

काठमाडौं महानगरपालिका
वार्षिक परीक्षा - २०८१
गणित(Mathematics)

Set 9

कक्षा : ९

समय : ३ घण्टा

पूर्णाङ्क : ७५

सबै प्रश्न अनिवार्य छन्। (Attempt all the questions)

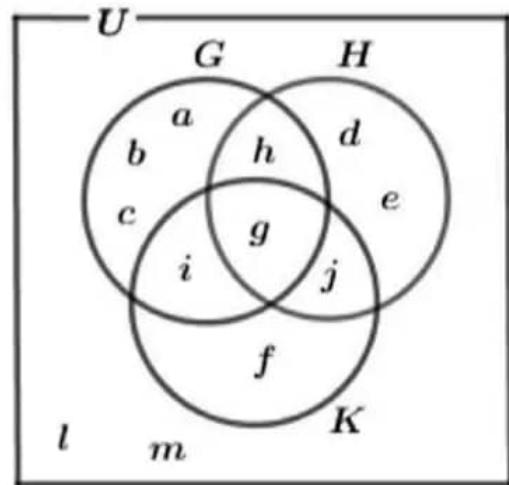
1. दिइएको भेन चित्रको आधारमा तलका प्रश्नहरूको उत्तर दिनुहोस्। (From the Venn diagram given alongside answer the following questions.)

- (a) सर्वव्यापक समूह U को गणनात्मक सङ्ख्या कति हुन्छ? लेखुहोस्। (What is the cardinal number of the universal set U ? Write it.) [1]
- (b) समूह $(G \cap K)$ लाई सूचीकरण विधिबाट लेखुहोस्। (Write the set $(G \cap K)$ by listing method.) [1]
- (c) प्रमाणित गर्नुहोस्। (Prove that): $\overline{G} \cup \overline{H} = \overline{G} \cap \overline{H}$ [3]
- (d) सर्वव्यापक समूह U का कति प्रतिशत सदस्यहरू ($GUHUK$) मा छन्? (What percent of the elements of universal set U have ($GUHUK$)?) [1]

2. जानुका एक अस्पतालकी अविवाहित नर्स हुन्। उनको मासिक तलब रु. 46,000 छ। उनले महिनामा रु. 2,000 महाँगी भत्ता र वर्षमा एक महिनाको तलब चाडपर्व खर्चको लागि पाउँछिन्। साथै मासिक आम्दानीको 10% कर्मचारी सञ्चय कोषमा जम्मा गर्दछिन् र त्यति नै रकम अस्पतालले पनि जम्मा गरिरदिन्छ भने तल दिइएको करको दर अध्ययन गरी प्रत्रहरूको उत्तर दिनुहोस्। (Januka is an unmarried nurse of a hospital. Her monthly salary is Rs.46,000. She earns Rs.2,000 per month as dearness allowance and one month's salary once a year for festival expenses. A total of 10% of the monthly income is deposited in employees' provident fund and the same amount is deposited by the hospital in the fund. Study the tax rates given below and answer the following questions.)

करको दायरा (Tax Slabs)	आम्दानी(Income)	करको दर(Tax rate)
	Up to Rs.5,00,000	1%
	Rs.5,00,001 - Rs.7,00,000	10%
	Rs.7,00,001 - Rs.10,00,000	20%
	Rs.10,00,001 - Rs.20,00,000	30%
	Above 20 lakhs	36%

- (a) आयकर भनेको के हो? (What is meant by income tax?) [1]



- (b) उनले एक वर्षमा कति आयकर तिर्नु पर्छ ?(How much income tax should she pay in a year?) [2]
- (c) यदि उनले मासिक आम्दानीको 12% नागरिक लगानी कोष (CIT) मा जम्मा गरिन् भने कति आयकर तिर्नु पर्छ ?(If she also deposits 12% of the monthly income in Citizens Investment Trust (CIT), how much income tax she has to pay?) [1]
3. एक जना व्यक्तिले 25,000 कित्ता शेयर रहेको बैंकबाट 360 कित्ता शेयर किने । एक वर्षमा बैंकले रु.2,80,00,000 नाफा कमायो र त्यसको 8% शेयरधनीहरूलाई लाभांश वितरण गर्ने निर्णय गरेछ । (A man bought 360 shares of a bank out of 25,000 shares. In a year, the bank earned Rs.2,80,00,000 net profit and decided to distribute 8% of the profit as a dividend to its shareholders.)
- (a) कम्पनीको कुन रकमबाट नगद लाभांश वितरण गरिन्छ ?(From which amount is the cash dividend distributed?) [1]
- (b) उक्त व्यक्तिले कति लाभांश प्राप्त गर्छ ?(Find the dividend received by the man.) [2]
- (c) यदि लाभांश दर 10% भए प्रति कित्ता कति लाभांश हुने थियो ? पत्ता लगाउनुहोस् । (If the dividend rate is 10%, what will be the dividend per share? Find it.) [2]
4. विनिताको घरमा 30A को विद्युत् मिटर जडान गरिएको छ । दिइएको शुल्क दरको आधारमा तलका प्रश्नहरूको उत्तर दिनुहोस् । (In Binita's house, 30A electricity meters have connected. Answer the following questions according to the given rate of charge.)

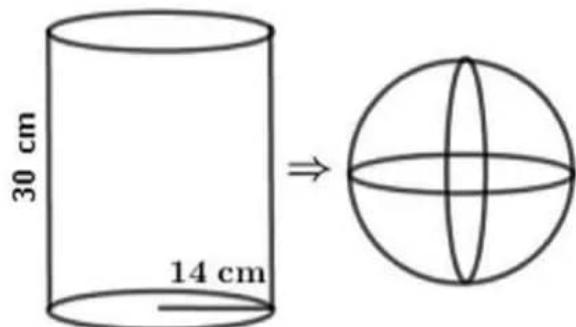
30 एम्पियर(30 Ampere)		
खपत युनिट (Consumed Units)	सेवा शुल्क (Service charge)	इनर्जी शुल्क (Energy charge)
0-20	Rs.75	Rs.5
21-30	Rs.100	Rs. 6.5
31-50	Rs.100	Rs.8
51-100	Rs.125	Rs.9.5

- (a) विनिताले 15 युनिट विद्युत् खपत गरे बापत कति महसुल तिर्नुपर्छ ?(How much money to be paid by Binita for the consumption of 15 units of electricity?) [1]
- (b) विनिताले कुनै महिनामा विद्युत् खपत गरेवापत रु.345 तिरिछन् भने उक्त महिनामा कति युनिट विद्युत् खपत भएको रहेछ ? पत्ता लगाउनुहोस् । (Binita paid Rs.345 for electricity consumption in any month, how many units of electricity consumption in that month? Find it.) [2]
- (c) विनिताले कुनै महिनाको महसुल रकम रु.100 मा सिमित गर्नका लागि अधिकतम कति युनिट खपत गर्नुपर्छ ?(What is the maximum number of units that Binita can consume to reduce the tariff amount to Rs.100 in any month?) [1]

5. वर्गाकार भुँडी भएको कोठाको क्षेत्रफल 64 वर्गमिटर र उचाई 4 मिटर छ। उक्त कोठामा 3 मि. \times 1 मि. आकारको एउटा ढोका र 1.5 मि. \times 1 मि. आकारका दुईवटा भ्याल छन्। (The area of the floor of a square room is 64 square meters and its height is 4 meters. The room has one door with a size $3 \text{ m} \times 1 \text{ m}$ and two windows with a size $1.5 \text{ m} \times 1 \text{ m}$ each.)

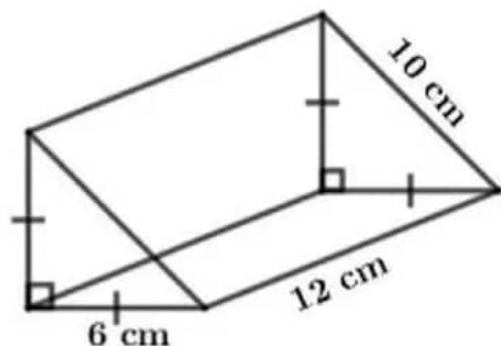
- (a) उक्त कोठाको भ्याल ढोकाबाहेक चार भित्तामा प्लास्टर गर्दा प्रति वर्गमिटर रु.250 का दरले जम्मा खर्च कति लाग्छ, पत्ता लगाउनुहोस्। (What is the total cost of plastering on the four walls of room excluding windows and doors at the rate of Rs.250 per square meter? Find it.) [3]
- (b) उक्त कोठामा लम्बाई 2 मिटर, चौडाई 1.5 मिटर र उचाई 1 मिटर भएका कार्टुनहरू नखप्टाइकन भुँडीमा बढीमा कति सङ्घायामा राख सकिएला गणना गर्नुहोस्। (How many maximum number of cartoons having length 2 m, breadth 1.5 m and height 1 m can be kept on the floor without overlapped? Calculate it.) [1]

6. चित्रमा, 14 से.मि. अर्धव्यास र 30 से.मि. उचाई भएको एउटा धातुको बेलनालाई पगालेर एउटा ठोस गोला बनाइयो। (A metallic cylinder of radius 14 cm and height 30 cm is melted and recast into a solid sphere.)



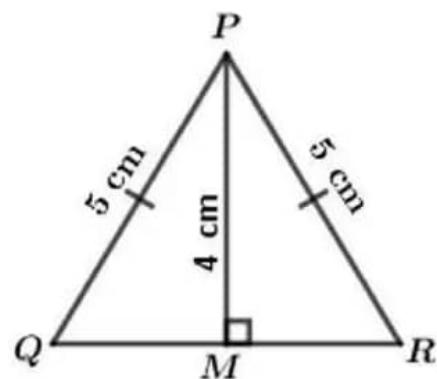
- (a) बेलनाको बक्र सतहको क्षेत्रफल निकाल्ने सूत्र लेख्नुहोस्। (Write the formula for finding the curved surface area of a cylinder.) [1]
- (b) माथिको बेलनाको आयतन निकाल्नुहोस्। (Find the volume of the above cylinder.) [2]
- (c) त्यसरी बनाइएको गोलाको अर्धव्यास निकाल्नुहोस्। (Find the radius of the sphere, so formed.) [2]
- (d) यदि 1 घन सेन्टीमिटर धातुको तौल 6 ग्राम हुन्छ भने गोलाको जम्मा तौल कति हुन्छ? (If 1 cubic centimeter of metal weighs 6 gram, then what is the total weight of the sphere?) [1]

7. यहाँ देखाइएको आकृति एउटा समद्विवाहु समकोणी त्रिभुजाकार आधार भएको प्रिज्मको हो। (The figure shown alongside is an isosceles right angled triangular based prism.)



- (a) प्रिज्मको क्रस-सेक्सनको क्षेत्रफल पत्ता लगाउने सूत्र लेख्नुहोस्। (Write the formula to find the cross-section area of the prism.) [1]

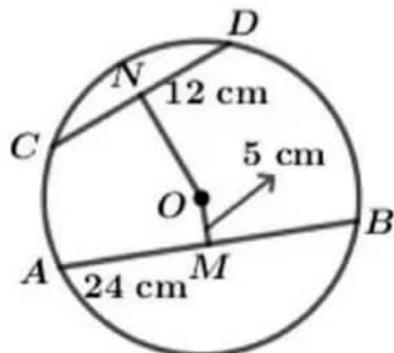
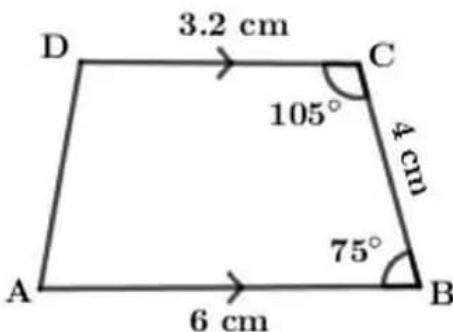
- (b) यसको आयताकार सतहहरूमा प्रति वर्ग सेन्टीमिटर रु.2 का दरले रड लगाउन कति खर्च लाग्छ ? (How much money is required to paint its rectangular surfaces at the rate of Rs.2 per square centimeter?) [2]
8. एक जना व्यक्तिले समान अनुपातमा रकम बढ़ि गरी बचत सुरु गरेछन्। (A person started his saving by increasing the amount in common ratio.)
- | बैशाख
(Baishakh)-1 | बैशाख
(Baishakh)-2 | बैशाख
(Baishakh)-3 | बैशाख
(Baishakh)-4 | |
|-----------------------|-----------------------|-----------------------|-----------------------|-------|
| Rs.5 | Rs.10 | Rs.20 | Rs.40 | |
- (a) उक्त बचत रकमबाट कस्तो प्रकारको अनुक्रम बन्छ ? (What type of sequence is formed from the saving amounts?) [1]
- (b) उक्त अनुक्रमको समान अनुपात पत्ता लगाउनुहोस्। (Find the common ratio of the sequence.) [1]
- (c) बैशाख 10 गते बचत गर्नका लागि रु.5120 पर्याप्त हुन्छ ? कारणसहित लेखुहोस्। (Is Rs.5120 sufficient to save for 10th Baishakh? Give reason with calculation.) [2]
9. (a) म.स. पत्ता लगाउनुहोस्। (Find the H.C.F. of): $x^3 - 1$ and $x^4 + x^2 + 1$ [3]
- (b) सरल गर्नुहोस्। (Simplify): $\frac{1}{1+a^{x-y}} + \frac{1}{1+a^{y-x}}$ [2]
10. दुई अड्डको सङ्घायामा एक स्थानको अड्ड दश स्थानको अड्डको दोब्बर छ। उक्त सङ्घाया र यसको विपरीत सङ्घायाको योगफल 99 छ। (In a two-digit number, the unit place digit is twice the tens place digit. The sum of the number and its reverse number is 99.)
- (a) एक स्थान र दश स्थानका अड्डहरू कमशः y र x भएको दुई अड्डको सङ्घाया लेखुहोस्। (Write a two-digit number in which y and x are in ones and tens places respectively.) [1]
- (b) दिइएका कथनहरूलाई रेखीय समीकरणहरूको रूपमा प्रस्तुत गर्नुहोस्। (Express the given statements in the form of linear equations.) [2]
- (c) उक्त दुई अड्डको सङ्घाया पत्ता लगाउनुहोस्। (Find that two digits number.) [3]
11. दिइएको चित्रमा, PQR एउटा समद्विबाहु त्रिभुज हो जसमा $PQ = PR = 5$ से.मि. र $PM = 4$ से.मि. दिइएका छन्। (In the given figure, PQR is an isosceles triangle, in which $PQ = PR = 5$ cm and $PM = 4$ cm are given.)
- (a) PM र QR बिचको सम्बन्ध लेखुहोस्। (Write the relation between PM and QR.) [1]
- (b) भुजा QR को लम्बाइ पत्ता लगाउनुहोस्। (Find the length of side QR.) [1]



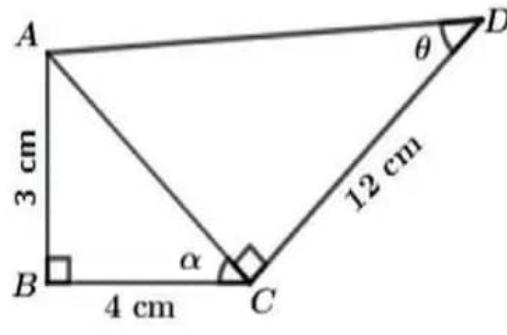
- (c) समद्विबाहु त्रिभुजका आधारका कोणहरू बराबर हुन्छन् भनी प्रयोगात्मक रूपमा परीक्षण गर्नुहोस् । (फरक नापका दुई चित्रहरू आवश्यक छन्) (Experimentally verify that the base angles of an isosceles triangle are equal. (Two figures having different measurements are necessary)) [3]
- (d) प्रमाणित गर्नुहोस् । (Prove that): $\angle PQR < \angle QPR$ [1]
12. चित्रमा समलम्ब चतुर्भुज ABCD को खेसा नमूना देखाइएको छ । (The rough sketch of trapezium ABCD is shown in the figure.)
- (a) समलम्ब चतुर्भुजको एउटा विशेषता लेख्नुहोस् । (Write an one characteristics of trapezium.) [1]
- (b) कम्पासको प्रयोग गरी चित्रमा दिइएको नापअनसुसारको समलम्ब चतुर्भुज ABCD को रचना गर्नुहोस् । (Construct the trapezium ABCD by using compass according to the given measurement in figure.) [2]
13. दिइएको चित्रमा O वृत्तको केन्द्रविन्दु हो । AB र CD जिवाहरू हुन् भने OM \perp AB तथा ON \perp CD छ । जहाँ, AB = 24 से.मि., OM = 5 से.मि. र ON = 12 से.मि दिइएको छ । (In the given figure, O is the center of the circle. AB and CD are two chords of the circle, with OM \perp AB and ON \perp CD. Where, AB = 24 cm, OM = 5 cm, ON = 12 cm are given.)
- (a) उक्त वृत्तको अर्धव्यास कर्ति हुन्छ ? पत्ता लगाउनुहोस् । (What is the radius of the circle? Find it.) [2]
- (b) जीवा AB र CD को लम्बाई तुलना गर्नुहोस् । (Compare the length of chords AB and CD.) [2]
14. कक्षा 9 का 50 जना विद्यार्थीहरूले गणित विषयमा प्राप्त गरेको अडू तलको तालिकामा देखाइएको छ । (The marks obtained by 50 students of class 9 in mathematics are given in the table below.)

प्राप्ताङ्क(Obtained Marks)	30	35	40	45	50	55
विद्यार्थी सङ्ख्या(No. of students)	6	8	14	10	8	4

- (a) कुन चतुर्थांशलाई मध्यिका भनेर चिनिन्छ ? (Which quartile is known as median?) [1]
- (b) दिइएको तथ्याङ्कको आधारमा सञ्चित वारम्बारता तालिका बनाउनुहोस् । (Construct a cumulative frequency table based on the given data.) [1]
- (c) उक्त तथ्याङ्कको पहिलो चतुर्थांश पत्ता लगाउनुहोस् । (Find the first quartile of the data.) [2]



- (d) यदि उत्तीर्ण अङ्क 35 भए कति जना विद्यार्थीहरू उत्तीर्ण भएछन् ? (If the pass mark is 35, how many students are passed?) [1]
15. राम्ररी फिटिएको 52 पत्तीको एक प्याकेट तासबाट नहेरिकन एउटा पत्ति भिकिएको छ। (A card is drawn randomly from a well shuffled deck of 52 playing cards.)
- अनिश्चित घटनाको सम्भाव्यता कति हुन्छ ? (What is the probability of an uncertain event?) [1]
 - कालो पत्ति पनेसम्भाव्यता पत्ता लगाउनुहोस्। (Find the probability of getting a black card.) [2]
 - रानी पत्ति नपनेसम्भाव्यता पत्ता लगाउनुहोस्। (Find the probability of not getting queen cards.) [2]
 - कालो पत्ति पनेसम्भाव्यता, अनुहार भएको पत्ति पनेसम्भाव्यता भन्दा कतिले बढी वा घटी हुन्छ ? पत्ता लगाउनुहोस्। (How much more or less is the probability of getting a black card than the probability of getting a faced card? Find it.) [1]
16. दिइएको चित्रमा, $\angle ABC = \angle ACD = 90^\circ$, $\angle ACB = \alpha$ र $\angle ADC = \theta$ छ। जहाँ, $AB = 3$ से.मि., $BC = 4$ से.मि. र $CD = 12$ से.मि. दिइएको छ। (In the given figure, $\angle ABC = \angle ACD = 90^\circ$, $\angle ACB = \alpha$ and $\angle ADC = \theta$. Also, $AB = 3$ cm, $BC = 4$ cm and $CD = 12$ cm are given.)
- $\tan\theta$ को त्रिकोणमितीय अनुपात लेखुहोस्। (Write the trigonometric ratio of $\tan\theta$.) [1]
 - भुजा AC को नाप पत्ता लगाउनुहोस्। (Find the length of side AC.) [1]
 - $\sin\alpha$ को मान पत्ता लगाउनुहोस्। (Find the value of $\sin\alpha$.) [1]
 - $\sin\alpha$ र $\sin\theta$ को मान तुलना गर्नुहोस्। (Compare the value of $\sin\alpha$ and $\sin\theta$.) [1]



समाप्त

पालिका स्तरीय परीक्षा समिति

Set 10

मकवानपुरगढी गाउँपालिका

वार्षिक परीक्षा-२०८१

कक्षा : ९

विषय : अ. गणित

पूँण्ड : ७५

समय : ३ घण्टा

सबै प्रश्नहरु अनिवार्य छन्। (All the questions are compulsory.)

1. यदि सर्वव्यापक समूह $U = \{1 \text{ देखि } 10 \text{ सम्मका पूँण्सङ्घाहरु}\}$ का उपसमूहहरु $A = \{3 \text{ का अपवर्त्यहरु}\}$, $B = \{6 \text{ का गुणनखण्डहरु}\}$ र $C = \{\text{विजोर सङ्घाहरु}\}$ छन् भने, (If the subsets of the Universal set $U = \{\text{Whole numbers from 1 to 10}\}$ are $A = \{\text{Multiples of 3}\}$, $B = \{\text{factors of 6}\}$ and $C = \{\text{Odd numbers}\}$ then,)
 (a) U को गणनात्मकता कति हुन्छ ? लेख्नुहोस्। (What is the cardinality of the set U ? Write.) [1]
 (b) माथिको जानकारीलाई भेनचित्रमा बेखाउनुहोस्। (Show the above information in Venn-diagram.) [1]
 (c) प्रमाणित गर्नुहोस्। (Prove that): $A - (B \cup C) = (A \cup B) - (B \cup C)$ [3]
 (d) $A \cup B \cup C$ र $B \cup C$ कस्ता समूह हुन् ? कारणसहित लेख्नुहोस्। (What is the relationship between the sets $A \cup B \cup C$ and $B \cup C$? Write with reasons.) [1]
2. एउटा पुस्तक पसलमा काम गर्ने एक कर्मचारीको मासिक तलब रु. २०,००० छ। जम्मा रु. १२,००,००० व्यापार भएको महिनाको जम्मा कमाई रु. ३२,००० भयो भने, (A man working in a book stall has monthly salary of Rs.20,000. In a month with total sale of Rs.12,00,000, his total income is Rs.32,000, then)
 (a) कमिसन रकम भनेको के हो ? (What is the commission amount?) [1]
 (b) कमिसन दर पत्ता लगाउनुहोस्। (Find the commission rate.) [2]
 (c) कमिसन रकम रु. १८,००० हुनलाई मासिक व्यापार कति हुनुपछ ? (What should be the total sale to get Rs.18,000 as commission?) [2]
3. एक जना मानिसले एउटा वासिङ मेसिन १०% छुट र १३% VAT सहित रु. ३१,१८८ मा किनेछन्। (A man bought a washing machine for Rs.31,188 with 10% discount and 13% VAT.)
 (a) मूल्य अभिवृद्धि कर भनेको के हो ? (What is value added tax?) [1]
 (b) उक्त वासिङ मेसिनको अद्वित मूल्य कति हो ? (What will be the marked price of the washing machine?) [2]
 (c) विना छुट उक्त मेसिनको मूल्य कति पछं होला ? (Without discount, what will be the cost of the machine?) [1]
4. नेपाल विद्युत् प्राधिकरणले मिति २०७८-०७-०८ मा जारी गरेको विद्युत् महसुल दर निम्नानुसार छ। (The Electricity Tariff rate on date 2078-07-08 by Nepal Electricity Authority is as follows):

एकाइ(Units)	15 एम्पियर(15 Ampere)	
	सेवा शुल्क(Service Charge (Rs.))	दर(Rate (Rs.))
0-20	50	4.00
21-30	75	6.50
31-50	75	8.00
51-100	100	9.50

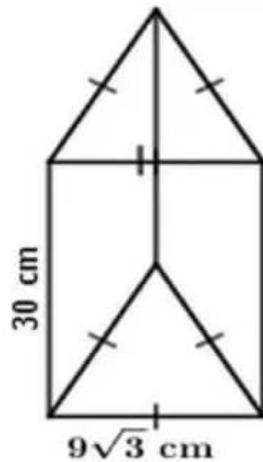
श्री जनक माध्यमिक विद्यालयमा 15 एम्पियरको मिटरबक्स जडान गरिएको छ। विद्यालयको पुष महिनाको बिजुलीको बिल निम्नानुसार देखियो। (A 15 ampere meter has been installed in Shree Janak Secondary School. The electricity bill of the school for the month of Poush was shown as follows):

हालको अड्ड (Present RDG) = 35450

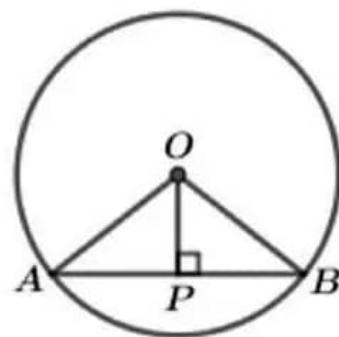
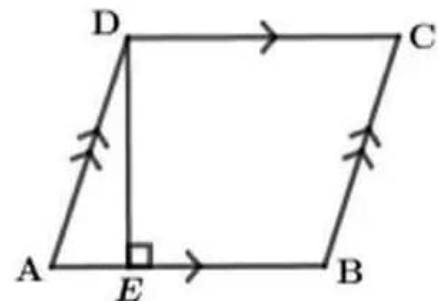
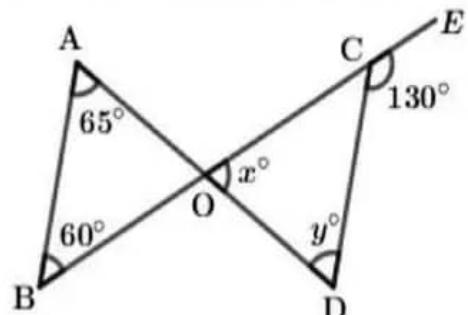
साविकको अड्ड (Previous RDG) = 35380

- (a) श्री जनक माध्यमिक विद्यालयमा पुष महिनामा कति युनिट विद्युत् खपत भएछ ? (How much unit of electricity is consumed in Janak Secondary School in month of Poush ?) [1]
- (b) श्री जनक माध्यमिक विद्यालयले पुष महिनामा जम्मा कति महसुल बुझाउनु पर्छ ? (How much Rs. should Janak Secondary School pay in the month of Poush?) [2]
- (c) उक्त विद्यालयले माघ महिनाको महसुल रकम रु.500 मा सीमित गर्नका लागि अधिकतम कति युनिट विद्युत् खपत गर्न सक्छ ? गणना गरी उल्लेख गर्नुहोस्। (What is the maximum number of units that the school can consume to reduce the tariff amount to Rs.500 for the month of Magh? Calculate and mention.) [1]
5. एउटा त्रिभुजाकार जग्गाको किनाराहरू 3:5:7 को अनुपातमा छन् र यसको परिमिति 300 मिटर छ। (The ratio of triangular land is 3:5:7 and its perimeter is 300 m.)
- (a) समबाहु त्रिभुजको क्षेत्रफल पत्ता लगाउने सूत्र के हो ? (What is the formula of finding area of equilateral triangle?) [1]
- (b) उक्त त्रिभुजाकार जग्गाको क्षेत्रफल पत्ता लगाउनुहोस्। (Find the area of triangular land.) [2]
- (c) यदि सो जग्गालाई छिमेकी संगको सहकायेमा वर्गाकार रूपमा बदल्ने हो भने उक्त जग्गाको लम्बाई कति हुन्छ ? (If the land is converted in the square form with the co-ordination of neighbor, what will be the length of a side?) [2]
6. विद्यालयमा विभिन्न कार्यक्रम सञ्चालन गर्न एउटा ठुलो हल बनाइएको छ। उक्त हलको भित्री लम्बाई, चौडाई र उचाई क्रमशः 30 मी., 25 मी. र 4 मी. छ। उक्त हलमा 2.5 मी. \times 1.5 मी. का 5 ओटा भ्याल र 5 मी. \times 3 मी. का दुइओटा ढोका छन्। (In a school, a hall is constructed to perform different programs. The length, breadth and height of the internal dimensions are 30 m, 25 m and 4 m respectively. In a hall there are 5 windows of dimensions 2.5 m \times 1.5 m and 2 doors of dimensions 5 m \times 3 m. then)

- (a) भुइं र सिलिङ्को क्षेत्रफल पत्ता लगाउने सूत्र के हो ?(What is the formula of finding the area of floor and ceiling?) [1]
- (b) भ्याल र ढोकाबाहेक चार भित्ताको क्षेत्रफल कति हुन्छ ? पत्ता लगाउनुहोस्। (What is the area of four walls excluding door and window? Find it.) [2]
- (c) भित्तामा प्रति वर्गमीटरमा तीनओटा झण्डा बनाइएको छ भने, जस्ता कतिओटा झण्डा बनाइएको होला ?(If 3 flags are drawn per square meter, how many flags are drawn in the wall?) [1]
7. चित्रमा दिइएको त्रिभुजाकार प्रिज्मको आधार $9\sqrt{3}$ से.मी. भुजा भएको समबाहु त्रिभुज छ। यदि सो त्रिभुजको उचाई 30 से.मी.छ भने, (In the given figure of equilateral triangular based prism length of side of base triangle is $9\sqrt{3}$ cm and height of prism is 30 cm. Then,) (a) दिइएको प्रिज्मको पूरा सतहको क्षेत्रफल पत्ता लगाउनुहोस्।(Find the total surface area of given prism.) [3] (b) दिइएको प्रिज्मको आयतन पत्ता लगाउनुहोस्।(Find the volume of given prism.) [1]
8. समानान्तरीय अनुक्रममा रहेका पहिलो 5 ओटा पदहरु तल उल्लेख गरिएको छ (The first 5 terms of the arithmetic sequence are illustrated below):
3, 7, 11, 15, 19,..... (a) समानान्तरीय अनुक्रमको साधारण पद पत्ता लगाउने सूत्र लेख्नुहोस्। (Write the formula for finding general term of the arithmetic sequence.) [1] (b) उक्त अनुक्रमको समान अन्तर पत्ता लगाउनुहोस्। (Find the common difference of the sequence.) [1] (c) उक्त अनुक्रमको 9 औं पद कति हुन्छ ? पत्ता लगाउनुहोस्। (Find the 9th term of that sequence.) [2]
9. (a) म. स. पत्ता लगाउनुहोस्।(Find HCF) : $x^3 + 27$ and $x^4 + 9x^2 + 81$ [3] (b) सरल गन्तुहोस्।(Simplify): [3]
- $$\frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{b-c}+x^{a-c}} + \frac{1}{1+x^{c-a}+x^{b-a}}$$
10. एउटा सङ्घर्षा 10 र 100 को बीचमा पछ्छ। त्यो सङ्घर्षा त्यसका अड्हहरुको योगको 8 गुणा छ र यदि त्यो सङ्घर्षाबाट 45 घटायो भने त्यो सङ्घर्षाको विपरीत सङ्घर्षा बन्दछ भने, (A number lies between 10 and 100. The number is 8 times the sum of two digits and if 45 is subtracted from the number, the number is reversed, then) (a) दिइएको कथनलाई रेखित समीकरणको रूपमा प्रस्तुत गन्तुहोस्। (Present the statement in the form of linear equation.) [1] (b) उक्त सङ्घर्षा पत्ता लगाउनुहोस्।(Find the number.) [2]



- (c) उक्त संख्या र अड्को स्थान बदल्दाको संख्याको भिन्नता पत्ता लगाउनुहोस् । (Find the difference between the number and its reverse.) [2]
11. त्रिभुज PQR को एउटा भुजा QR लाई S सम्म लम्बाइएको छ । (In the triangle PQR a side QR is produced up to S.)
- (a) दुइओटा फरक फरक नापका त्रिभुज PQR को चित्र बनाई त्रिभुजको वाहिरी कोण र त्यस कोणसँग अनासन्न दुइ भिन्नी कोणको योगफलको सम्बन्धलाई प्रयोगात्मक रूपमा परीक्षण गर्नुहोस् । (Construct two triangles PQR and verify the relation of the sum of two non-adjacent interior angles and exterior angle of the triangle PQR.) [3]
- (b) चित्रमा x , y र 130° को सम्बन्ध के हुन्छ ? लेख्नुहोस् । (What is the relation of x , y and 130° in the given figure? Write down.) [1]
12. चित्रमा एउटा समानान्तर चतुर्भुज ABCD दिइएको छ । (In the given figure, ABCD is a parallelogram.) [1]
- (a) समानान्तर चतुर्भुजको विकर्णहरूको सम्बन्ध के हुन्छ । (What is the relation between the diagonals of parallelogram?) [1]
- (b) यदि $AB = 6$ से.मी. र $DE = 4$ से.मी. भए, समानान्तर चतुर्भुज ABCD को क्षेत्रफल कति हुन्छ ? (If $AB = 6$ cm and $DE = 4$ cm, what is the area of parallelogram ABCD?) [1]
- (c) विकर्ण $AC = 6$ से.मी. र विकर्ण $BD = 8$ से.मी. भएको समवाहु चतुर्भुज ABCD को रचना गर्नुहोस् । (Construct a rhombus ABCD in which diagonal $AC = 6$ cm and diagonal $BD = 8$ cm.) [2]
13. केन्द्रविन्दु 'O' भएको वृत्तमा केन्द्रदेखि जीवा AB मा खिचिएको लम्ब रेखा OP छ । (A perpendicular line OP is drawn from the center to the chord AB of a circle with center point 'O'.)
- (a) $\triangle ABC$ कस्तो प्रकारको त्रिभुज हो ? (What type of triangle is $\triangle ABC$?) [1]
- (b) जीवा $AB = 16$ से.मी. र $OP = 6$ से.मी. भए, उक्त वृत्तको अर्धव्यास कति हुन्छ ? पत्ता लगाउनुहोस् । (If the Chord $AB = 16$ cm and $OP = 6$ cm, then find the radius of that circle.) [2]
- (c) OP र AB आपसमा लम्ब हुन्छ भनि प्रमाणित गर्नुहोस् । (Prove that OP is perpendicular to AB .) [2]

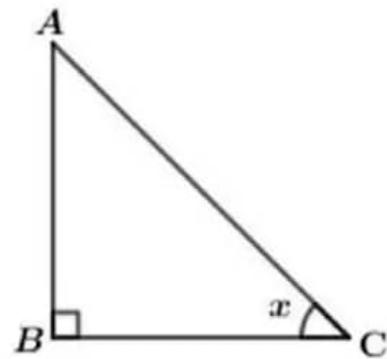


14. कक्षा 9 को 75 पूर्णाङ्कको गणित विषयको दोस्रो त्रैमासिक परीक्षामा 25 जना परीक्षार्थीहरूले प्राप्त गरेको अङ्क तलको तालिकामा दिइएको छ। उक्त तथ्याङ्कका आधारमा सोधिएका प्रश्नहरूको उत्तर दिनुहोस्। (Marks obtained by 25 students of class 9 in second terminal examinations of 75 marks are given in the table.)

प्राप्ताङ्क (x)	15	25	35	45	55	65	75
विद्यार्थी संख्या (f)	3	2	5	7	3	4	1

- (a) दिइएको तथ्याङ्कलाई कुन श्रेणीमा प्रस्तुत गरिएको छ? (In which series is given data represented?) [1]
- (b) दिइएको तथ्याङ्कको आधारमा सञ्चित बारम्बारता तालिका निर्माण गर्नुहोस्। (Construct cumulative frequency table of given data.) [1]
- (c) कक्षा 9 का विद्यार्थीको मध्यिका प्राप्ताङ्क कति रहेछ? पत्ता लगाउनुहोस्। (What is the median mark obtained by the students of class 9?) [3]
- (d) मध्यिका मानभन्दा बढी अङ्क प्राप्त गर्ने विद्यार्थीको संख्या कति छ? गणना गर्नुहोस्। (Calculate the number of students who obtained more than median marks in the examination.) [1]

15. समकोणी त्रिभुज ABC मा $\angle ABC = 90^\circ$ र $\angle BCA = x$ रहेको छ। (In the right-angled triangle ABC, $\angle ABC = 90^\circ$ and $\angle BCA = x$.)



- (a) दिइएको चित्रमा कुन भुजा कर्ण हो? (Which side is hypotenuse in the provided figure?) [1]
- (b) AB को लम्बाई कसरी पत्ता लगाउन सकिन्दछ? (How is the length of AB calculated?) [1]
- (c) यदि $AB = BC$ भए x कोणको नाप कर्ति हुन्छ? (If $AB = BC$, what will be the value of angle x?) [1]
- (d) यदि $A = 30^\circ$ भए $\tan 2A$ को मान पत्ता लगाउनुहोस्। (What is the value of $\tan 2A$, if $A = 30^\circ$) [1]

16. 1 देखि 30 सम्म लेखिएका सङ्घया दिइएको छ। (The number cards numbered from 1 to 30 are given then.)

- (a) $n(E)$ ले अनुकूल परिणाम सङ्घया र $n(S)$ ले कूल परिणाम सङ्घया जनाउँछ भने सम्भाव्यता $P(E)$ पत्ता लगाउने सूत्र लेख्नुहोस्। (If $n(E)$ is number of favorable case and $n(S)$ is number of all possible cases, what is the formula of finding $P(E)$?) [1]
- (b) ती सङ्घयापतीलाई राम्ररी फिटेर एउटा सङ्घयापती थुत्वा 4 ले निःशेष भाग जाने सङ्घयापती आउने सम्भाव्यता कति हुन्छ? (If a card is drawn after shuffling well, what is the probability of getting a number exactly divisible by 4?) [1]

- (c) ती सबै सङ्घापतीलाई राम्ररी फिटेर एउटा सङ्घापती थुल्वा रुढ सङ्घापती आउने र वर्ग सङ्घापती आउने सम्भाव्यता कति हुन्छ ?(If a card is drawn after shuffling well, what is the probability of getting prime numbered card and square numbered card?) [2]
- (d) रुढ सङ्घापती आउने र वर्ग सङ्घापती आउने संभाव्यतामा कति फरक छ ?(What is the difference between the probability of getting square and prime number?) [1]

"Best of Luck"

भिमदत्त नगरपालिका
महेन्द्रनगर, कंचनपुर
वार्षिक परिक्षा-२०८१

Set 11

कथा : ९

विषय : अनिवार्य गणित

पृष्ठा ७५

समयः ३:०० घण्टा

सबै प्रश्नहरुको उत्तर दिनहोस ।

1. यदि $n(U) = 50$, $n(P \cap Q) = 20$, $n(P) = 25$ र $n(Q) = 30$ भए पत्ता लगाऊहोस् ।
 (If $n(U) = 50$, $n(P \cap Q) = 20$, $n(P) = 25$ and $n(Q) = 30$, then find)

[2+1+1+2]

2. श्री प्रितम माध्यमिक तहका अविवाहित शिक्षक हुन् । उनको मासिक तलब रु.43,689 छ । प्रत्येक महिनाको आधारभूत तलबको जम्मा 10% रकम कर्मचारी सञ्चयकोषमा जम्मा हुन्छ र त्यति नै रकम सरकारले उत्तर कोषमा जम्मा गर्दछ । यदि उनले दशै भत्ता वापत एक महिनाको तलब प्राप्त गर्दछन भने तलका प्रश्नको उत्तर दिनुहोस् । (Mr. Pritam is an unmarried secondary level teacher. His monthly salary is Rs.43,689. A total of 10% of the basic salary of each month is deposited in the employee's provident fund and the same amount is deposited by the government in the fund. If he gets one month salary as Dashain allowance answers the following questions.)

2+2]

अविवाहित व्यक्तिका लगी(For unmarried people)	
वार्षिक आय(Annual income)	कर दर(Tax Rates)
रु.5,00,000 सम्म (up to Rs.5,00,000)	1%
थप रु.2,00,000 सम्म (Additional Rs.2,00,000)	10%
थप रु.3,00,000 सम्म (Additional Rs.3,00,000)	20%

- (a) आयकरलाई परिभाषित गर्नुहोस् । (Define income tax.)

(b) प्रितमले वार्षिक कति आयकर तिनु पद्ध्य ? (How much income tax should Pritam pay annually?)

(c) यदि प्रितमले एउटा बैंकमा रु.90,000 वार्षिक 15% का दरले 2 वर्षका लागि साधारण व्याजमा जम्मा गर्दछन र बैंकले व्याजको 5% कर कटी गर्दछ भने प्रितमले 2 वर्ष पछि कति रकम प्राप्त गर्दछन ? (If Pritam deposits Rs.90,000 in a bank at the rate of 15% per annum simple interest for 2 years and the bank deducts 5% tax of interest, how much money does Pritam get after 2 years?)

3. एउटा बैंको 25000 कित्ता शेयरहरूमध्ये एक मानिसले 360 कित्ता सेयर खरिद गयो । सो बैंकले एक वर्षमा खुद रु.2,80,00,000 नाफा कमायो र नाफाको 8% लाभांश स्वरूप आफ्ना सेयर सदस्यहरूलाई वितरण गर्ने निर्णय गयो । (A man bought 360 shares of a bank out of 25000 shares. In a year, the bank earned Rs.2,80,00,000 net profit and decided to distribute 8% of the profit as dividend to its share holders.)

[1+1+2]

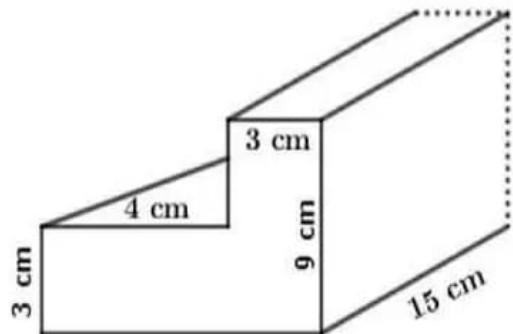
- (a) जम्मा लाभांश रकम कति रहेछ ? (What is the total dividend amount?)
 (b) प्रति सेयर कित्ता ले पाउने लाभांश हिसाब गर्नुहोस् । (Calculate the dividend per share Kitta.)
 (c) सो मानिसले कति लाभांश पाउला ? (How much dividend will the man get?)
 4. दिपकले वि.सं. 2081 सालको पौस महिनामा खपत भएको टेलिफोन र विजुलीको बिल तिन वि.सं. 2081 माघ, 10 गते ट्याक्सीको प्रयोग गरे । महशुल दर तलको तालिकामा दिइएको छ । (Deepak used a taxi on Magh 10, 2081 B.S to pay telephone bill and electricity bill consumed in one month of "Poush" 2081 B.S. The charge has been given in the following table.)

[1+2+1]

विद्युत महशुल 15(A) (Electric charge 15(A))			ल्यान्डलाइन टेलिफोन शुल्क (Land line telephone charge)	ट्याक्सी भाडा (Taxi Fare)
युनिट (कि.वा. प्रति घण्टा मासिक) (Unit (Kw/hr.) (monthly))	सेवाशुल्क (Service charge) (Rs.)	इनजी शुल्क (Energy charge)		
0-20	Rs.50.00	Rs.4.00	पहिलो 175 कल रु.200 र त्यसपछि रु.1 प्रति कल (First 175 calls Rs.200 then Re.1 per extra call)	न्यूनतम भाडा रु.50 र प्रति 1 कि.मी. को भाडा रु.50 (Minimum fare Rs.50 and fare of each 1 km is Rs.50)
21-30	Rs.75.00	Rs.6.50		
31-50	Rs.75.00	Rs.8.00		
51-100	Rs.100.00	Rs.9.50		
101-250	Rs.125.00	Rs.9.50		
More than 250	Rs.175.00	Rs.11.00		

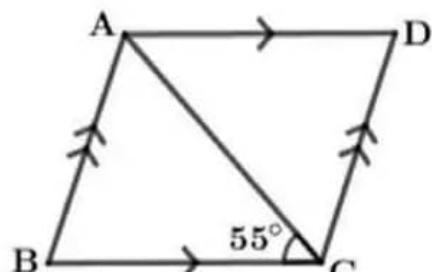
- (a) यदि उनले ट्याक्सिमा 6 कि.मी. यात्रा गरे भने कति ट्याक्सी भाडा तिरे ? (If he travelled 6 km in the taxi then how muh taxi fare did he pays.)
 (b) यदि वि.सं. 2081 पौस महिनामा 45 युनिट विजुली खपत भयो भने जम्मा विजुलीको बिल शुल्क पत्ता लगाउनुहोस् । (If 45 units of electricity was consumed in Poush, 2081 BS. Then find the total electricity bill amount.)
 (c) यदि सेवा शुल्क र भ्याट बिना टेलिफोनको बिल रु.355 भए वि.सं. 2081 को पौष महिनामा कति ओटा टेलिफोन कलहरु भएका रहेछन् ? गणना गर्नुहोस् । (If the telephone bill without TSC and VAT was Rs.355 then how much telephone call were made in the month of "Poush" 2081 B.S? Calculate.)

5. एउटा त्रिभुजाकार जमिनका किनाराहरु क्रमशः 20 मी., 12 मी. र 18 मी. का छन्। (The sides of triangular shaped land are 20 m, 12 m and 18 m respectively.) [1+2+2]
- विषमबाहु त्रिभुजको क्षेत्रफल गणना गर्ने सूत्र लेख्नुहोस्। (Write the formula to calculate the area of scalene triangle.)
 - सो त्रिभुजाकार जमिनको क्षेत्रफल पत्ता लगाउनुहोस्। (Find the area of the triangular shaped land.)
 - प्रति आना रु.4,50,000 का दरले उक्त जमिनको मूल्य गणना गर्नुहोस्। (Calculate the total cost of land at the rate of Rs.4,50,000 per ana.)
(1 आना = 31.08 m^2)
6. सगैको चित्रमा भर्याडको खुडिकलो दिइएको छ। (In the adjoining figure, one step of stair is shown.) [2+2]
- दिएको वस्तुको छड्के सतहको क्षेत्रफल पत्ता लगाउनुहोस्। (Find the lateral surface area of given solid.)
 - आयतन पत्ता लगाउनुहोस्। (Find the volume.)
7. एउटा कोठाको लम्बाई 12 मि. र चौडाई 8 मि. छ। यदि कोठामा $2.5 \text{ m} \times 2 \text{ m}$ का 2 वटा भ्यालहरु र $3 \text{ m} \times 1.5 \text{ m}$ को एउटा ढोका छ भने, (The length of a room is 12 m and breadth is 8 m. If the room contain 2 windows of size $2.5 \text{ m} \times 2 \text{ m}$ and a door of size $3 \text{ m} \times 1.5 \text{ m}$.) [1+1+2+1]
- कोठाको चारभित्ता, भुँड र सिलिङ्को क्षेत्रफल पत्ता लगाउने सूत्र लेख्नुहोस्। (Write the formula of 4 walls, floor and ceiling of room?)
 - भ्याल र ढोका बाहेक चारै ओटा भित्तामा रु.170 प्रति वर्ग मिटर का दरले रड लगाउन कति खच लाग्दछ? (What is the cost of painting its 4 walls excluding windows and door at the rate of Rs 170 per square meter?)
 - यदि सिलिङ्क सहित 4 भित्ता र भुँडको क्षेत्रफल 392 m^2 वर्ग मिटर भए यसको उचाई पत्ता लगाउनुहोस्। (If the area of 4 walls with ceiling and floor is 392 m^2 , find its height.)
 - यदि भ्याल र ढोका बाहेक चारै ओटा भित्तामा रु.195 प्रति वर्ग मिटरका दरले कागत टाँस्वा, रड लगाउदा भन्दा कर्ति वढी खच हुन्छ? (If wall paper is pasted on its 4 walls excluding windows and door at the rate of Rs.195 per square meter, how much does it cost more than when it is painted?)
8. एउटा अनुक्रम निम्न अनुसार दिइएको छ। (A sequence is given as):
7, 12, 17, 22, 27, [1+1+2]
- दिइएका संख्याहरु कुन अनुक्रममा छन्? (The given numbers are in which sequences?)

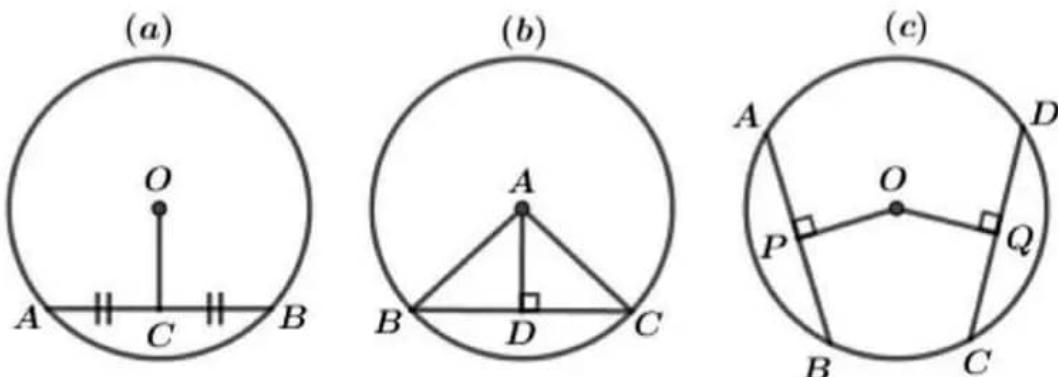


- (b) सो अनुक्रम को साधारण पद पत्ता लगाउनुहोस् । (Find the general term of the sequence.)
- (c) सो अनुक्रमको कुन पद 127 होला ? (Which term of sequence is 127?)
9. तलका प्रश्नहरूको उत्तर दिनुहोस् । (Answer the following questions.) [3+2]
- (a) म. स. पत्ता लगाउनुहोस् । (Find the H.C.F):
 $x^2 + 2xy + y^2, x^2 - y^2 \text{ and } x^3 + y^3$
- (b) सरल गन्तुहोस् । (Simplify):

$$\left(\frac{x^p}{x^q}\right)^{p^2+pq+q^2} \times \left(\frac{x^q}{x^r}\right)^{q^2+qr+r^2} \times \left(\frac{x^r}{x^p}\right)^{r^2+rp+p^2}$$
10. बाबु र छोराको हालको उमेरको योग 44 वर्ष छ । 8 पछि बाबुको उमेर छोराको उमेरको दुइगुणा हुनेछ भने, (The sum of present ages of the father and son is 44 years. After 8 years, the age of father will be twice the age of the son then.) [1+2+2]
- (a) दिइएका समिकरणलाई रेखिय समिकरणको रूपमा लेख्नुहोस् । (Represent the given statements in terms of linear equations.)
- (b) बाबुको हालको उमेर पत्ता लगाउनुहोस् । (Find the present age of father)
- (c) छोराको जन्मसाल पत्ता लगाउनुहोस् । (Find the birth year of son.)
11. त्रिभुज ΔABC को एउटा भुजालाई लम्ब्याइएको अवस्थामा (On the side of ΔABC is extended.) [3+2]
- (a) दुइवटा फरक फरक नापका त्रिभुज ΔABC को चित्र बनाई त्रिभुजको बाहिरी कोण र त्यसको कोणसँग अनासन्न दुई भिन्नी कोणको योगफलको सम्बन्धलाई प्रयोगात्मक रूपमा परिक्षण गन्तुहोस् । (Draw two triangles ABC of different sizes and experimentally verify the relationship between the exterior angle and the sum of non-adjacent interior angles.)
- (b) यदि दुई परिपुरक कोणको अनुपात $2:3$ छ भने ती कोणहरु पत्ता लगाउनुहोस् । (If the ratio of two angles of a supplementary angle is $2:3$, find them.)
12. तलका समस्याहरु समाधान गन्तुहोस् । (Solve the following problems.) [1+1+2]
- (a) ΔACD र ΔABC मा $\angle ACD = \angle ACB$ भए ΔACD र ΔABC विचको सम्बन्ध लेख्नुहोस् । (In ΔACD and ΔABC if $\angle ACD = \angle ACB$ then write the relation between ΔACD and ΔABC .)
- (b) दिइएको चित्रबाट $\angle ACD$ को नाप पत्ता लगाउनुहोस् । (From the above given figure find the measure of $\angle ACD$.)
- (c) एउटा चतुर्भुज ABCD को रचना गन्तुहोस्, जहाँ $AB = BC = 5.5$ से.मी. $CD = DA = 4.5$ से.मी. र $\angle DAB = 60^\circ$ छन् । (Construct a quadrilateral ABCD in which $AB = BC = 5.5$ cm, $CD = DA = 4.5$ cm and $\angle DAB = 60^\circ$.)



13. दिएको चित्रहरुको आधारमा तलका प्रश्नहरुको उत्तर दिनुहोस् । (On the basis of following figures answer the following questions.) [1+2+1]



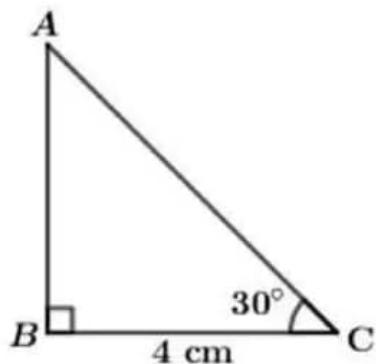
- (a) दिएको चित्रमा AB र OC बिचको सम्बन्ध लेख्नुहोस् । (In the given figure write the relationship between AB and OC .)
- (b) दिएको चित्रमा A वृत्तको केन्द्र विन्दु $AD \perp BC$, ΔABC को क्षेत्रफल 42 वर्ग से. मी. र $DC = 7$ से. मी. भए AD को मान पत्ता लगाउनुहोस् । (In the given figure, A is the centre of the circle, $AD \perp BC$, the area of ΔABC is 42 cm^2 and $DC = 7 \text{ cm}$. Find the measure of AD .)
- (c) दिएको चित्रमा $AB = CD$ र $OP = 8$ से. मी. भए OQ को नाप पत्ता लगाउनुहोस् । (In the given figure $AB = CD$ and $OP = 8 \text{ cm}$. Find the measure of OQ .)
14. तलको तालिकामा कक्षा 9 का विद्यार्थीले गणित विषयको परीक्षामा प्राप्त गरेको प्राप्ताङ्क दिएको छ । (The following data of marks obtained by all class nine students in maths examination.) [1+1+3+1+1]

प्राप्ताङ्क(Marks Obtained)	50	60	70	80	90	100
विद्यार्थीको सङ्ख्या (No. of Students)	3	4	7	5	2	6

- (a) गणित विषयको परीक्षामा भाग लिएका जम्मा विद्यार्थीको सङ्ख्या पत्ता लगाउनुहोस् । (Find the number of students who appeared in maths examination.)
- (b) दिएको तथ्याङ्कको बहुलक प्राप्ताङ्क कति हुन्छ ? (What is the modal marks of the student.)
- (c) मध्यिका र दोस्रो चतुर्थांशबिच के सम्बन्ध रहेको छ ? (What is the relation between median and second quartile?)
- (d) पहिलो चतुर्थांश र तेस्रो चतुर्थांश पत्ता लगाउनुहोस् । (Find the first quartile and third quartile.)
- (e) तेश्रो चतुर्थांश भन्दा तल कति प्रतिशत विद्यार्थीहरु रहेका छन् ? (How much percentage of data lies below third quartile?)

15. आँखा बन्द गरेर "MATHEMATICS" शब्दका अक्षरहरु छुँदा निम्न समभाव्यता कति हुन्छ ? पत्ता लगाउनुहोस् । (The letters of the word "MATHEMATICS" is touched by closing the eyes find the probability of) [1+1+1+1]
- (a) M छोइने सम्भाव्यता(Touching M)

- (b) A छोइने समभाव्यता(Touching A)
 (c) A नछोइने समभाव्यता(Not touching A)
 (d) असम्भव घटनाहरुको समभाव्यता कति हुन्छ ?(What is the probability of impossible event?)
16. दिइएको समकोण त्रिभुज ABC मा $\angle B = 90^\circ$, $\angle C = 30^\circ$, BC = 4 से.मी. छ। (In the given right angled triangle ABC, $\angle B = 90^\circ$, $\angle C = 30^\circ$, BC = 4 cm.) [1+1+1+2]
- (a) AB को लम्बाइ पत्ता लगाउनुहोस्। (Find length of AB.)
 (b) SinC को अनुपात कति हुन्छ ?(What is the ratio of SinC?)
 (c) $\sin 30^\circ + \cos 30^\circ$ को मान पत्ता लगाउनुहोस्। (Find the value of $\sin 30^\circ + \cos 30^\circ$.)
 (d) प्रमाणित गर्नुहोस्। (Prove that): $\sin^2 30^\circ + \cos^2 30^\circ = 1$



कक्षा : ९

पूर्णाङ्क : ७५

विषय : गणित

समय : ३ घण्टा

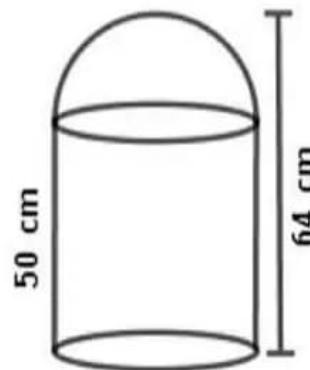
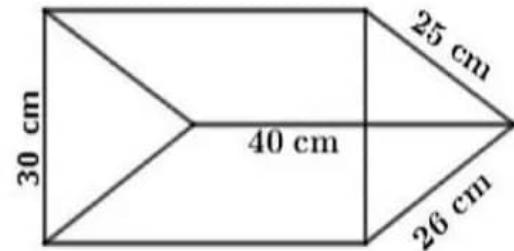
सबै प्रश्नहरु अनिवार्य छन्।

1. यदि सर्वव्यापक समूह $U = \{20 \text{ भन्दा साना प्राकृतिक संख्याहरु}\}$, $A = \{18 \text{ का गुणनखण्डहरु}\}$, $B = \{3 \text{ का अपवत्यहरु}\}$ र $C = \{\text{रुढ संख्याहरु}\}$ भए (If $U = \{\text{natural numbers less than } 20\}$, $A = \{\text{Factors of } 18\}$, $B = \{\text{Multiples of } 3\}$ and $C = \{\text{Prime numbers}\}$ Then,
- U को गणनात्मकता लेख्नुहोस्। (Write cardinality of U). [1]
 - माथिको जानकारीलाई भेनचित्रमा देखाउनुहोस्। (Show the given information in venn diagram.) [3]
 - प्रमाणित गर्नुहोस्। (Prove that): $A - (B \cup C) = (A - B) \cap (A - C)$ [2]
 - $A \cup B \cup C$ र $A \cap B \cap C$ कस्ता समूहहरु हुन्? कारण समेत लेख्नुहोस्। (What types of sets are $A \cup B \cup C$ and $A \cap B \cap C$. Write with reason?) [1]
2. एउटा परिवारले कुनै एक महिनामा 50 युनिट पानी प्रयोग गरेछ। 300 कल टेलिफोन गरेछ। तल दिइएको तालिकाको आधारमा सोधिएका प्रश्नको उत्तर दिनुहोस्। (A family consumes 50 units of water and 300 call telephone in a month. Answer the questions with the information given in the table.)

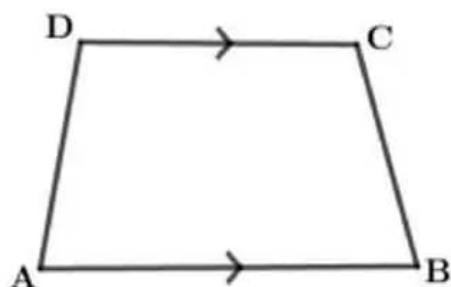
शीर्षक (Heading)	न्यूनतम उपभोग	न्यूनतम महशुल	अतिरिक्त महशुल
पानीको लागि (For water)	१०००० लिटर	रु. ११०	रु. २५ प्रति युनिट
टेलिफोनको लागि (For telephone)	१७५ कल	रु. 200	रु. 1 प्रतिकल

- 1 युनिट पानी उपभोग भन्नाले के बुझिन्छ? (What is meant by consumption of one units of water?) [1]
 - 3% छुटसहित पानीको महशुल कति हुन्छ? (What is the total cost of water with 3% discount?) [2]
 - उत्तर परिवारको टेलिफोन महशुल कति हुन्छ? (What amount will be the telephone bill?) [2]
3. संगम एकजना अविवाहित पुरुष हुन्। उनको मासिक तत्वब रु. 52,000 छ। उनको वार्षिक आयको पहिलो रु. 5,00,000 मा 1% सामाजिक सुरक्षा कर र बाँकी आयमा 10% आयकर लाग्छ। (Sangam is an unmarried person. His monthly income is Rs.52,000. He pays 1% social service tax on his first Rs.5,00,000 income and rest is levied as 10% income tax.)
- उनको वार्षिक आय पत्ता लगाउनुहोस्। (Find his annual income.) [1]
 - सामाजिक सुरक्षा कर रकम कति हुन्छ? (What will be social service tax amount?) [2]
 - जम्मा तिनुपर्ने वार्षिक आयकर पत्ता लगाउनुहोस्। (Find his total income tax.) [2]

4. एउटा कम्पनीको जम्मा नाफाको 15% ले रु. 90,000 हुन्छ। यदि सो कम्पनीले नाफाको 8% लाभांश त्यसका 30 जना शेयर सदस्यलाई दिने निर्णय गयो भने, (15% of total profit of a company is Rs.90,000. If 8% of total profit is to be divided as dividend to its 30 shareholders,)
 (a) सो कम्पनीको कुल नाफा पत्ता लगाउनुहोस्। (Find total profit of the company.) [1]
 (b) कुल लाभांश रकम पत्ता लगाउनुहोस्। (Find total dividend amount.) [1]
 (c) प्रत्येक शेयर सदस्यले कति रकम पाउलान्? (How much does each shareholder get?) [2]
5. एउटा बगाँकार हलमा कापेट ओच्च्याउँदा प्रति वर्गमीटर रु.125 का दरले रु.40,500 परेछ। त्यो हलको चार भित्तामा प्लास्टर गर्दा प्रतिवर्गमीटर रु.50 का दरले रु.14,400 परेछ भने, (The cost of carpeting a square room at the rate of Rs.125 per square meter is Rs.40,500 and cost of plastering its four wall at Rs.50 per m^2 is Rs.14,400.)
 (a) सो कोठाको भुइँको क्षेत्रफल निकाल्नुहोस्। (Find the area of the floor.) [1]
 (b) एउटा बगाँकार कोठाको लम्बाइ p मी. र q मी. भएमा त्यसको चारभित्ताको क्षेत्रफल निकाल्ने सूत्र के हुन्छ? (What will be the area of four walls of a room with length p meter and height q meter.) [1]
 (c) माथि उल्लेखित कोठाको उचाइ पत्ता लगाउनुहोस्। (Find the height of the above mentioned room.) [2]
 (d) सो कोठाको परिमिति पत्ता लगाउनुहोस्। (Find the perimeter of the room.) [2]
6. चित्रमा एउटा ठोस प्रिज्म देखाइएको छ। (A solid prism is shown in the figure.)
 (a) प्रिज्मको पुरा सतहको क्षेत्रफल पत्ता लगाउनुहोस्। (Find the TSA of the prism.) [2]
 (b) प्रिज्मको आयतन पत्ता लगाउनुहोस्। (Find the volume of the prism.) [2]
7. चित्रमा एउटा ठोस वस्तु दिइएको छ। (A solid object is given in the figure.)
 (a) यस अंधगोलाकार वस्तुको देखिने सतहको क्षेत्रफल निकाल्ने सूत्र लेख्नुहोस्। (Write the formula to find the visible surface of hemispherical object.) [1]
 (b) उक्त वस्तुको सबै सतहमा रु.1.50 प्रति वर्ग सेमी. को दरले रड लगाउँदा जम्मा कति खर्च लाग्ला? (What is the total cost of painting its total surface at the rate of Rs.1.50 per square cm?) [3]

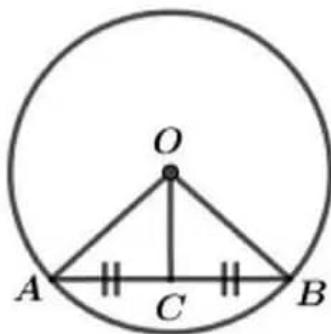


8. दिइएको श्रेणी ज्यामितीय श्रेणी हो । (The given series is geometric series.):
 9, 3, 1,
 (a) यसको साधारण पद निकाल्ने सूत्र लेख्नुहोस् । (Write the formula for general term.) [1]
 (b) उक्त श्रेणीको कुन चाहिँ पद $\frac{1}{81}$ हुन्छ? (Which term of the given series is $\frac{1}{81}$?) [2]
 (c) उक्त श्रेणीको समान अनुपात पत्ता लगाउनुहोस् । (Find the common ratio of the given series.) [1]
9. (a) म.स. निकाल्नुहोस् । (Find HCF.): $16a^4 - 4a^2 - 4a - 1$ and $8a^3 - 1$ [2]
 (b) सरल गन्तुहोस् । (Simplify.): $\left(\frac{x^m}{x^n}\right)^{m+n-p} \times \left(\frac{x^n}{x^p}\right)^{n+p-m} \times \left(\frac{x^p}{x^m}\right)^{p+m-n}$ [3]
10. अहिले दिक्षाको उमेर उनकी छोरीको उमेरको 3 गुणा छ । 15 वर्ष पहिले उनीहरुको उमेरको योगफल 34 वर्ष थियो । (Diksha is 3 times as old as her daughter. 15 years ago the sum of the age of her and daughter was 34.)
 (a) माथिको भनाइलाई रेखीय समीकरणको रूपमा लेख्नुहोस् । (Express the above information as linear equation.) [1]
 (b) दुवैको हालको उमेर पत्ता लगाउनुहोस् । (Find present ages of mother and daughter.) [2]
 (c) कति वर्ष पहिले उनीहरुको उमेरको योगफल 44 वर्ष थियो ? (How many years ago the sum of age was 44 years?) [2]
11. (a) समानान्तर चतुर्भुजका सममुख कोणहरु बराबर हुन्छन् भनि प्रयोगात्मक विधिवाट प्रमाणित गन्तुहोस् । दुइओटा फरक नापका चित्र अनिवार्य छन् । (Verify experimentally that the opposite angles of a parallelogram are equal. (Two different figures of different measurement are necessary.)) [3]
 (b) सम्मुख भुजाहरु नापी तिनीहरुबीचको सम्बन्ध कस्तो हुन्छ ? लेख्नुहोस् । (Measure the opposite sides and Write their relation.) [1]
12. संगैको चित्रमा समलम्ब चतुर्भुज ABCD दिइएको छ ।
 (The given figure ABCD is a trapezium.)
 (a) यदि यो चित्रमा $AB = CD$ भएमा कुन चित्र बन्दछ ? (If $AB = CD$ in the figure, which shape is formed?) [1]
 (b) समबाहु चतुर्भुजलाई परिभाषित गन्तुहोस् । (Define rhombus.) [1]
 (c) $AB//CD$, $AB = 7$ से.मी., $BC = 5$ से.मी., $AD = 6$ से.मी. र $\angle B = 60^\circ$ हुने समलम्ब चतुर्भुजको रचना गन्तुहोस् । (Construct a trapezium with given measurement, $AB//CD$, $AB = 7$ cm, $BC = 5$ cm, $AD = 6$ cm and $\angle B = 60^\circ$.) [3]



13. चित्रमा केन्द्रविन्दु O भएको एउटा वृत्त दिइएको छ । रेखा OC ले जीवा AB लाई समद्विभाजन गरेको छ । (There is a circle with center O in the figure. The line OC bisects the chord AB.)

- (a) OA र OB को सम्बन्ध लेख्नुहोस् । (Write the relation of OA and OB.) [1]
- (b) OC जीवा AB मा लम्ब हुन्छ भनि प्रमाणित गर्नुहोस् । (Prove that OC is perpendicular to chord AB.) [3]



14. तलको तालिकामा 35 जना विद्यार्थीको गणित विषयका प्राप्तांक दिइएको छ । (The table below shows the marks obtained by 35 students in Mathematics.)

प्राप्तांक	25	35	45	55	65	75
विद्यार्थी संख्या	6	4	5	10	8	2

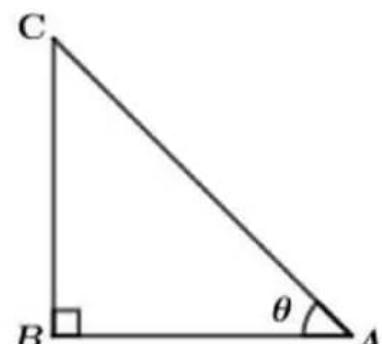
- (a) सञ्चित वारम्बारता तालिका तयार गर्नुहोस् । (Make a cumulative frequency table.) [1]
- (b) मध्यिका अंक पत्ता लगाउनुहोस् । (Find median mark.) [3]
- (c) उक्त तथ्यांकको रित मान कति हुन्छ ? (What is the mode of the given data?) [1]
- (d) कति विद्यार्थीले मध्यिका भन्दा माथि अंक प्राप्त गरेछन् ? (How many students are getting above median marks?) [1]

15. 52 पत्ती तासको समूहबाट नहेरिकन एउटा तास निकालिएछ । (A card is drawn from a deck of 52 cards.)

- (a) $n(S)$ नमूना समूह र $n(E)$ अनुकूल समूह भए $P(E)$ पत्ता लगाउने सूत्र लेख्नुहोस् । (Write formula for $P(E)$ if cardinality of sample space is $n(S)$ and cardinality of favorable event is $n(E)$.) [1]
- (b) अनुहार भएको तास पनेसम्भावना कति हुन्छ ? (What is the probability of face card?) [1]
- (c) बादशाह वा रातो पनेसम्भाव्यता पत्ता लगाउनुहोस् । (Find the probability of a king or a red card.) [1]
- (d) एक्का वा कालो तास पनेसम्भाव्यता पत्ता लगाउनुहोस् । (Find is the probability of getting an Ace or a black card.) [1]

16. दिइएको समकोणी त्रिभुज ΔABC मा (In right angled ΔABC ,)

- (a) $\angle B = 90^\circ$ हुँदा भुजाहरुको समबन्ध कस्तो हुन्छ ? (What is the relationship between the sides when $\angle B = 90^\circ$.) [1]



- (b) यदि $\sin\theta = \frac{3}{5}$ र कण्ठ (h) = 20 एकाइ भए लम्ब (p) को मान पत्ता लगाउनुहोस् ।
(If $\sin\theta = \frac{3}{5}$ and hypoteneous (h) = 20 units. Find length of perpendicular (p).) [1]
- (c) मान पत्ता लगाउनुहोस् । (Evaluate): $\sec^2\theta - \tan^2\theta$ [1]
- (d) यदि AB = BC भए θ को मान पत्ता लगाउनुहोस् । (Find if AB = BC then find the value of θ .) [1]

Best of Luck

PABSON

District Level Examination - 2081 (2025)

Subject: Compulsory Mathematics

Full Marks: 75

Grade: IX

Time: 3 hrs

सबै प्रश्नहरुको उत्तर दिनुहोस्। (Attempt all the following questions.)

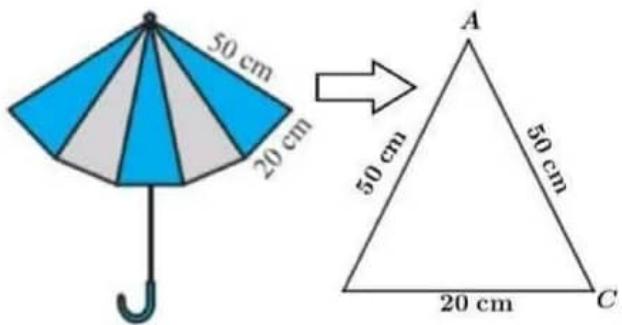
1. यदि $U = \{1, 2, 3, \dots, 10\}$, $\bar{A} = \{1, 4, 6, 8, 9, 10\}$, $\bar{B} = \{6, 7, 8, 9, 10\}$ र $C = \{1, 3, 5, 7, 9\}$ भए, (If $U = \{1, 2, 3, \dots, 10\}$, $\bar{A} = \{1, 4, 6, 8, 9, 10\}$, $\bar{B} = \{6, 7, 8, 9, 10\}$ and $C = \{1, 3, 5, 7, 9\}$ then,
 - (a) A र B को गणनात्मकता कति हुन्छ लेख्नुहोस्। (What are the cardinalities of A and B ? Write it.) [1K]
 - (b) U , A , B र C को सम्बन्धलाई भेन चित्रमा देखाउनुहोस्। (Show the relation of U , A , B and C in Venn-diagram.) [1K]
 - (c) प्रमाणित गर्नुहोस्। (Prove that): $(\bar{A} \cup \bar{B} \cup C) = \bar{A} \cap \bar{B} \cap \bar{C}$ [3A]
 - (d) $A - (B \cup C)$ को सदस्यहरु पत्ता लगाई सो समूहलाई व्याख्या गर्नुहोस्। (Identify the elements of $A - (B \cup C)$ and describe the set.) [1HA]
2. एउटा मेसिनको अद्वित मूल्यमा केही प्रतिशत छुट दिएपछि 10% भ्याट लगाउँदा उक्त मेसिनको अन्तिम मूल्य रु. 99,000 हुन्छ। यदि सो मेसिनको अद्वित मूल्य रु. 1,00,000 भए, (After allowing certain percent discount on the marked price of a machine and levying 10% VAT, the final price of the machine becomes Rs.99,000. If the marked price of the machine is Rs.1,00,000 then,)
 - (a) यदि अद्वित मूल्य (MP), विक्रय मूल्य (SP) र छुट (D) भए विक्रय मूल्य (SP) निकाल्ने सूत्र लेख्नुहोस्। (If the marked price is (MP), selling price is (SP) and discount is (D) then write the formula to find selling price (SP).) [1K]
 - (b) उक्त मेसिनमा कति प्रतिशत छुट दिइएको रहेछ, पत्ता लगाउनुहोस्। (What percent of discount was allowed in the machine? Find it.) [2HA]
 - (c) यदि उक्त मेसिनमा 20% छुट दिइएको भए, ग्राहकले कर्ति तिनुपध्यो ? (If 20% discount was allowed in the machine, how much should a customer have to pay for the machine?) [2A]
3. एउटा कम्पनीले प्रतिकिता रु.100 का वरले 50,000 कित्ता सेयर स्थानीयवासीका लागि साधारण सेयर जारी गरेछ। उक्त कम्पनीले काम सुरु गरेको पहिलो वर्षमै रु.10,00,00,000 मुनाफा गरेछ। उक्त कम्पनीको सञ्चालक समितिको बैठकले मुनाफा रकमबाट 20% नगद लाभांश सेयर धनीलाई वितरण गर्ने निर्णय गरेछ। (A company has sold 50,000 total shares of Rs.100 per share for local respondents by issuing ordinary shares. It has made a net profit of Rs.10,00,00,000 in the first year of operation. From the meeting of board of directors of the company, it has decided to distribute 20% as cash dividend to the shareholders.)

- (a) नगद लाभांश कुन रकमबाट वितरण गरिन्छ? (From what amount is the cash dividend distributed?) [1K]
- (b) कुल कति नगद लाभांश वितरण गरिएको रहेछ ? (What amount of cash dividend was distributed?) [1U]
- (c) यदि दिनेश 500 सेयर भएको सेयरधनी हो भने उसले पाउने लाभांश पत्ता लगाउनुहोस्। (If Dinesh is a shareholder holding 500 shares then find the dividend received by him.) [1A]
4. मौसमको घरमा 5A को बिजुलीको मिटर, 0.5 इन्चको पानीको धारा र नेपाल टेलिकमको ल्यान्डलाइन फोन जडान गरिएको छ। (Mausam's house is connected with 5A electricity meter, 0.5 inch water tap and Nepal Telecom Landline phone.)

Electricity Charge (5A)			Per month rate of water pipe (0.5")			Landline Telephone Charge
Monthly units	Service Charge (Rs.)	Energy Charge	Minimum consumption of water	Minimum charge	Extra consumption rate per 1 unit	
0-20	30.00	3.00	10,000 (liters) 1 unit = 1,000 liters	Rs.100	Rs.32	The minimum charge for first 175 calls is Rs.200 then the charge for each extra call is Re.1
21-30	50.00	6.50				
31-50	50.00	8.00				
51-100	75.00	9.50				
101-250	100.00	9.50				
More than 250	150.00	11.00				

- (a) माथि दिइएको विद्युत महसुल दर अनुसार 68 युनिट खपतको महसुल पत्ता लगाउनुहोस्। (According to the given electricity charge, find the electricity charge for the consumption of 68 units.) [2U]
- (b) माथि दिइएको खानेपानी महसुल दर अनुसार पानी 180 युनिट भए तिनुपने महसुल पत्ता लगाउनुस्। (Find the amount to be paid for 180 units water consumption according to the charge shown above.) [2A]
- (c) 400 टेलिफोन कलको कति महसुल लाग्दछ? (How much will be charged for 400 telephone calls?) [1A]

5. एउटा छाता 10 ओटा दुई फरक रङ्गहरू सेतो र कालो त्रिभुजाकार कपडा प्रयोग गरी बनाइएको छ। यदि प्रत्येक टुक्राको नाप 50 से.मी., 50 से.मी., र 20 से.मी. भए, (An umbrella is made by stitching 10 triangular pieces of cloth of two different colors black and white. If each piece of cloth measures 50 cm, 50 cm and 20 cm then,)



- (a) तलका मध्ये त्रिभुजको क्षेत्रफल पत्ता लगाउने सूत्र कुन हो? (Which one of the following is the formula to find the area of a triangle?) [1K]
- (i) $\sqrt{s(s-a)(s-b)(s-c)}$ (ii) $\sqrt{s(a-s)(b-s)(s-c)}$
 (iii) $\sqrt{s(s-a)(b-s)(c-s)}$ (iv) All of these
- (b) उक्त छाता बनाउन कति कपडा आवश्यक पछं? पत्ता लगाउनुहोस्। (How much cloth is required to make the umbrella? Find it.) [2A]
- (c) यदि 1 वर्ग से.मी. कालो कपडाको मूल्य रु. 2 र 1 वर्ग से.मी. सेतो कपडा को मूल्य रु. 1.50 पछं भने, रु.3,000 खर्चले उक्त छाता बनाउन लाग्ने कपडा किन्तु पुग्छ वा पुग्दैन? हिसाब गर्नुहोस्। (If 1 cm² of black cloth cost Rs.2 and 1 cm² of white cloth cost Rs.1.50 then is Rs.3,000 enough to purchase the cloth required to make the umbrella? Calculate it.) [2A]

6. चित्रमा दिइएको जानकारी अनुसार तलका प्रश्नहरूको उत्तर दिनुहोस्। (From the given information in figure, answer the following questions.)

- (a) प्रिज्मको पूरा सतहहरूको क्षेत्रफल पत्ता लगाउनुहोस्। (Find the total surface area of the prism.) [2U]
- (b) प्रिज्मको आयतन पत्ता लगाउनुहोस्। (Find the volume of the prism.) [2A]

7. चित्र नं. 1 मा बराबर आधार भएका बेलना र अर्धगोला देखाइएको छ। चित्र नं. 2 मा सोही बेलना र अर्धगोला जोडेर संयुक्त ठोस वस्तु बनाइएको छ। (There are a cylinder and a hemisphere with the same base in the figure (1). A solid shown in the figure (2) is formed combining cylinder and hemisphere of the first figure.)

- (a) बेलनाको आयतन पत्ता लगाउने सूत्र लेख्नुहोस्। (Write the formula to find the volume of a cylinder.) [1K]

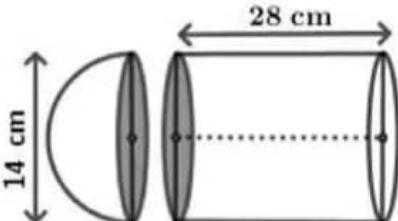
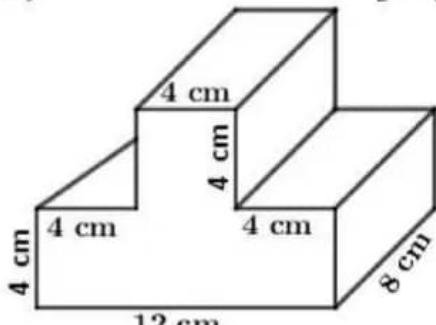


Fig. (1)

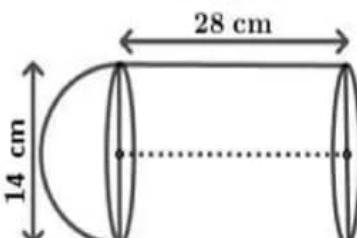
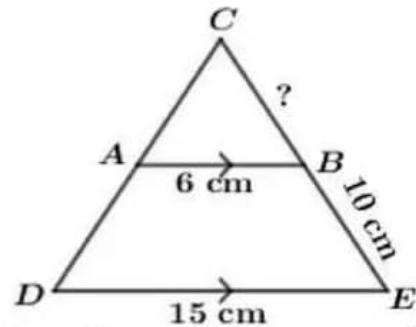


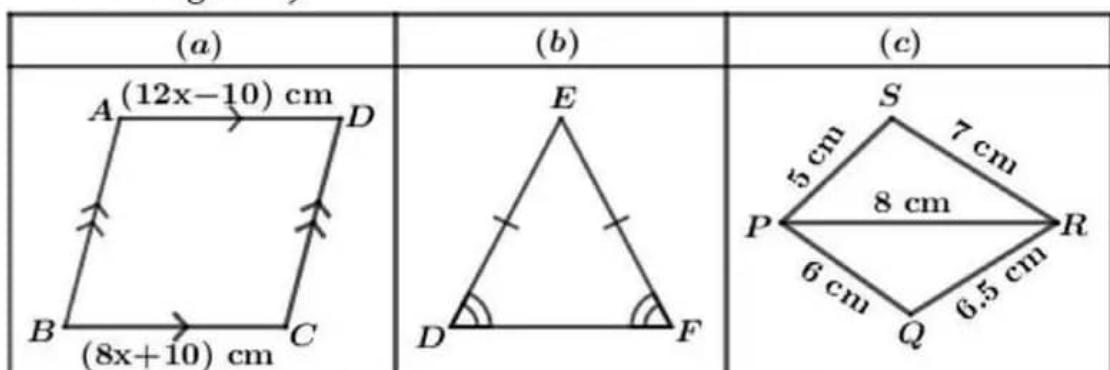
Fig. (2)

- (b) चित्र नं. 1 मा देखाइएको दुवै ठोस वस्तुहरुको पूरा सतहको क्षेत्रफल छुट्टाछुट्टै पत्ता लगाई तिनीहरुको क्षेत्रफलको योगफल कति हुन्छ, पत्ता लगाउनुहोस् । (Find the total surface area of solid figures of first figure separately and find their sum.) [2A]
- (c) चित्र नं. 1 मा देखाइएका ठोस वस्तुहरुको पूरा सतहको क्षेत्रफल र चित्र नं. 2 को संयुक्त ठोस वस्तुको पूरा सतहको क्षेत्रफल बराबर हुन्छ? हुन्दैन भने कत्तिको फरक हुन्छ, पत्ता लगाउनुहोस् । (Is the sum of total surface area of solids of the figure (1) equal to the total surface area of combined solid of figure (2)? If not, find the difference.) [2HA]
8. यहाँ एउटा अङ्गणीतीय अनुक्रम दिइएको छ । (Here, an arithmetic sequence is given); 5, 8, 11, 14,.....
- अङ्गणीतीय अनुक्रमको साधारण पद पत्ता लगाउने सूत्र लेख्नुहोस् । (Write the formula to calculate the general term of the arithmetic sequence.) [1K]
 - दिइएको अनुक्रमको समान अन्तर पत्ता लगाउनुहोस् । (Find the common difference of the given sequence.) [1A]
 - उक्त अनुक्रमको 12 औं पद पत्ता लगाउनुहोस् । (Find the 12th term of the sequence.) [1A]
9. (a) म.स. पत्ता लगाउनुहोस् । (Find the HCF of): [3A]
 $x^3 - 9x, x^4 - 2x^3 - 3x^2$ and $x^3 - 27$
- (b) यदि $pqr = 1$ भए प्रमाणित गर्नुहोस् । (If $pqr = 1$ then show that): [3HA]
- $$\frac{1}{1+p+q^{-1}} + \frac{1}{1+q+r^{-1}} + \frac{1}{1+r+p^{-1}} = 1$$
10. दुइ अङ्गले बनेको एउटा सङ्घामा अङ्गहरुको योगफल 7 छ । यदि सो सङ्घाबाट 45 घटाइयो भने, अङ्गहरुको स्थान परिवर्तन हुन्छ । (The sum of digits in a two digit number is 7. If 45 is subtracted from the number the places of digits are interchanged.)
- दिइएका कथनहरूलाई रेखीय समिकरणको रूपमा लेख्नुहोस् । (Represent the given statements in the form of linear equation.) [1A]
 - दश स्थानको अङ्ग पत्ता लगाउनुहोस् । (Find the digit at tenth place.) [2A]
 - उक्त सङ्घामा कति जोड्दा 100 हुन्छ पत्ता लगाउनुहोस् । (What should be added to the number so that the sum is 100? Find it.) [2A]
11. ΔABC को एउटा भुजालाई लम्ब्याइएको अवस्थामा (One side of ΔABC is extended).
- दुईओटा फरक फरक नापका त्रिभुज ABC को चित्र बनाइ त्रिभुजको बाहिरी कोण र त्यस कोणसँग अनासन्न दुई भित्री कोणको योगफलको सम्बन्धलाई प्रयोगात्मक रूपमा परीक्षण गर्नुहोस् । (Draw two triangles ABC of different sizes and experimentally verify the relationship between the exterior angle and the sum of non-adjacent interior angles.) [3A]

- (b) यदि $\Delta ABC \sim \Delta CDE$ र $AB//DE$ भए BC को नाप पत्ता लगाउनुहोस् । (If $\Delta ABC \sim \Delta CDE$ and $AB//DE$, then find the measure of BC.) [2A]



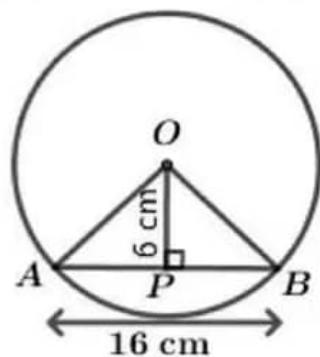
12. दिइएका चित्रहरुको आधारमा तलका प्रश्नहरुको उत्तर दिनुहोस् । चित्रमा समानान्तर चतुर्भुज, त्रिभुज र चतुर्भुज देखाइएको छ । (On the basis of given figures, answer the following questions. The Figure of Parallelogram, triangle and quadrilateral are given.)



- (a) यदि $BC = (8x + 10)$ से.मी. र $AD = (12x - 10)$ से.मी. भए x को मान पत्ता लगाउनुहोस् । (If $BC = (8x + 10)$ cm and $AD = (12x - 10)$ cm then, find value of x). [1A]
 (b) दिइएको चित्रमा ΔEDF समद्विबाहु त्रिभुज हो । यदि $\angle DEF = 30^\circ$ भए, $\angle EDF$ को मान पत्ता लगाउनुहोस् । (In the figure, ΔEDF is an isosceles triangle. Find the value of $\angle EDF$ if $\angle DEF = 30^\circ$). [1U]
 (c) चित्रमा देखाइएको जानकारी अनुसार चतुर्भुज ABCD को रचना गर्नुहोस् । (Construct a quadrilateral ABCD according to the given figure). [2A]

13. केन्द्रविन्दु O भएको वृत्तमा केन्द्रदेखि जीवा AB मा खिचिएको लम्ब रेखा OP छ । (In a circle with center O, perpendicular line OP is drawn from the center to the chord AB.)

- (a) ΔOAB कस्तो प्रकारको त्रिभुज हो? (What type of triangle is ΔOAB ?) [1K]
 (b) जीवा $AB = 16$ से.मी. र $OP = 6$ से.मी. भए, उक्त वृत्तको अर्धव्यास कति हुन्छ? पत्ता लगाउनुहोस् । (If chord $AB = 16$ cm and $OP = 6$ cm, what is the radius of circle? Find it.) [2A]
 (c) वृत्तको जीवा AB र व्यास तुलना गर्नुहोस् । (Compare the chord AB and diameter of circle.) [1HA]



14. दिइएका तथ्याङ्कको आधारमा निम्नलिखित प्रश्नहरुको उत्तर दिनुहोस् । (Answer the following questions according to given data.)

Marks obtained	20	30	40	50	60	70
Number of Students	4	3	4	5	2	2

- (a) दिइएको तथ्याङ्क कुन श्रेणीमा प्रस्तुत गरिएको छ ? (In which series is the given data presented?) [1K]
- (b) सञ्चित वारम्बरता तालिका बनाउनुहोस् । (Make a cumulative frequency table.) [1U]
- (c) Q_1 र Q_3 को मान पत्ता लगाउनुहोस् । (Find the value of Q_1 and Q_3 .) [2A]
- (d) मध्यिका र मध्यक मध्ये कुन कर्तिले बढी हुन्छ ? गणना गरि देखाउनुहोस् । (Which one is more and by how much between median and mean? Show by calculation.) [2A]

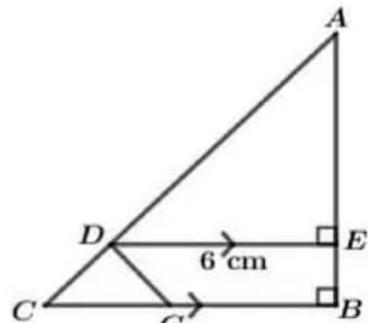
15. 52 पत्तीको तासको गडीबाट नहेरीकन एउटा तास भिकिएको छ । (A card is drawn randomly from a deck of 52 cards.)

- (a) निश्चित घटनाको सम्भाव्यता कति हुन्छ ? (What is the probability of sure event?) [1K]
- (b) गुलाम पनै सम्भाव्यता पत्ता लगाउनुहोस् । (Find the probability of getting a jack.) [1U]
- (c) गुलाम नपनै सम्भाव्यता पत्ता लगाउनुहोस् । (Find the probability of not getting a jack.) [1A]
- (d) एउटा घटना हुन सक्ने र हुन नसक्ने सम्भाव्यताको भिन्नता $\frac{1}{3}$ छ भने उक्त घटना हुन सक्ने सम्भाव्यता कति हुन्छ ? मानौ उक्त घटना हुन सक्ने सम्भाव्यता हुन नसक्ने सम्भाव्यता भन्दा बढि छ । (If the difference between occurring and not occurring an event is $\frac{1}{3}$ then find the probability of occurring the event. Let us assume that the probability of occurring the event is greater than the probability of not occurring the event.) [2HA]

16. दिइएको समकोणी त्रिभुज ABC मा $\angle A = 90^\circ$ छ ।

त्यस्तै $\triangle CDG$ समबाहु त्रिभुज हो । यदि $AB = 10\sqrt{3}$ से.मी. र $ED = 6$ से.मी. भए तलका प्रश्नहरुको उत्तर दिनुहोस् । (In a right angled triangle ABC, $\angle A = 90^\circ$. Similarly $\triangle CDG$ is an equilateral triangle. If $AB = 10\sqrt{3}$ cm and $ED = 6$ cm then answer the following questions.)

- (a) $\angle CAB$ को नाप पत्ता लगाउनुहोस् । (Find the measure of $\angle CAB$.) [1K]
- (b) CB को नाप पत्ता लगाउनुहोस् । (Find the measure of CB.) [1A]
- (c) EB को नाप पत्ता लगाउनुहोस् । (Find the measure of EB.) [1A]
- (d) प्रमाणित गर्नुहोस् । (Prove that) $\cos^2 45^\circ + \tan^2 45^\circ = 1$ [1A]



**Collaborative Educational Partnership (CEP), Kaski
ANNUAL EXAMINATION 2081**

Set 14

Grade: 9

Time: 3:00 hrs.

Compulsory Mathematics

Full Marks: 75

Pass Marks: 28

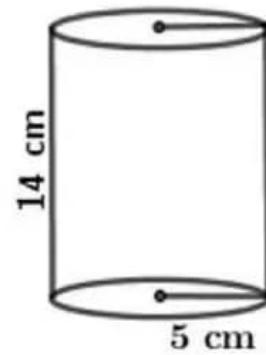
Attempt all the questions.

1. If $U = \{x: x < 10, x \in N\}$ is a universal set, $A = \{x: x \text{ is a factor of } 6\}$, $B = \{y: y \text{ is a prime number}\}$ and $C = \{z: z \text{ is a multiple of } 3\}$ are the subsets of U .
 - (a) What is the cardinal number set U ? [1]
 - (b) Write $(A \cap B)$ in listing method. [1]
 - (c) Find $(A \cup B) - C$ and illustrate it in a Venn-diagram by shading. [3]
 - (d) If $C = \{4, 7, 8, 9\}$, what will be the relation between $A \cup B \cup C$ and U ? [1]
2. Mr. Gurung buys 100 cycles of same model from India and marked each cycle with price Rs.5,000. He allows 10% discount in each cycle and sells all the cycles by levying 13% VAT.
 - (a) What is the formula to calculate the price of cycle after allowing discount? [1]
 - (b) Calculate the selling price of all cycles with VAT. [2]
 - (c) If he deposits half of the selling price of all cycles excluding VAT in a bank for next one year at 12% p.a., how much net interest will he get if 5% of interest is charged as income tax%? [2]
3. The monthly salary of a marketing representative working on a publication is Rs.16,000 and 2% commission is provided on his monthly sales of book more than 5 lakhs.
 - (a) Write the formula for finding the rate of commission. [1]
 - (b) If the sales of the book in the month of Baisakh is Rs.7,50,000, find his/her income in the month of the Baisakh. [2]
 - (c) How much more or less commission amount does he/she get if 0.75% commission was provided on the total sales? [1]
4. The table given below shows the rate of electricity charge with service charge for a 5A meter box.

Case	KWh (units)	Service Charge	Energy Charge/unit
Consumed units is up to 20 units	0-20	Rs.30.00	Rs. 0.00
Consumed units exceeds 20 units	0-20	Rs.30.00	Rs.3.00
	21-30	Rs.50.00	Rs.6.50
	31-50	Rs.50.00	Rs.8.00

A 5A transmission line is connected to Bina's house and the meter reading of 1 Bhadra and 1 Aswin was recorded as 01045 units and 01070 units respectively. The electricity office is at a distance of 2 km from Bina's house. The minimum fare of taxi is Rs.14 and fare per 200 meter is Rs.7.20. Answer the following questions.

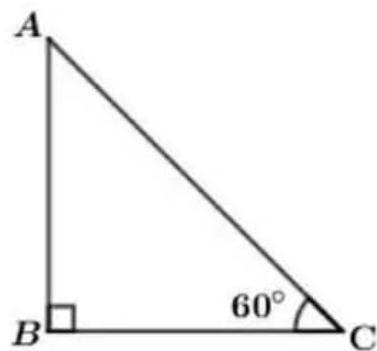
- (a) How many units of electricity was consumed in Bhadra? [1]
 - (b) What was the electricity bill of the month Bhadra? [2]
 - (c) If she used the taxi to go to the electricity office for paying the bill, how much fare did she pay for the taxi? [1]
5. In Gautam Buddha secondary school, the room of class IX is rectangular in shape. It is 15 m long, 10 m broad and 5 m high. Also, it contains two windows of size $2\text{ m} \times 1.5\text{ m}$ each and a door of size $1\text{ m} \times 4\text{ m}$.
- (a) Write down the formula to calculate the area of four walls. [1]
 - (b) What is the area of the ceiling of the room? [1]
 - (c) Find the cost of coloring its walls excluding the windows and doors at Rs.250 per sq. meter. [2]
 - (d) By how much more or less does it require to papering the walls at Rs.275 per sq. meter than coloring? [1]
6. On a sunny day, Mr. Shah was working in the field. He went to a store and bought a cylindrical can completely filled with pineapple juice. The inner radius of base of can was 5 cm and height 14 cm.
- (a) What is the formula to calculate the volume of the can? [1]
 - (b) How many liter of juice was filled in the can? Find it. [3]
7. Prasanna a student of class 9 made an equilateral triangular prism having its base length is 6 cm and its height 10 cm is made for her practical work of mathematics using paper.
- (a) Find the total paper used to make the prism. [2]
 - (b) Find the maximum number of prism of volume 2 cm^3 can be kept in the prism made by Prasanna. [2]
8. The 6th term of arithmetic progression is 5 times the first term and the 11th term is 3 more than double the 5th term.
- (a) Write the general term of arithmetic sequence. [1]
 - (b) Find the first term and common difference. [2]
 - (c) Find the 20th term of the sequence. [2]



9. Amit scored two digits number in his third term exam of mathematics in class 9. The sum of the digits he scored is 9. If 27 is subtracted from the number he scored will reversed it digits.
- Write the two digits number in standard form. [1]
 - Find the number that Amit score. [3]
 - If the pass mark of the examination was 30 and Aman score the number reversed of Amit, does he pass the exam? [1]
10. Answer the following questions:
- Find the HCF of the expressions, $x^2 - 4$ and $x^2 - 3x + 2$ [2]
 - Simplify: $\frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{b-c}+x^{a-c}} + \frac{1}{1+x^{c-a}+x^{b-a}}$ [3]
11. Answer the following questions.
- Prove that the base angles of isosceles triangles are equal to each other. [3]
 - In the given figure $\Delta ABO \sim \Delta CDO$. Find the values of x and y . [2]
12. A parallelogram ABCD is given.
- What is the relation between the opposite sides of parallelogram? [1]
 - If $\angle ABC = (30^\circ + p)$ and $\angle ADC = (60^\circ - p)$, what is the value of p ? Find it. [1]
 - Construct a rhombus ABCD in which diagonal $AC = 6$ cm and diagonal $BD = 8$ cm. [2]
13. In the given figure $OM = 6$ cm, $AB = 16$ cm and $OM \perp AB$, then find:
- Write the relation of AM and BM. [1]
 - The length of radius of circle. [1]
 - If the distance between the chord AB and centre of the circle is 15 cm, find the increase length of the radius of the circle. [2]
14. Last week, the mathematics teacher of ABC School administered a class test of 30 marks for class IX students. He recorded the marks obtained by students in the following table.

Marks obtained	5	10	15	20	25	30
No. of students	2	3	7	10	8	4

- (a) What is the model marks? [1]
 (b) Construct a cumulative frequency distribution table? [1]
 (c) Calculate the median mark. [1]
 (d) What is the average mark of students who secured more than median marks? [2]
15. A bag contains 5 white balls, 4 black balls and 3 red balls of same shape and size.
- (a) Write the probability range. [1]
 (b) What is probability that the drawn ball is either black or white? [2]
 (c) Find the probability of not getting black ball. [1]
 (d) Is the probability of getting ball either black or white is equal to the probability of not getting red ball? Justify your answer. [1]
16. In the given figure, AB is the height of the pole which is $10\sqrt{3}$ m. and BC is the length of the shadow of the pole, then find:
- (a) Which trigonometric ratio is represented by AB/BC ? [1]
 (b) Find the value of $\tan 60^\circ$. [1]
 (c) Find the length of the shadow of the pole. [1]
 (d) What will be the size of $\angle ACB$ when length of the shadow is equal to the height of the pole? [1]



The End