

आधारभूत तह परीक्षा २०८१
Basic Level Education 2025
अनिवार्य गणित Compulsory Mathematics

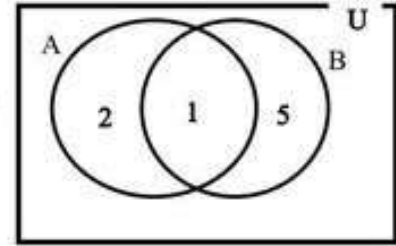
कक्षा (Class): 8
समय (Time): 2 hours

पूर्णाङ्क (Full Marks): 50

सबै प्रश्न अनिवार्य छन् । Attempt all questions.

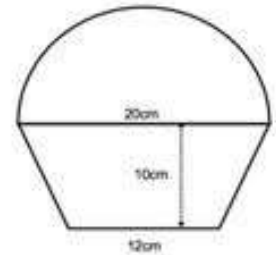
- 1) दुईओटा समूहहरू A र B लाई भेनचित्रमा प्रस्तुत गरिएको छ । Two sets A and B are presented in the Venn diagram.

- A) समूह A र समूह B अलगिएका वा खप्टिएका कस्ता समूह हुन् पहिचान गरी लेख्नुहोस् । Identify and write whether the sets A and B are overlapping or disjoint? 1 mark
- B) समूह B बाट बन्ने अनुपयुक्त उपसमूह उल्लेख गर्नुहोस् । Illustrate improper subset can be made from set B. 1 mark
- C) समूह A र समूह B बाट बढीमा कतिवटा साझा उपयुक्त उपसमूहहरू बनाउन सकिनेछन् ? How many maximum common proper subsets can be made from set A and set B? 1 mark



- 2) एकजना अधिकृतको मासिक तलब रु. 43,689 छ । उनको मासिक बचत रकम भन्दा खर्च रकम दोब्बर छ । The monthly salary of an officer is Rs. 43,689. The expenditure amount is double of the saving amount in the month.
- A) उनले एक वर्षमा जम्मा तलब कति पाउँछन् ? How much salary does he/she get in one year? 1 mark
- B) उक्त मासिक तलबमानलाई पञ्चआधार सङ्ख्या पद्धतिमा रूपान्तरण गर्नुहोस् । Convert the amount of monthly salary in the quinary number system. 2 marks
- C) उनले एक महिनामा कति रकम बचत गर्छन् ? How much amount did he/she save in a month? 2 marks
- 3) एउटा कम्प्युटरको अङ्कित मूल्य रु. 50000 छ । रामले उक्त कम्प्युटर छुटसहित रु. 42500 मा किन्यो र 10% नाफा राखी बेचेछ । The mark price of a computer is Rs. 50000. Ram bought it in Rs. 42500 after allowing discount and sold it with 10% profit.
- A) अङ्कित मूल्य (MP), छुट रकम (D) र विक्रय मूल्य (SP) भए SP लाई MP तथा D को रूपमा लेख्नुहोस् । If mark price (MP), discount amount (D) and selling price (SP) is given, write to SP in terms of MP and D. 1 mark
- B) रामले उक्त कम्प्युटरमा कति रकम छुट पाएछ ? पत्ता लगाउनुहोस् । How much amount did Ram get discount in a computer? Find it. 1 mark
- C) रामले उक्त कम्प्युटर कतिमा बेच्यो ? पत्ता लगाउनुहोस् । How much did Ram sell the computer for? Find it. 1 mark
- D) उक्त कम्प्युटरको छुट रकम र नाफा रकम तुलना गर्नुहोस् । Compare the discount amount and profit amount of the computer. 1 mark
- 4) वि. सं. 2078 सालको जनगणनाअनुसार नेपालको जनसङ्ख्या वृद्धिदर 0.93% छ । According to the census of 2078 BS, the population growth rate of Nepal is 0.93%
- A) 0.93 आनुपातिक वा अनानुपातिक कस्तो सङ्ख्या हो लेख्नुहोस् । Write 0.93 is either rational or irrational number. 1 mark
- B) 0.93 लाई वैज्ञानिक सङ्केतमा रूपान्तरण गर्नुहोस् । Convert 0.93 into scientific notation. 2 marks
- C) 0.93 लाई भिन्नमा रूपान्तरण गर्नुहोस् । Convert 0.93 into fraction. 2 marks

- 5) दिइएको चित्रमा समलम्ब चतुर्भुजमाथि अर्धवृत्ताकार आकृति देखाइएको छ । समलम्ब चतुर्भुजका दुई समानान्तर भुजाहरू नाप 12 से.मी. र 20 से.मी. छ भने त्यसको उचाइ 10 से.मी. छ । In the figure, a shape of semicircle is shown above the trapezium. The lengths of two parallel sides of trapezium are 12 cm and 20 cm respectively with height of 10 cm.



- A) समलम्ब चतुर्भुजको क्षेत्रफल पत्ता लगाउने सूत्र लेख्नुहोस् । Write the formula for finding area of trapezium. 1 mark
- B) समलम्ब चतुर्भुजको क्षेत्रफल पत्ता लगाउनुहोस् । Find the area of trapezium. 1 mark
- C) अर्धवृत्तको क्षेत्रफल भन्दा समलम्ब चतुर्भुजको क्षेत्रफल कतिले कम वा बढी छ ? गणना गर्नुहोस् । How many more or less than the area of the trapezium than the area of semicircle? Calculate it. 2 marks
- D) के समलम्ब चतुर्भुजमा एउटा विकर्ण खिच्दा बन्ने दुई त्रिभुजहरूको क्षेत्रफल बराबर हुन्छ त ? तर्कपूर्ण जवाफ दिनुहोस् । Are the areas of two triangles formed by drawing a diagonal in a trapezium equal? Give a logical answer. 1 mark
- 6) A) दुईवटा अभिव्यञ्जकहरूको ल.स. $4a^3 - 9ab^2$ र म.स. $(2a - 3b)$ छ । पहिलो अभिव्यञ्जक $(2a - 3b)$ भए दोस्रो अभिव्यञ्जक कति हुन्छ? The LCM and HCF of two expressions are $4a^3 - 9ab^2$ and $(2a - 3b)$. If the first expression is $(2a - 3b)$, what is the second expression? 2 marks
- B) सरल गर्नुहोस्: Simplify: $\frac{x^2 - 7x + 12}{x - 3} \div \frac{x - 4}{2}$ 2 marks
- 7) A) वर्ग समिकरणको एउटा उदाहरण लेख्नुहोस् । Write an example of the quadratic equation. 1 mark
- B) यदि $m = 2$, $n = 3$, $p = 1$ र $q = -2$ भए तलको अभिव्यञ्जकको मान पत्ता लगाउनुहोस् । If $m = 2$, $n = 3$, $p = 1$ and $q = -2$, find the value of the following expressions.

$$\frac{m^p \times n^q}{p^m \times q^n}$$

2 marks

- 8) तल दुईओटा समिकरण दिइएको छ । Two equations are given below.

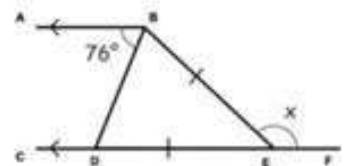
$$x + y = 5 \text{ and } x - y = 3$$

- A) ग्राफविधि प्रयोग गरी x र y को मान पत्ता लगाउनुहोस् । Find the value of x and y by using graphical method. 2 marks
- B) माथिका समिकरणलाई कस्ता समिकरण भनिन्छ ? What equations are the above equations called? 1 mark

- 9) दिइएको चित्रमा $\triangle BDE$ समद्विबाहु त्रिभुज हो । जहाँ $AB \parallel CD$ तथा $\angle ABD = 76^\circ$ र $\angle BEF = x$ छ ।

In the adjoining figure, $\triangle BDE$ is an isosceles triangle. Where, $AB \parallel CD$,

$$\angle ABD = 76^\circ \text{ and } \angle BEF = x.$$



- A) कोण $\angle ABD$ सँग बराबर हुने एकान्तर कोणको नाम लेख्नुहोस् । Write the name of alternate angle equal with $\angle ABD$. 1 mark

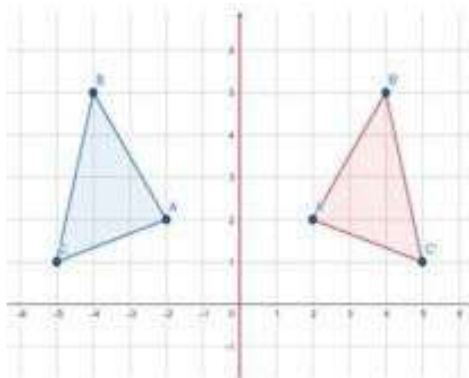
- B) x को मान कति हुन्छ ? पत्ता लगाउनुहोस् । What is the value of x ? Find it. 2 marks

- C) फरक फरक नापका दुईओटा समद्विबाहु त्रिभुजहरु बनाई समद्विबाहु त्रिभुजका आधार कोणहरु बराबर हुन्छन् भनी प्रयोगबाट परीक्षण गर्नुहोस् ।

Experimentally verify that the base angles of an isosceles triangle are equal by making two different size of isosceles triangle. 3 marks

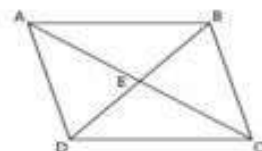
- 10) चित्रमा $\triangle ABC$ र $\triangle A'B'C'$ लाई निर्देशाङ्क सतहमा देखाइएको छ । In the figure, $\triangle ABC$ and $\triangle A'B'C'$ are shown in the coordinate plane.

- A) $\triangle ABC$ लाई कुन अक्षमा परावर्तन गरी $\triangle A'B'C'$ बनाइएको छ ? । In which axis is $\triangle ABC$ reflected to form $\triangle A'B'C'$? 1 mark
B) रेखा AB को लम्बाइ गणना गर्नुहोस् । Calculate the length of line AB. 2 marks
C) के समद्विबाहु त्रिभुजबाट टेट्राहेड्रन बनाउन सकिन्छ ? कारण दिनुहोस् । Can a tetrahedron be made from an isosceles triangle? Give reason. 1 mark



- 11) चित्रमा समानान्तर चतुर्भुज ABCD का विकर्णहरू AC र BD बिन्दु E मा काटिएका छन् । In the figure, diagonals AC and BD are intersected at E on the parallelogram ABCD.

- A) कम्पासको प्रयोग गरी समानान्तर चतुर्भुज ABCD को रचना गर्नुहोस् । जहाँ, $DC = 5$ cm र $BC = 4$ cm तथा $\angle ADC = 120^\circ$ छ । Construct a parallelogram ABCD by using compass, where $DC = 5$ cm, $BC = 4$ cm and $\angle ADC = 120^\circ$. 3 marks



- B) प्रमाणित गर्नुहोस् । Prove that : $\triangle ABC \cong \triangle ADC$ 2 marks

- 12) तल दिइएको तालिकामा एउटा परिवारको तीन महिनाको मासिक खर्चको विवरण दिइएको छ । In the table given below, the monthly expenditure of a family of three months is given.

महिना (Month)	खर्च रकम रु. मा (Amount of Expenditure in Rs.)
वैशाख (Baisakh)	24000
जेठ (Jetha)	28000
असार (Asar)	20000

- A) माथिको तथ्याङ्कलाई वृत्त चित्रमा प्रस्तुत गर्नुहोस् । Represent the above information in the pie-chart. 2 marks
B) माथि दिइएको तथ्याङ्कबाट तीन महिनाको औसत खर्च गणना गर्नुहोस् । Calculate the average expenditure of three months of the above data. 1 mark

-The End-

Marking Scheme of the model set-1

- 1) A) Sets A and B are overlapping sets 1 mark
- B) $\{1, 5\}$ 1 mark
- C) 2 common proper subsets made from set A and B. i.e. $\phi, \{1\}$ 1 mark
- 2) A) Yearly Salary = Rs. 524268
- OR, Yearly Salary = $12 \times 43689 = \text{Rs. } 524268$ 1 mark
- B) Dividing by 5 as follows: 1 mark
- $43689 / 5 = 8737$ with remainder 4
 $8737 / 5 = 1747$ with remainder 2
 $1747 / 5 = 349$ with remainder 2
 $349 / 5 = 69$ with remainder 4
 $69 / 5 = 13$ with remainder 4
 $13 / 5 = 2$ with remainder 3
 $2 / 5 = 0$ with remainder 2
- Thus, $436895 = 2344224_5$ 1 mark
- C) $x + 2x = 43689$ 1 mark
- Saving amount in a month = Rs. 14563 1 mark
- 3) A) $SP = MP - D$ 1 mark
- B) Discount amount = Rs. 7500
- OR, Discount amount = $MP - CP = 50000 - 42500 = \text{Rs. } 7500$
- OR, Discount amount = $50000 - 42500 = \text{Rs. } 7500$ 1 mark
- C) $SP = \text{Rs. } 46750$
- OR, $SP = CP + 10\% \text{ of } CP = 42500 + 4250 = \text{Rs. } 46750$
- OR, $SP = 42500 \times 1.1 = \text{Rs. } 46750$ 1 mark

- D) Required Ratio = 30:17 or 17:30
- OR, Discount amount is Rs. 3250 more than profit amount
- OR, Profit amount is Rs. 3250 less than discount amount 1 mark
- 4) A) 0.93 is a rational number 1 mark
- B) $0.93 = \frac{93}{100}$ 1 mark
- $0.93 = 9.3 \times 10^{-1}$ 1 mark
- C) Let $x = 0.9393$ and $100x = 93.9393$ 1 mark
- $0.\overline{93} = \frac{31}{33}$ 1 mark
- 5) A) Area of trapezium = $\frac{1}{2}(a + b) \times h$ sq. unit 1 mark
- B) $A = \frac{1}{2}(12 + 20) \times 10 = 160 \text{ cm}^2$
- OR, $A = 160 \text{ cm}^2$ 1 mark
- C) Area of semicircle = 157.14 cm^2
- OR, Area of semicircle = $\frac{\pi r^2}{2} = \frac{22 \times 10 \times 10}{7 \times 2} = 157.14 \text{ cm}^2$ 1 mark
- Area of trapezium is 2.86 cm^2 more than area of semicircle 1 mark
- D) Yes, both have equal areas. 1 mark
- 6) A) $(4a^3 - 9ab^2)(2a - 3b) = (2a - 3b) \times 2^{\text{nd}} \text{ exp}$ 1 mark
- $2^{\text{nd}} \text{ exp} = (4a^3 - 9ab^2)$ 1 mark
- B) $\frac{x^2 - 7x + 12}{x - 3} \div \frac{x - 4}{2} = \frac{(x - 3)(x - 4)}{x - 3} \times \frac{2}{x - 4}$ 1 mark
- $= 2$ 1 mark
- 7) A) Any one example (eg. $x^2 + 5x + 6 = 0, x \neq 0$) 1 mark

B) $\frac{m^p \times n^q}{p^m \times q^n} = \frac{2^1 \times 3^{-2}}{1^2 \times (-2)^3}$

$$= \frac{1}{36}$$

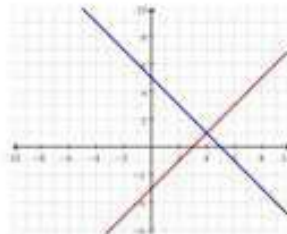
1 mark

1 mark

8) A) for correct graphical representation

$x = 4$ and $y = 1$

B) Simultaneous equations



1 mark

1 mark

1 mark

9) A) $\angle ABD = \angle BDE$

1 mark

B) $\angle BED = 28^\circ$

1 mark

$x = 152^\circ$

1 mark

C) Two different shaped figures with naming

1 mark

Correct tabulation

1 mark

Obtained data by used protractor.

1 mark

10) A) Reflection on y – axis

1 mark

B) $A = (-2,2)$, $B = (-4,5)$

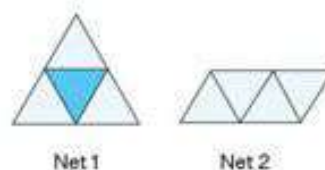
1 mark

$AB = \sqrt{13} \text{ unit}$

1 mark

C) Nets of tetrahedron (anyone)

1 mark



11) A) Draw line $DC = 5 \text{ cm}$ and $\angle ADC = 120^\circ$

1 mark



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Ex. $AB = DC$, $AD = CB$, $\angle A = \angle C$, $\angle B = \angle D$, $AC =$
 BD

Abstract

1

17. All Control Angles: 130°, 140°, 150°

8) Complete chart (20 questions in class period)

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