Symbol No. ..... RE – 1031'KoP

SEE 2081 (2025)
अनिवार्य गणित

समय : ३ घण्टा पूर्णाङ्क : ७५

दिइएका निर्देशनका आधारमा आफ्नै शैलीमा सिर्जनात्मक उत्तर दिनुहोस् :

सबै प्रश्नहरू अनिवार्य छन् । (Answer all the questions.)

1. 360 जना विद्यार्थीहरूको समूहमा सर्वेक्षण गर्दा 100 जनाले वास्केटवल खेल मात्र मन पराउँछन् । 60 जनाले क्रिकेट खेल मात्र मन पराउँछन् र 100 जनाले दुवै खेलमध्ये कुनै पनि मन पराउँदैनन् ।
In a survey of a group of 360 students, 100 students like basketball game only, 60 like cricket game only and 100 do not like any of the two games.
   (a) यदि 'B' र 'C' ले क्रमशः वास्केटवल र क्रिकेट खेल मन पराउने विद्यार्थीहरूको समूह जनाउँदछन् भने $n(\overline{BUC})$ को मान कति हुन्छ ? लेख्नुहोस् ।
   If 'B' and 'C' denote the set of students who like basketball and cricket game respectively, then what is the value of $n(\overline{BUC})$? Write it. (1)
   (b) माथिको तथ्यलाई भेन चित्रमा प्रस्तुत गर्नुहोस् ।
   Present the above information in a venn-diagram. (1)
   (c) दुवै खेल मन पराउने विद्यार्थीहरूको सङ्ख्या पत्ता लगाउनुहोस् ।
   Find the number of students who like both the games. (3)
   (d) यदि दोस्रो पटक फेरि सर्वेक्षण गर्दा कुनै पनि खेलमा रुची नभएका सबैले क्रिकेट खेल मन पराए र अन्य यथावत पाइयो भने कम्तिमा एउटा खेल मन पराउने विद्यार्थीहरूको सङ्ख्या कति हुनेथियो ? पत्ता लगाउनुहोस् ।
   If everyone who is not interested in any game liked cricket game in the second survey and found others to be same then, what would be the number of students who like at least one game? Find it. (1)

2. राजनले रामसँग 2 वर्षका लागि 10% साधारण व्याजको दरले रु.10,000 सापटी लिएछ र त्यत्तिनै बेला सो रकम समान समय र उही व्याज दरमा वार्षिक चक्रीय व्याजमा श्यामलाई सापटी दिएछ ।
Rajan borrowed a loan of Rs.10,000 from Ram for 2 years at the rate of 10% simple interest. Immediately, Rajan lent the same sum for same time and same rate of interest compounded annually to Shyam.
   (a) दिइएको सन्दर्भअनुसार, 2 वर्षको अन्त्यमा हुने साधारण व्याज र चक्रीय व्याज मध्ये कुन बढी हुन्छ ? लेख्नुहोस् ।
   According to the given context, which interest is more among simple interest and compound interest for 2 years? Write it. (1)

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(b) राजनले उक्त कारोवारमा 2 वर्षमा कति फाइदा पाए ? पत्ता लगाउनुहोस् ।
How much profit did Rajan get during the transaction of 2 years? Find it. (2)

(c) यदि राजनले उक्त रकम अर्धवार्षिक चक्रीय व्याजदरमा सापटी दिएको भए थप कति व्याज श्यामले दिनु पर्दथ्यो ? पत्ता लगाउनुहोस् ।
How much more interest should Shyam need to pay to Rajan if Rajan had lent the amount at semi-annual compound interest? Find it. (2)

3. कुनै गाउँको हालको जनसङ्ख्या 20,000 छ । उक्त गाउँमा वार्षिक 2% का दरले जनसङ्ख्या वृद्धि हुन्छ ।
The population of a village is 20,000. The population increases by 2% annually in the village.

(a) यदि सुरुको जनसङ्ख्या P, जनसङ्ख्या वृद्धिदर R प्रतिवर्ष र T वर्षपछिको जनसङ्ख्या P_T भए, P_T पत्ता लगाउने सुत्र लेख्नुहोस् ।
If the initial population is P, growth rate is R per annum and population after T years is P_T then write the formula to find P_T.(1)

(b) कति वर्षपछि सो गाउँको जनसङ्ख्या 20,808 पुग्छ ? पत्ता लगाउनुहोस् ।
After how many years the population of the village will be 20,808 ? Find it. (2)

(c) यदि प्रति वर्ष 3% का दरले जनसङ्ख्या वृद्धि भएको भए 2 वर्षमा सो गाउँको जनसङ्ख्या कतिले वढ्छ ? पत्ता लगाउनुहोस् ।
If the population increases at the rate of 3% per annum, by what number will the population of the village be increased in 2 years? Find it. (1)

4. मुद्रा विनियम दरअनुसार कुनै दिनको 1 अमेरिकी डलरको खरिद दर ने.रु. 136.13 र विक्रीदर ने.रु. 137.25 थियो ।
According to the currency exchange rate, the buying rate of 1 American dollar was NRs. 136.13 and selling rate was NRs. 137.25 in a certain day.

(a) तपाईंले अमेरिकी डलर नेपाली रुपियाँमा साट्दा खरिददर र विक्रीदर मध्ये कुन प्रयोग हुन्छ ? लेख्नुहोस् ।
Which rate buying or selling is used when you exchange American dollar into Nepali rupees? Write it. (1)

(b) अमेरिकी पर्यटकले 1000 डलर साट्दा कति नेपाली रुपिया पाउँछन् ? पत्ता लगाउनुहोस् ।
How many Nepali rupees can American tourist get by exchanging 1000 dollars? Find it. (1)

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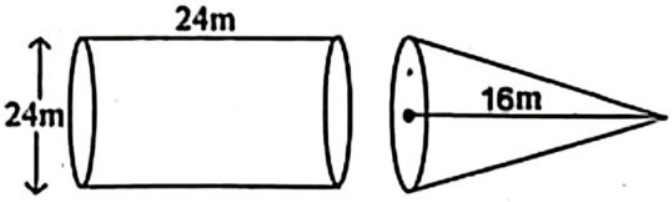
(c) उक्त अमेरिकी पर्यटकले नेपाल वसाइमा ने.रु.1,01,817.50 खर्च गरेछ भने आफ्नो देश फर्किंदा बाँकी रकमको कति अमेरिकी डलर सटही गर्न सक्दछ ? पत्ता लगाउनुहोस् ।
The American tourist spent NRs. 1,01,817.50 while staying in Nepal, how many American dollars can he/she exchange from remaining Nepalese rupees, while returning back to own country? Find it. (2)

5. एउटा विद्यार्थीहरूको समूहले आधार भुजाको लम्बाइ 24 मिटर र ठाडो उचाइ 5 मिटर भएको एउटा वर्गाकार आधार भएको पिरामिड आकारको टेन्ट बनाएछन् ।
A group of students constructed a square based pyramid shaped tent having length of base side 24 meter and vertical height 5 meter.
(a) वर्ग आधार भएको पिरामिडमा कतिओटा त्रिभुजाकार सतहहरू हुन्छन् ? लेख्नुहोस् ।
How many triangular surfaces are there in the square based pyramid? Write it. (1)
(b) उक्त माथिको वर्गाकार आधार भएको टेन्टको छड्के उचाइ पत्ता लगाउनुहोस् ।
Find the slant height of the above square based tent. (1)
(c) त्रिभुजाकार सतहहरूमा प्रति वर्ग मिटर रु.125 का दरले कपडा लगाउँदा जम्मा कति खर्च लाग्छ ? पत्ता लगाउनुहोस् ।
What is the total cost of cloths required to make triangular surfaces at the rate of Rs.125 per square metre? Find it. (2)

6. दिइएको चित्रमा बराबर आधार भएका काठको बेलना र सोली देखाइएको छ ।
In the given figure, wooden cylinder and cone having equal base are shown.



(a) सोलीको आयतन पत्ता लगाउने सुत्र लेख्नुहोस् ।
Write the formula to find the volume of a cone. (1)
(b) देखाइएको वस्तुहरूमा सोलीको आयतन पत्ता लगाउनुहोस् ।
Find the volume of the cone in the given objects. (2)
(c) दिइएको बेलनामा दिइएको सोली आकार खोपेमा, उक्त बेलनामा काठको आयतन कति बाँकी हुन आउँछ ? पत्ता लगाउनुहोस् ।
If given wooden cylinder is drilled out in the given conical shape, what will be the volume of remaining wood in cylinder? Find it. (2)

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7. एउटा पर्खालको लम्बाइ 10 मि., चौडाइ 0.5 मि. र उचाइ 2 मि. छन् । उक्त पर्खाल बनाउन 25 से.मि. × 12 से.मि. × 8 से.मि. नापका इटाहरू प्रयोग गरिएका छन् । साथै उक्त पर्खालको $\frac{1}{10}$ भाग माटोको जोर्नीले ओगटेको छ ।
The length of a wall is 10 m, width is 0.5 m and height is 2 m. Bricks of size 25 cm × 12 cm × 8 cm are used to build the wall. Also, $\frac{1}{10}$ part of the wall is occupied by the clay joints.

(a) सो पर्खाल बनाउन कतिओटा इटाहरू चाहिन्छन् ? पत्ता लगाउनुहोस् ।
How many bricks are required to construct the wall? Find it. (3)

(b) प्रति 1000 इटाको मूल्य रु.14,500 का दरले सो पर्खाल बनाउन लाग्ने इटाको खर्च अनुमान गर्नुहोस् ।
Estimate the cost of bricks used in the wall at the rate of Rs. 14500 per 1000 bricks. (1)

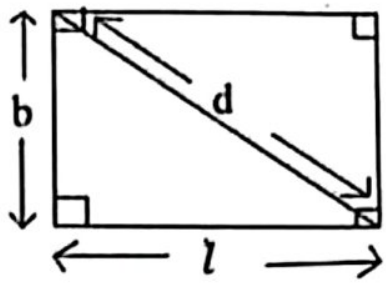
8. रमेशले प्रत्येक दिन अघिल्लो दिनको भन्दा दोब्बर रकम जम्मा गर्ने गरी 7 दिनसम्म एउटा सहकारीमा रकम बचत गर्छन् । जसअनुसार उनले पहिलो दिन रु. 10, दोस्रो दिन रु.20, तेस्रो दिन रु. 40 गरी 7 औं दिनसम्म यसरी नै रकम जम्मा गरेछन् ।
Ramesh deposits the amount in a co-operative for 7 days by increasing the amount every day double than the previous day. He deposited Rs. 10 on the first day, Rs. 20 on the second day, Rs. 40 on the third day and so on till the 7^{th} day.

(a) माथिको सन्दर्भ अनुसार जम्मा गरेको रकमबाट बन्ने श्रेणी कुन प्रकारको हुन्छ ? लेख्नुहोस् ।
What type of series is formed from the deposit amount according to above context? Write it. (1)

(b) 7 दिनको अन्त्यसम्ममा रमेशले कति रकम जम्मा गर्छन् ? सूत्र प्रयोग गरी पत्ता लगाउनुहोस् ।
How much amount will Ramesh deposit by the end of 7 days? Find it using formula. (2)

(c) यदि रमेशले 4 दिनसम्म जम्मा भएको रकम पहिले नै निकालेको भए 7 दिनको अन्त्यमा उसले कति रकम मात्र पाउँछन् ? पत्ता लगाउनुहोस् ।
If Ramesh withdraws the amount deposited by 4 days, how much will he receive at the end of the 7^{th} days? Find it. (2)

9. एउटा आयताकार जमिनको लामो भुजा छोटो भुजाभन्दा 40 मि. बढी छ र त्यसको विकर्ण लामो भुजाभन्दा 40 मि. बढी छ।
The longer side of a rectangular field is 40 m more than the shorter side and its diagonal is 40 m more than its longer side.



(a) माथिको सन्दर्भ अनुसार जमिनको लम्बाइ (l) चौडाइ (b) र विकर्ण (d) बिचको सम्बन्ध लेख्नुहोस्।
Write the relation among the length (l), breadth (b) and diagonal (d) of the field according to the above context. (1)

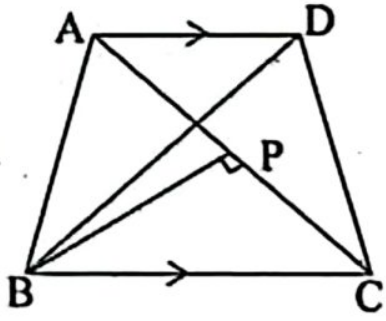
(b) आयताकार जमिनको छोटो भुजा र लामो भुजाको लम्बाइ पत्ता लगाउनुहोस्।
Find the length of the shorter side and longer side of the rectangular filed. (2)

(c) उक्त आयताकार जमिनमा 30 मि. × 20 मि. नापका अधिकतम कति ओटा जग्गाका टुक्राहरू तयार गर्न सकिन्छ ? पत्ता लगाउनुहोस्।
How many maximum numbers of plots of size 30 m × 20 m can be made from the rectangular filed? Find it. (2)

10. (a) सरल गर्नुहोस् (Simplify): $\frac{p+q}{pq} - \frac{q+r}{qr} - \frac{r+p}{rp}$ (2)

(b) हल गर्नुहोस् (Solve): $3^y + 3^{-y} = 9\frac{1}{9}$ (3)

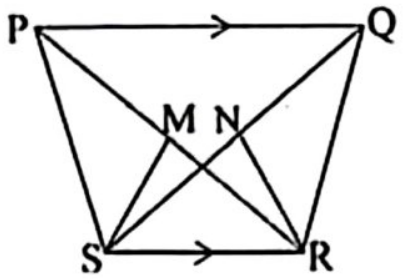
11. दिइएको चित्रमा ΔABC र ΔBCD एउटै आधार BC र उही समानान्तर रेखाहरू AD र BC बिच रहेका छन्। बिन्दु B बाट रेखा AC मा लम्ब BP खिचिएको छ।
In the given figure, ΔABC and ΔBCD are standing on same base BC and between same parallel lines AD and BC. From the point B, a perpendicular BP is drawn to the line AC.



(a) दिइएको चित्रमा ΔBAD को क्षेत्रफलसँग बराबर हुने त्रिभुजको नाम लेख्नुहोस्।
Write the name of triangle whose area is equal to area of ΔBAD in the given figure. (1)

(b) यदि AC = 9 से.मि. र BP = 6 से.मि. भए त्रिभुज BCD को क्षेत्रफल पत्ता लगाउनुहोस्।
If AC = 9 cm and BP = 6 cm, find the area of triangle BCD. (2)

(c) दिइएको चित्रमा PQRS एउटा समलम्ब चतुर्भुज हो । जहाँ PQ||SR छ । साथै M र N क्रमशः विकर्णहरू PR र QS का मध्यविन्दुहरू हुन् भने $\Delta MSR = \Delta NSR$ हुन्छ भनि प्रमाणित गर्नुहोस् ।



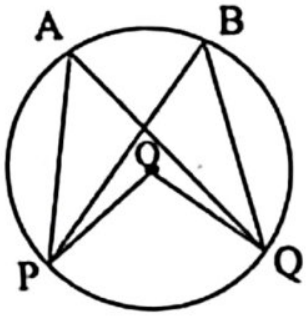
In the given figure, PQRS is a trapezium, where PQ||SR. M and N are the mid points of the diagonals PR and QS respectively. Prove that: $\Delta MSR = \Delta NSR$. (2)

12. त्रिभज PQR मा $\angle PQR = 60^\circ$, QR = 8 से.मि. र PQ = 6 से.मि. दिइएका छन् ।
In a triangle PQR, $\angle PQR = 60^\circ$, QR = 8 cm and PQ = 6 cm are given.

(a) माथिका नापअनुसारको ΔPQR को रचना गर्नुहोस् र उक्त त्रिभुजको क्षेत्रफलसँग बराबर हुने गरी एउटा आयत RITA को पनि रचना गर्नुहोस् ।
Construct a ΔPQR according to above measurements and also construct a rectangle RITA equal in area to the triangle. (3)

(b) यसरी बनेका त्रिभुज र आयतको क्षेत्रफल किन बराबर हुन्छ ? कारण लेख्नहोस् ।
Why the areas of triangle and rectangle so formed are equal? Write reason. (1)

13. दिइएको वृत्तको केन्द्रविन्दु O छ । परिधिका कोणहरू PAQ र PBQ एउटै चाप PQ मा आधारित छन् ।
O is the centre of the given circle. Inscribed angles PAQ and PBQ are standing on the same arc PQ.



(a) परिधि कोणहरू PAQ र PBQ विचको सम्बन्ध लेख्नुहोस् ।
Write the relation between the circumference angles PAQ and PBQ. (1)

(b) यदि केन्द्रीय कोण POQ को नाप $(12x + 4)^\circ$ र परिधि कोण PAQ को नाप $(3x + 20)^\circ$ छन् भने x को मान निकाल्नुहोस् ।
If the measures of central angle POQ is $(12x + 4)^\circ$ and the measures of inscribed angle PAQ is $(3x + 20)^\circ$, find the value of x. (1)

(c) एउटै चापमा बनेको केन्द्रीय कोण परिधि कोणको दोब्बर हुन्छ भनी प्रयोगद्वारा सिद्ध गर्नुहोस् । (अर्धव्यास 3 से.मि. भन्दा बढी भएका दुईओटा वृत्तहरू आवश्यक छन् ।)
Verify experimentally that central angle is double of the inscribed angle formed on same arc. (Two circles having radii more than 3 cm are necessary.) (2)

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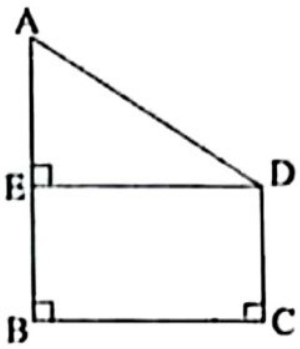
14. दिइएको चित्रमा स्तम्भ AB को उचाइ 24.5 मिटर र घर CD को उचाइ 4.5 मिटर छन् । BC ले स्तम्भ र घर बिचको दूरी जनाउँछ ।
In the given figure, height of the tower AB is 24.5 meter and height of a house CD is 4.5 meter. BC denotes the distance between tower and house.



(a) उन्नतांश कोणलाई परिभाषित गर्नुहोस् ।
Define the angle of elevation. (1)

(b) AE को मान पत्ता लगाउनुहोस् ।
Find the value of AE. (1)

(c) यदि $\angle ADE = 30^\circ$ भए स्तम्भ र घरबिचको दुरी पत्ता लगाउनुहोस् ।
If $\angle ADE = 30^\circ$, find the distance between the tower and the house.(1)

(d) AE र ED बराबर भएको बेलामा उन्नताश कोण कति डिग्रीले कम वा बढी हुन्छ ? तुलना गर्नुहोस् ।
By how many degrees is the angle of elevation less or more when AE and ED are equal? Compare it. (1)

15. 75 पूर्णाङ्कको गणितको एउटा परीक्षामा विद्यार्थीहरूले प्राप्त गरेका अङ्क तलको तालिकामा दिइएको छ ।
The marks obtained by the students in an exam of mathematics of 75 full marks are given in the following table.

प्राप्ताङ्क (Obtained Marks)	0-15	15-30	30-45	45-60	60-75
विद्यार्थी सङ्ख्या (Number of students)	2	5	4	6	3

(a) माथिको तथ्याङ्कबाट रीत पर्ने श्रेणी उल्लेख गर्नुहोस् ।
Illustrate the modal class from the above data. (1)

(b) माथिको तालिकाबाट मध्यिका निकाल्नुहोस् ।
Find the median from the above table. (2)

(c) माथिको तालिकाबाट मध्यक पत्ता लगाउनुहोस् ।
Find the mean from the above table. (2)

(d) सो परीक्षामा सहभागी विद्यार्थी सङ्ख्यामध्ये रीत श्रेणी भन्दा तलको वर्गान्तरमा कति प्रतिशत विद्यार्थी रहेछन् ? पत्ता लगाउनुहोस् ।
Among all the participants in the exam, what percentage of students obtained marks below the model class? Find it. (1)

16. एउटा बासकमा 6 ओटा सेता र 10 ओटा काला उस्तै र उत्रै वलहरू छन् । दुई ओटा बलहरू एकपछि अर्को गरी पुनः राखेर झिकिएका छन् ।
A box contains 6 white and 10 black balls of same shape and size. Two balls are drawn at random one after another with replacement.

(a) यदि A र B दुईओटा अनाश्रित घट्नाहरू भए सम्भाव्यताको गुणन सिद्धान्त लेख्नुहोस् ।
If A and B are two independent events, write the multiplication law of probability. (1)

(b) सबै सम्भावित परिणामहरूको सम्भाव्यतालाई वृक्षचित्रमा देखाउनुहोस् ।
Show the probability of all the possible outcomes in a tree diagram. (2)

(c) दुवै बल उही रङ्का पर्ने सम्भाव्यता पत्ता लगाउनुहोस् ।
Find the probability of getting both balls of same color. (1)

(d) दुवै बल फरक रङका पर्ने सम्भाव्यता, दुवै बल सेता रङका पर्ने सम्भाव्यता भन्दा कति कम वा बढी हुन्छ ? पत्ता लगाउनुहोस् ।
By how much the the probability of getting both balls of different color is less or more than probability of getting both balls of white color? Find it. (1)

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Date:

Page:

Subject :- Maths

SEE - 2.081 (2025)

Koshi province (RE-1031/Kop)

By E. P. Sunar

Answer Sheet

Q.N. 1 Ans,

Sol^n,

Given,

Here,

Let B be the basketball and C be the cricket liked students.

$n(U) = 360$

$n_o(B) = 100$

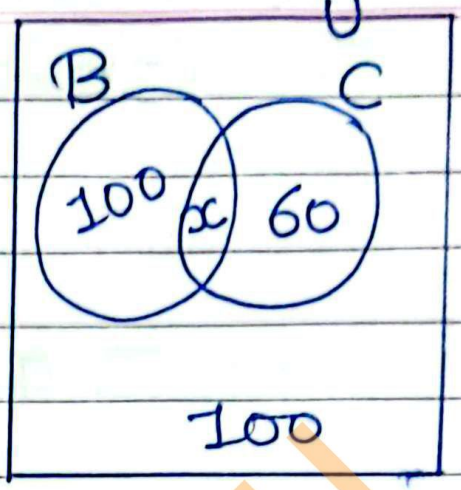
$n_o(C) = 60$

$n(\overline{B \cup C}) = 100$

$n(B \cap C) = x$ (Let)

(a) The value of $n(\overline{B \cup C})$ is 100.

(b) Showing it in a Venn diagram,



(c) From the Venn diagram,

$x + 100 + 60 + 100 = 360$

or, $x + 260 = 360$

or, $x = 360 - 260$

$\therefore x = 100$

Thus, the number of students who like both games is 100.

(d) In the second survey,

$n_o(B) = 100$

$n_o(C) = 60 + 100 = 160$

Now,

The no. of students who like at least one game is

$= n_o(B) + n_o(C) + n(B \cap C)$

$= 100 + 160 + 100$

$= 360$ Ans

Q.N. 2. Ans

Solⁿ.

(a) Given,

Here,

Taking 1st case (Simple interest)

principal (P) = Rs. 10000

Time (T) = 2 years

Rate % (R) = 10 %.

Simple interest (S.I) = ?

We have,

$$S.I = \frac{PTR}{100}$$

$$= \frac{10000 \times 2 \times 10}{100}$$

$$= Rs.\ 2000$$

Taking 2nd case (Compound Interest)

P = Rs. 10000

T = 2 years

R = 10 %.

Now,

$$C.I = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$= 10000\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$= 10000 [(1.1)^2 - 1]$

$= 10000 [1.21 - 1]$

$= 10000 \times 0.21$

$= Rs 2100$

Thus,
compound interest is more than simple interest in 2 years.

(b) Rajan get the profit during the transaction of 2 years is
$= Rs. 2100 - Rs. 2000$
$= Rs. 100$ Ans

(c) Here,
Semi annual compound interest is

$= p\left[\left(1 + \frac{R}{200}\right)^{2T} - 1\right]$

$= 10000\left[\left(1 + \frac{10}{200}\right)^{2\times 2} - 1\right]$

$= 10000[(1.05)^4 - 1]$

$= 10000 \times 0.2155$

$= RS. 2155.063$

Difference between annual-CI and semi-annual CI is

$= RS. 2155.063 - RS. 2100$

$= RS. 55.063$

Thus,

Shyam need to pay RS.55.06 more interest to Rajan for semi annual compound interest.

Q.N. 3 Ans

Soln.

(a) The formula of P_T is

$$P_T = P\left(1 + \frac{R}{100}\right)^T$$

Where,

P = initial population

P_T = population after T years

R = Growth rate
T = Time

(b) Here,
P = 20000
R = 2%
P_T = 20808
T = ?
We have,

$$P_T = P\left(1 + \frac{R}{100}\right)^T$$

or, $20808 = 20000\left(1 + \frac{2}{100}\right)^T$

or, $\left(1 + \frac{2}{100}\right)^T = \frac{20808}{20000}$

or, $(1.02)^T = 1.0404$

or, $(1.02)^T = (1.02)^2$

$\therefore T = 2$ years

Thus,
After 2 years, the population of the Village will be 2,0808.

(c) Here,
$P = 20000$
$R = 3\%$
$T = 2$ years
$P_T = ?$
We have,
$$P_T = P\left(1 + \frac{R}{100}\right)^T$$
or, $$P_2 = 20000\left(1 + \frac{3}{100}\right)^2$$
$$= 20000 \times (1.03)^2$$
$$= 20000 \times 1.0609$$
$$= 21218$$

Difference bet^n. P and P_2 is
$= 21218 - 20000$
$= 1218$
Thus,

if the growth rate is 3% the population of the village increased by 12.18 in 2 years.

Q.N. 4 Ans

Sol^n.

(a) Buying rate is used when we exchange American dollar into Nepali rupees.

(b) Here,
Buying rate, $1 = NRS. 136.13
Selling rate, $1 = NRS. 137.25

Using buying rate,
$1 = NRS. 136.13
$1000 = NRS. 136.13 × 1000
= NRS. 136130

Thus,
American tourist get NRS. 136130 by exchanging $1000.

(c) Here,
Total money = NRS. 1,36,130
Expenditure = NRS. 1, 01, 817.50

Remaining Money
= NRS. (1,36,130 − 1,01,817.50)

= NRS 34312.50

Using selling rate,
$1 = NRS. 137.25

or, NRS. 1 = $ $\frac{1}{137.25}$

or, NRS. 34312.50 = $ $\frac{1}{137.25}$ × 34312.50

∴ NRS. 34312.50 = $ 250

Thus,
American tourist get $250 exchange from remaining Nepali rupees.

Q.N. 5 Ans →

Sol^n.

(a) There are 4 triangular surface on the square based pyramid.

(b) Here,
Length of base (a) = 24m
Vertical Height (h) = 5m
Slant height (l) = ?
Now,
We have the relation,

$$l^2 = h^2 + \left(\frac{a}{2}\right)^2$$

or, $l^2 = 5^2 + \left(\frac{24}{2}\right)^2$

or, $l = \sqrt{25 + 144}$

or, $l = \sqrt{169}$

$\therefore l = 13m$

Thus, the slant height is 13m.

(c) Here,
The area of triangular surface of pyramid is

$$LSA = 2al$$
$$= 2 \times 24 \times 13$$
$$= 624 m^2$$

The cost of $1 m^2$ cloths is
$$= RS. 125$$

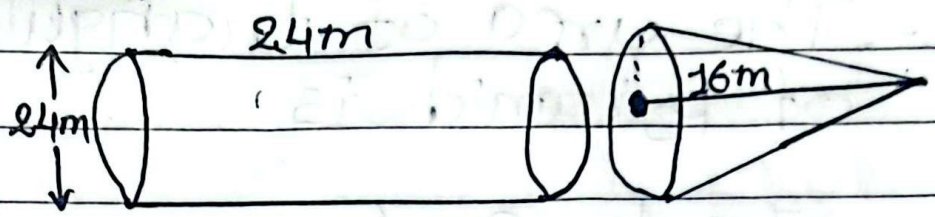
The cost of $624 m^2$ of cloths is
$$= RS. 125 \times 624$$
$$= RS. 78000$$

Thus, the total cost of cloths is RS. 78000.

Q.N. 6 Ans.

Sol^n.

(a)



Here,
The formula to find the volume of a cone is

$$V = \frac{1}{3}\pi r^2 h$$

(b) Here,
Radius of cone $(r) = \frac{24}{2} = 12m$

Height $(h) = 16m$

∴ The volume of cone is

$$V = \frac{1}{3}\pi r^2 h$$

$$= \frac{1}{3} \times \frac{22}{7} \times 12 \times 12 \times 16$$

$$= 2413.71 m^3 \text{ Ans}$$

(c) Here,
Radius of cylinder $(r) = \frac{24}{2}$

$= 12m$

height $(h) = 24m$

Now,
The volume of cylinder is

$V = \pi r^2 h$

$= \frac{22}{7} \times 12 \times 12 \times 24$

$= 10861.71 m^3$

Also,
The volume of remaining wood is

V = Volume of cylinder - Volume of Cone

$= 10861.71 m^3 - 2413.71 m^3$

$= 8448 m^3$ Ans

Q.N.7 Ans

Solⁿ.

(a) Here,
The volume of wall (V) = $l \times b \times h$
$= 10m \times 0.5m \times 2m$
$= 10m^3$

Also,
The volume of brick = $25cm \times 12cm \times 8cm$
$= 2400cm^3$

Again,
The volume of wall without clay joints = $10m^3 - \frac{1}{10}$ of $10m^3$
$= 10m^3 - 1m^3$
$= 9m^3$

Now,
The required number of bricks
$= \frac{9m^3}{2400cm^3}$

$= \frac{9 \times 100 \times 100 \times 100\ cm^3}{2400\ cm^3}$

$= 3750$

Thus, 3750 bricks used in the wall.

(b) Here,
The cost of 1000 bricks = Rs.14500
The cost of 1 brick = $\frac{14500}{1000}$
= Rs.14.5

Now,
The required no. of bricks = 3750
So,
The cost of 3750 bricks
= Rs.14.5 × 3750
= Rs.54375 Ans

Thus,
the cost of bricks used in the wall = Rs.54375.

Q.N. 8 Ans
Sol^n
(a) Geometric series is formed from the above context.

(b) Sol^{n}.

Here,

First term (a) = Rs. 10

Common ratio (r) = $\frac{20}{10}$ = 2

Total No. of terms (n) = 7

Here, $r > 1$,

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

So,

$$S_7 = \frac{10(2^7 - 1)}{2 - 1}$$

$$= \frac{10 \times (128 - 1)}{1}$$

$$= 10 \times 127$$

$$= 1270$$

Thus, Ramesh deposited Rs. 1270 by the end of 7 days.

(c) Here,
For 4 days, $n = 4$

$$S_4 = \frac{a(r^n - 1)}{r - 1}$$

So,

$$S_4 = \frac{10(2^4 - 1)}{2 - 1}$$

$$= \frac{10 \times 15}{1}$$

$$= RS.150$$

Now,
The remaining amount is

$$= S_7 - S_4$$

$$= 1270 - 150$$

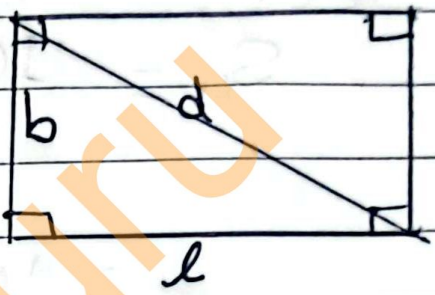
$$= RS.\ 1120$$

Thus,
Ramesh receive RS. 1120 at the end of 7th days, if he withdraw by 4 days.

Q.N. 9 Ans

Sol^{n}.

(a) Here,
For a rectangular field,
Length = l
Breadth = b
Diagonal = d
Now,
The relation bet^{n}. length, breadth and diagonal is



$$d^2 = l^2 + b^2$$
$$\therefore d = \sqrt{l^2 + b^2}$$

(b) Sol^{n}.
Here,
Let the length of the shorter side = xm (Let)
Also
Length of longer side = $(x+40)$m
Diagonal = $(x+40+40)$m
$= (x+80)$m
We have, the relation,
$d^2 = l^2 + b^2$
or, $(x+80)^2 = (x+40)^2 + x^2$

$\Rightarrow x^2 + 160x + 6400 = x^2 + 80x + 1600 + x^2$

$\Rightarrow x^2 + 80x - 160x + 1600 - 6400$

$\Rightarrow x^2 - 80x - 4800 = 0$

$\Rightarrow x^2 - 120x + 40x - 4800 = 0$

$\Rightarrow x(x-120) + 40(x-120) = 0$

$\Rightarrow (x+40)(x-120) = 0$

Either,

$\Rightarrow x + 40 = 0$

$\therefore x = -40$ (-ve is impossible)

$\Rightarrow x - 120 = 0$

$\therefore x = 120$

Thus,
the length of the shorter side is 120m

Also,
The length of the loger side is $= (120 + 40)$m
$= 160$m Ans

(c) Here,
Length of field (l) = 160m
breadth of field (b) = 120m
Now,
The area of the field (A)
$= l \times b$
$= 160m \times 120m$
$= 19200 m^2$
Also,
The area of plot is
$= 30m \times 20m$
$= 600 m^2$
So,
The maximum no. of plots
$= \frac{19200}{600}$
$= 32$
Thus,
32 plots of size 30m x 20m can be made from the given rectangular field.

Q.N. 10 Ans,

Sol^{n},

(a) Here,

$$\frac{p+q}{pq} - \frac{q+r}{qr} = \frac{r+p}{rp}$$

$$= \frac{(p+q)\times r - (q+r)\times p - (r+p)\times q}{pqr}$$

$$= \frac{pr+qr - pq - pr - qr - pq}{pqr}$$

$$= -\frac{2pq}{pqr}$$

$$= -\frac{2}{r} \quad \text{Ans}$$

(b) Here,

$$3^{y} + 3^{-y} = 9\frac{1}{9}$$

Let, $3^{y} = a \longrightarrow (1)$

Then,

$$a + \frac{1}{a} = \frac{82}{9}$$

$$\text{or } \frac{a^2+1}{a} = \frac{82}{9}$$

$$\text{or, } 9a^2+9 = 82a$$

$$\text{or, } 9a^2-82a+9=0$$

$$\text{or, } 9a^2-81a-1a+9=0$$

$$\text{or, } 9a(a-9)-1(a-9)=0$$

$$\text{or, } (a-9)(9a-1)=0$$

Either,

$\Rightarrow a-9=0$ | $9a-1=0$

$\therefore a=9$ | $\therefore a=\frac{1}{9}$

Now, from eqn. (1)

$\Rightarrow 3^y=9$ | $3^y=\frac{1}{9}$

$3^y=3^2$ | $\text{or, } 3^y=3^{-2}$

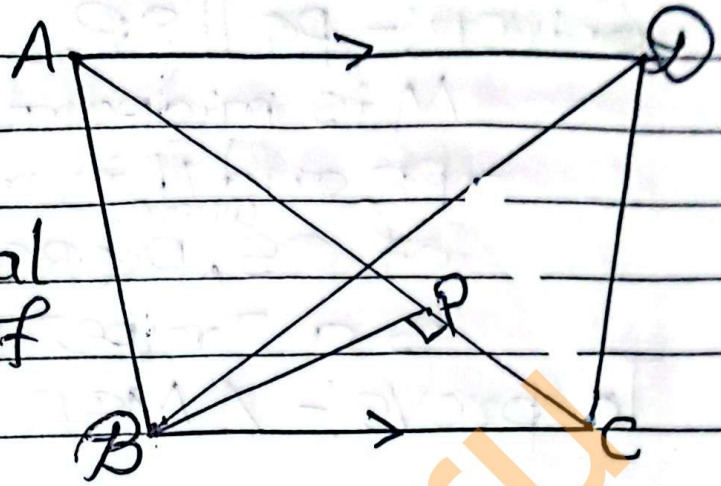
$\therefore y=2$ | $\therefore y=-2$

Hence, $y=2$ and -2.

Q.N. 11 Ans →

Std.

(a) Here,
The area of ΔBAD is equal to the area of ΔACD.



(b) Here,
Given,
$AC = 9\,cm$
$BP = 6\,cm$
Now,
The area of ΔABC is

$$= \frac{1}{2} \times AC \times BP$$

$$= \frac{1}{2} \times 9\,cm \times 6\,cm$$

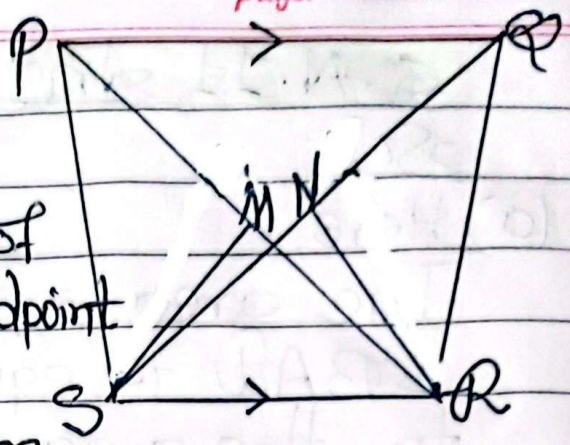
$$= 27\,cm^2$$

So,
The area of $ABCD$ = Area of ΔABC

$$= 27\,cm^2$$

Thus, the area of ΔBCD is $27\,cm^2$.

(c) Here,



Given:- PQ || SR
M is midpoint of PR and N is midpoint of QS, where, PQRS is a Trapezium.

To prove:- $\Delta MSR = \Delta NSR$

Proof:-

Statement	Reasons
1. Area of $\Delta MSR = \frac{1}{2}$ of area of ΔPSR	1 M is midpoint of PR. So, MS is a median splitting ΔPSR into two equal areas.
2. Area of $\Delta NRS = \frac{1}{2}$ of area of ΔQRS	2 N is midpoint of QS So, NR is a median splitting ΔQRS into two equal areas.
3. Area of ΔPSR = Area of ΔQSR	3 Diagonals divide it into equal area triangles.
4. Area of ΔMSR = Area of ΔNSR	4 From (1), (2) and (3).

Conclusion:- Hence, $\Delta MSR = \Delta NSR$ in area.

proved

Q.N. 12 Ans

Soln.

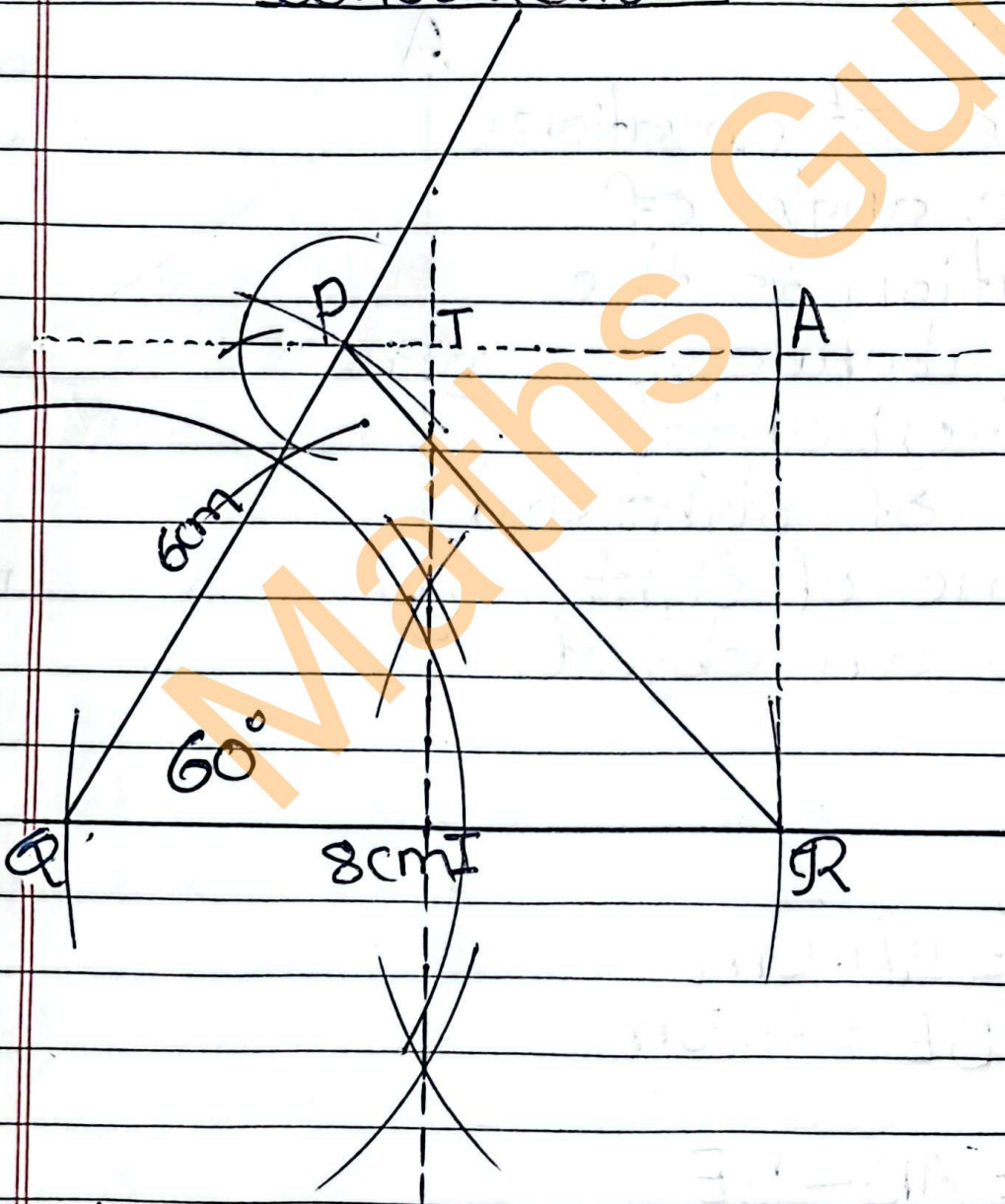
(a) Here,

$\angle PQR = 60°$

$QR = 8cm$

$PQ = 6cm$

construction



We construct □RITA equal in area to the ΔPQR.

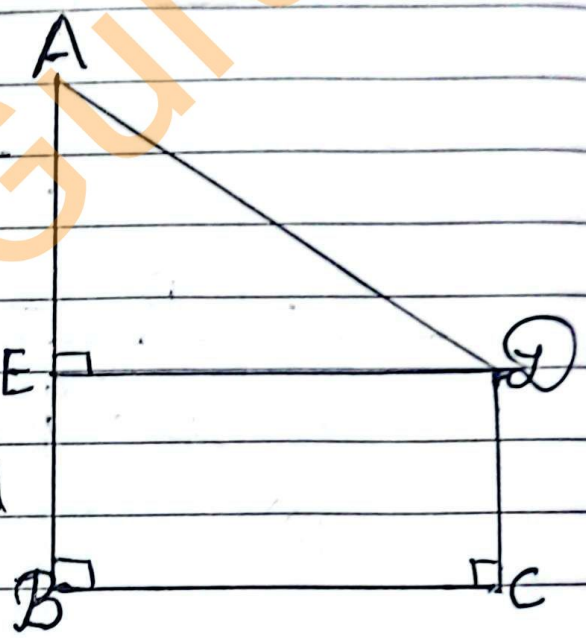
(b) ΔPQR and rectangle RITA lie between the same parallel lines and one side of rectangle RITA is half of the base of ΔPQR.

Q.N. 14 Ans

Soln.

(a) Angle of elevation

The angle of elevation is the angle between the horizontal line of sight and the line of sight up to an object.



(b) Here,

$AB = 24.5m$

$CD = BE = 4.5m$

Now,

$AE = AB - BE$

$= 24.5m - 4.5m$

$= 20m$

The value of AE is 20m.

(c) Here,
$\angle ADE = 30^\circ$
$DE = ?$
$AE = 20m$
We have,
$\tan 30^\circ = \frac{AE}{DE}$

or, $\frac{1}{\sqrt{3}} = \frac{20}{DE}$

$\therefore DE = 20\sqrt{3}\,m$

Thus, the distance between the tower and house is $20\sqrt{3}\,m$.

(d) Here,
When, $AE = ED$ then,
$\tan\theta = \frac{AE}{ED}$

or, $\tan\theta = \frac{AE}{AE}$ [$\because AE = ED$]

or, $\tan\theta = 1$

or, $\tan\theta = \tan 45^\circ$

$\therefore \theta = 45^\circ$

So, $\angle ADE = 45°$

Now,

Angle of elevation more by

$= 45° - 30°$

$= 15°$ Ans

Q.N. 15 Ans

Sol^n.

(a) Here,

The highest frequency is 6, so, the model class = 45–60.

(b) Here,

C.I.	f	Cf
0-15	2	2
15-30	5	7
30-45	4	11
45-60	6	17
60-75	3	20
	N=20	

The position of median

$= \left(\frac{N}{2}\right)^{th}$ obs.

$= \frac{20}{2}$

$= 10^{th}$ obs.

The class interval having 10^{th} obs.

$= (30-45)$

Now,

$l = 30$

$f = 4$

$cf = 7$

$h = 15$

We know that,

Median $(Md) = l + \frac{\frac{N}{2} - cf}{f} \times h$

$= 30 + \frac{10-7}{4} \times 15$

$= 30 + 11.25$

$= 41.25$ Ans

(c) Here,

C.I	f	m	fm
0-15	2	7.5	15
15-30	5	22.5	112.5
30-45	4	37.5	150
45-60	6	52.5	315
60-75	3	67.5	202.5
	$N=20$		$\Sigma fm = 795$

We know that,

$$\text{Mean}(\bar{X}) = \frac{\Sigma fm}{N}$$

$$= \frac{795}{20}$$

$$= 39.75 \text{ Ans}$$

(d) Here,

The percentage of students obtained marks below the model class is

$$= \frac{11}{20} \times 100\%$$

$$= 55\%$$

Q.N. 16 Ans

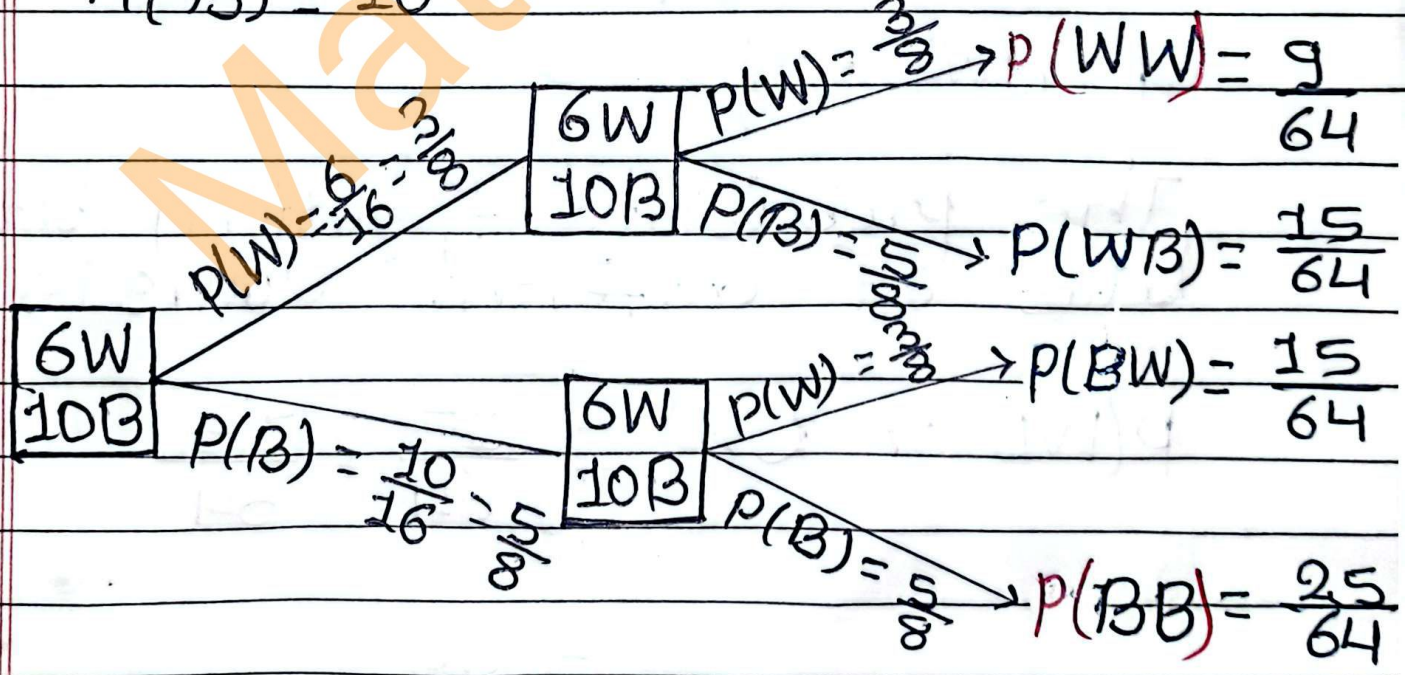
Sol^n.,

(a) Here,
If A and B are two independent events, then
The multiplication law of probability is

$$P(A \cap B) = P(A) \times P(B)$$

(b) Here,
Let, W be the white ball and B be the black ball.

$$n(W) = 6$$
$$n(B) = 10$$



(c) Here, $P(WW) = 9/64$, $P(BB) = 25/64$
The probability of getting both balls of same colour is

$$P(WW \text{ or } BB) = \frac{9}{64} + \frac{25}{64}$$

$$= \frac{34}{64}$$

$$= \frac{17}{32} \text{ Ans}$$

(d) Here, $P(WW) = 9/64$, $P(BB) = 25/64$

$$P(WB) = \frac{15}{64}$$

$$P(BW) = \frac{15}{64}$$

The probability of getting both balls of different colours is.

$$P(W\bar{B} \text{ or } BW) = \frac{15}{64} + \frac{15}{64}$$

$$= \frac{30}{64}$$

Now,
p(WB or BW) is more than p(WW) by

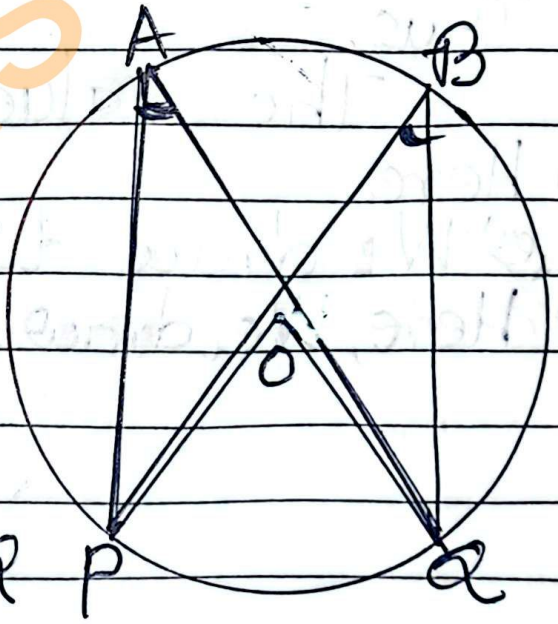
$$= \frac{30}{64} - \frac{9}{64}$$

$$= \frac{21}{64} \text{ Ans}$$

Q.N. 13 Ans

Sol^n

(a) Here,
The ration bet^n. $\angle PAQ$ and $\angle PBQ$ is equal to each other.
i.e. $\angle PAQ = \angle PBQ$



(b) Here,
$\angle POQ = (12x+4)^\circ$
$\angle PAQ = \angle PBQ = (3x+20)^\circ$
Now,

$\angle POQ = 2 \times \angle PAQ$ [$\because$ The central angle is double of the inscribed angle]

or, $12x + 4 = 2 \times (3x + 20)$

or, $12x + 4 = 6x + 40$

or, $12x - 6x = 40 - 4$

or, $6x = 36$

or, $x = \frac{36}{6}$

$\therefore x = 6^\circ$

Thus,
The value of x is 6°

(c) Here,
Given: We draw two figures with different measurement.

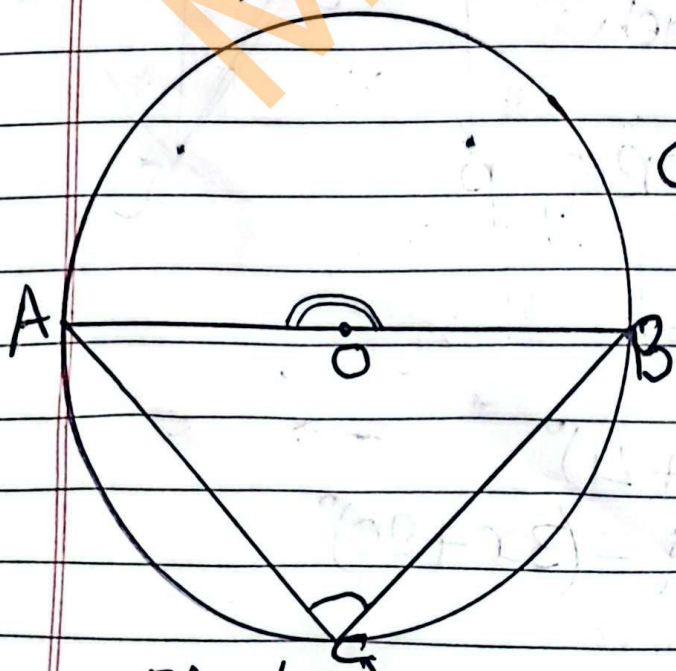


Fig. (a)

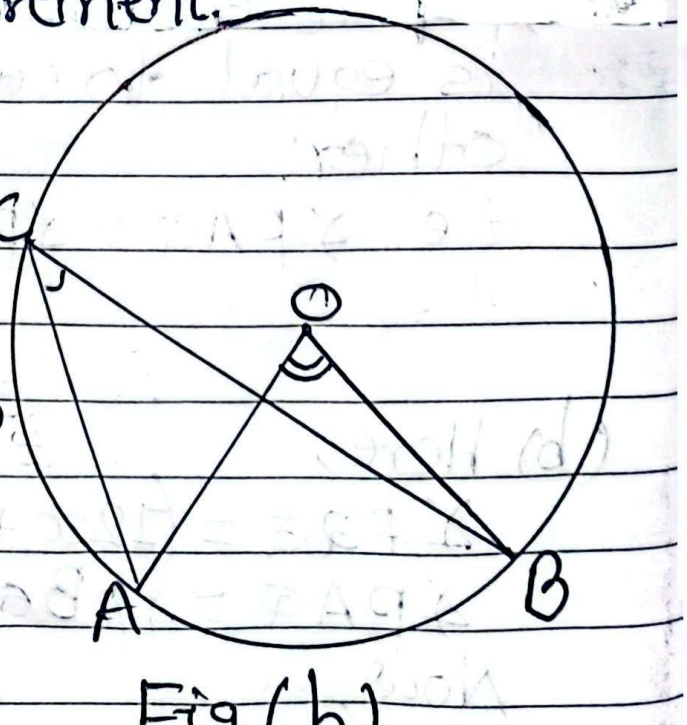


Fig. (b)

To prove:- $\angle AOB = 2\angle ACB$

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observation table

Figure	$\angle AOB$	$\angle ACB$	Result
(a)	180°	90°	$\angle AOB = 2\angle ACB$
(b)	80°	40°	$\angle AOB = 2\angle ACB$

Conclusion :- Hence, the central angle is double of the inscribed angle formed on same arc.

proved

Thank You !!!