सम्बन्ध लेख्नुहोस् ।
    If P′ is the image of P and r is radius of circle with centre O in an inversion transfomation, write the relation of OP, OP′ and r.

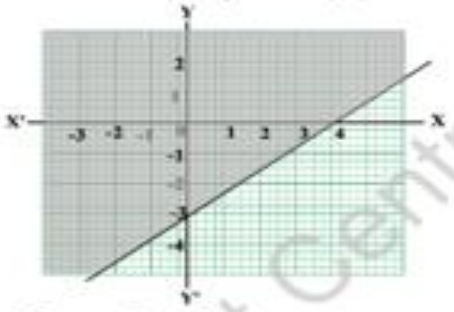
समूह ख Group 'B' $8 \times 2 = 16$

11. यदि $2x^3 - 7x^2 + x + 10 = (x-1)Q(x) + R$, भए शेष R र भागफल $Q(x)$ पत्ता लगाउनुहोस् ।

If $2x^3 - 7x^2 + x + 10 = (x-1)Q(x) + R$, find the reminder R and quotient $Q(x)$.

12. दिइएको ग्राफमा छाया पारिएको भागलाई जनाउने असमानता लेख्नुहोस् ।

Write down the inequality represented by the shaded region in the adjoining figure.



13. समीकरणहरू $4x - 5y = 2$ र $3x + 4y = 48$ मा क्रामरको नियम प्रयोग गरी x र y का गुणाङ्कहरूका डिटरमिनान्टहरू क्रमशः D_1 र D_2 पत्ता लगाउनुहोस् ।

Find the determinants D_1 and D_2 of coefficient of x and y by using Cramer's rule from the equations $4x - 5y = 2$ and $3x + 4y = 48$.

14. समीकरणहरू $3x + 4y + 5 = 0$ र $6x + 8y + 7 = 0$ भएका रेखाहरूका भुकाव पत्ता लगाई ती रेखाहरूको सम्बन्ध लेख्नुहोस् ।

Find the slopes of two straight lines having equations $3x + 4y + 5 = 0$ and $6x + 8y + 7 = 0$ and write the relationship between them.

15. sin6A.cos4A लाई sine वा cosine को योग वा अन्तरमा रूपान्तरण गर्नुहोस् ।

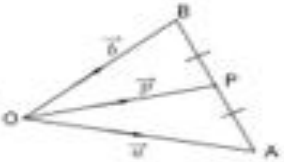
Convert sin6A.cos4A into sum or difference of sine or cosine.

16. यदि $2sin2\theta = \sqrt{3}$ भए θ को मान पत्ता लगाउनुहोस् . ($0° \leq \theta \leq 180°$)

If $2sin2\theta = \sqrt{3}$, find the value of θ. ($0° \leq \theta \leq 180°$)

17. दिइएको चित्रमा O उद्गम बिन्दु हो । यदि $\vec{a}$ र $\vec{b}$ बिन्दु A र B का स्थिति भेक्टर भए, बिन्दु P को स्थिति भेक्टर $\vec{p} = \frac{1}{2}(\vec{a} + \vec{b})$ हुन्छ भनी देखाउनुहोस् ।

O is the origin in the given figure. If $\vec{a}$ and $\vec{b}$ are the position vector of the points A and B, show that the position vector of point P is $\vec{p} = \frac{1}{2}(\vec{a} + \vec{b})$



18. यदि एउटा श्रेणीको पहिलो चतुर्थांश (Q_1) = 35 र तेस्रो चतुर्थांश (Q_3) = 75 भए, चतुर्थांशीय विचलन र यसको गुणाङ्क पत्ता लगाउनुहोस् ।

In a series, the first quartile (Q1) = 35 and third quartile (Q3) = 75, find the quartile deviation and it's coefficient.

समूह ग Group 'C' $11 \times 3 = 33$

19. यदि दुई फलनहरू $f(x) = \frac{2x+5}{3}$ र $g(x) = 3x - 4$ भए $(f \circ g)^{-1}(3)$ पत्ता लगाउनुहोस् ।

If two functions are $f(x) = \frac{2x+5}{3}$ and $g(x) = 3x - 4$, find $(f \circ g)^{-1}(3)$.

20. लेखाचित्र विधिद्वारा हल गर्नुहोस् ।

Solve by graphical method:
$2x^2 + x - 6 = 0$.

21. वास्तविक फलन f(x) = 2x + 3 का लागि f(2.99), f(3.01) र f(3) का मानहरू पत्ता लगाउनुहोस् । के यो फलन x = 3 मा अविच्छिन्न हुन्छ ?

For a real valued function f(x) = 2x + 3, find the values of f(2.99), f(3.01) and f(3). Is this function continuous at x = 3?

22. मेट्रिक्स विधिको प्रयोग गरी तल दिइएका समीकरणहरू हल गर्नुहोस् :

Use matrix method to solve the following systems of equations:

$3x + 5y = 11, 2x - 3y = 1$

23. समीकरण $6x^2 - xy - y^2 = 0$ ले प्रतिनिधित्व गर्ने जोडा रेखाहरूको समीकरण पत्ता लगाउनुहोस् र ती रेखाहरू बिचको कोण पनि पत्ता लगाउनुहोस् ।

Find the equations of the pair of lines represented by the equation $6x^2 - xy - y^2 = 0$ and also find the angle between them.

24. प्रमाणित गर्नुहोस् ।

Prove that: tanA + 2 tan2A + 4 cot4A = cot A

25. यदि $A + B + C = \pi$ भए प्रमाणित गर्नुहोस् :

If $A + B + C = \pi$, prove that: $\sin^2A - \sin^2B + \sin^2C = 2\sin A\cos B\sin C$

26. एउटा धरहराको ठिक अगाडि जमिनको सतहमा रहेको कुनै एक स्थानबाट धरहराको माथि ठड्याइएको 6m अग्लो झ्यालदण्डको टुप्पो र फेदका उन्नतांश कोणहरू क्रमशः 60° र 45° पाइयो । धरहराको उचाइ र धरहराको फेदबाट यो बिन्दुसम्मको दुरी पत्ता लगाउनुहोस् ।

From a place at the ground level in front of a tower, the angle of elevations of the top and bottom of flag staff 6m high situated at the top of a tower are observed 60° and 45° respectively. Find the height of the tower and the distance between the base of the tower and point of observation.

27. एकाइ वर्ग $\begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix}$ लाई समानान्तर चतुर्भुज $\begin{pmatrix} 0 & 3 & 4 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix}$ का रूपमा

समूह ग Group 'C' $11 \times 3 = 33$

19. यदि दुई फलनहरू $f(x) = \frac{2x+5}{8}$ र $g(x) = 3x - 4$ भए $(f \circ g)^{-1}(3)$ पत्ता लगाउनुहोस् ।

If two functions are $f(x) = \frac{2x+5}{8}$ and $g(x) = 3x - 4$, find $(f \circ g)^{-1}(3)$.

20. लेखाचित्र विधिद्वारा हल गर्नुहोस् ।

Solve by graphical method:

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

21. वास्तविक फलन f(x) = 2x + 3 का लागि f(2.99), f(3.01) र f(3) का मानहरू पत्ता लगाउनुहोस् । के यो फलन x = 3 मा अविच्छिन्न हुन्छ ?

For a real valued function f(x) = 2x + 3, find the values of f(2.99), f(3.01) and f(3). Is this function continuous at x = 3?

22. मेट्रिक्स विधिको प्रयोग गरी तल दिइएका समीकरणहरू हल गर्नुहोस् :

Use matrix method to solve the following systems of equations:

$3x + 5y = 11, 2x - 3y = 1$

23. समीकरण $6x^2 - xy - y^2 = 0$ ले प्रतिनिधित्व गर्ने जोडा रेखाहरूको समीकरण पत्ता लगाउनुहोस् र ती रेखाहरू बिचको कोण पनि पत्ता लगाउनुहोस् ।

Find the equations of the pair of lines represented by the equation $6x^2 - xy - y^2 = 0$ and also find the angle between them.

24. प्रमाणित गर्नुहोस् ।

Prove that: tanA + 2 tan2A + 4 cot4A = cot A

25. यदि $A + B + C = \pi^c$ भए प्रमाणित गर्नुहोस् :

If $A + B + C = \pi^c$, prove that: $\sin^2A - \sin^2B + \sin^2C = 2\sin A\cos B\sin C$

26. एउटा धरहराको ठिक अगाडि जमिनको सतहमा रहेको कुनै एक स्थानबाट धरहराको माथि ठड्याइएको 6m अग्लो झ्यालदण्डको टुप्पो र फेदका उन्नतांश कोणहरू क्रमशः 60° र 45° पाइयो । धरहराको उचाइ र धरहराको फेदबाट सो बिन्दुसम्मको दुरी पत्ता लगाउनुहोस् ।

From a place at the ground level in front of a tower, the angle of elevations of the top and bottom of flag staff 6m high situated at the top of a tower are observed 60° and 45° respectively. Find the height of the tower and the distance between the base of the tower and point of observation.

27. एकाइ वर्ग $\begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix}$ लाई समानान्तर चतुर्भुज $\begin{pmatrix} 0 & 3 & 4 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix}$ का रूपमा स्थानान्तरण गर्ने 2×2 मेट्रिक्स पत्ता लगाउनुहोस् ।

Find the 2×2 matrix which transforms unit square $\begin{pmatrix} 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \end{pmatrix}$ to a parallelogram $\begin{pmatrix} 0 & 3 & 4 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix}$

28. दिइएको तथ्याङ्कको मध्यक भिन्नता र यसको गुणाङ्क पत्ता लगाउनुहोस् :
Find the mean deviation and its coefficient of the given data.

प्राप्ताङ्क (Marks obtained)	0-10	10-20	20-30	30-40	40-50
विद्यार्थी सङ्ख्या (No. of students)	2	3	6	5	4

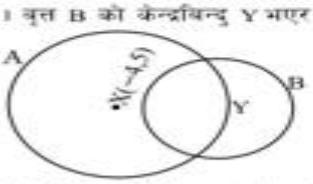
29. दिइएको तथ्याङ्कबाट स्तरीय भिन्नता पत्ता लगाउनुहोस् :
Find the standard deviation from given data.

उमेर (Age)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
मानिसको सङ्ख्या (No. of Persons)	4	6	10	20	6	4

समूह घ 'Group D' $4 \times 4 = 16$

30. एउटा समानान्तरीय श्रेणीमा तीनओटा पदहरूको योगफल 24 छ । यदि ती पदहरूमा क्रमशः 1, 6 र 18 जोड्दा परिणाम गुणोत्तर श्रेणीमा हुन्छ भने ती पदहरू निकाल्नुहोस् ।
The sum of three terms in an arithmetic series is 24. If 1, 6 and 18 are added to them respectively, the results are in geometrical series, find the terms.

31. दिइएको चित्रमा X र Y क्रमशः A र B को केन्द्रबिन्दुहरू हुन् । वृत्त B को केन्द्रबिन्दु Y भएर वृत्त A गएको छ । यदि वृत्त B को समीकरण $x^2 + y^2 - 4x + 6y - 12 = 0$ र X को निर्देशाङ्क $(-4, 5)$ छ भने वृत्त A को समीकरण पत्ता लगाउनुहोस् ।

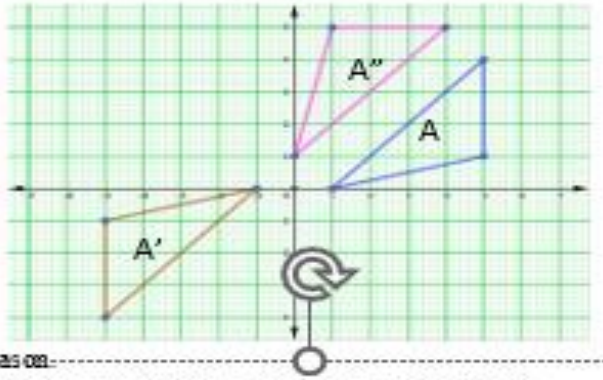


In the given figure, X and Y are the center of circles A and B respectively. Circle A passes through the centre Y of the circle B. If the equation of the circle B is $x^2 + y^2 - 4x + 6y - 12 = 0$ and the coordinates of X is $(-4,5)$, find the equation of the circle A.

32. भेक्टर विधिको प्रयोग गरी कुनै पनि चतुर्भुजका भुजाहरूका मध्यबिन्दुहरू क्रमशः जोड्दै जाँदा बन्ने चतुर्भुज समानान्तर चतुर्भुज हुन्छ, भनी प्रमाणित गर्नुहोस् ।

By using vector method, prove that the quadrilateral formed by joining the midpoints of adjacent sides of a quadrilateral is a parallelogram.

33. दिइएको आकृतमा त्रिभुज A को प्रतिबिम्ब A' र A' को प्रतिबिम्ब A'' भए The image of the triangle A is A' and image of A' is A'' in the given graph



(क) कुन रूपान्तरणद्वारा त्रिभुज A को प्रतिबिम्ब A' हुन्छ ? कारणसहित लेख्नुहोस् । By what transformation the image of the triangle A is A' ? Write with reason.

(ख) कुन रूपान्तरणद्वारा त्रिभुज A' को प्रतिबिम्ब A'' हुन्छ ? कारणसहित लेख्नुहोस् । By what transformation the image of the triangle A' is A'' ? Write with reason.

(ग) माथिका दुई रूपान्तरणको संयुक्त रूपान्तरणलाई जनाउने रूपान्तरण कुन हुन्छ ? कारणसहित लेख्नुहोस् । Write the name of transformation which denotes the combined transformation of above two transformations ? Write with reason.