

माध्यमिक शिक्षा परीक्षा  
(Secondary Education Examinations - SEE)  
अनिवार्य गणित

समय : 3:00 घण्टा

पूर्णाङ्क : 100

सबै प्रश्नहरू हल गर्नुहोस् । Attempt all the Questions.

## समूह 'क' (Group 'A') [3 x 2 = 6]

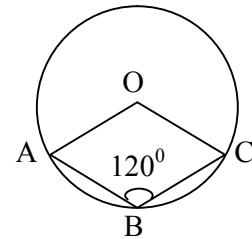
1. a) यदि कुनै सामानको शुरुको मूल्य रु. P र वार्षिक ह्रासदर R% छ भने T वर्ष पछिको मूल्य पत्ता लगाउने सूत्र लेख्नुहोस् ।  
If the initial price of an article is Rs. P and annual rate of depreciation is R%, then write the formula to find the price after T years.
- b) एउटा समद्विबाहु त्रिभुजको आधार भुजा b से.मी. र बराबर दुई भुजाहरू a से.मी. छन् भने उक्त त्रिभुजको क्षेत्रफल कति हुन्छ ? लेख्नुहोस् ।  
The base of an isosceles triangle is b cm and equal sides are a cm. What is the area of the triangle ? Write it.

2. a) ल.स. को परिभाषा लेख्नुहोस् ।  
Define L.C.M.
- b) यदि कुनै तथ्याङ्कको मध्यिका श्रेणीको तल्लो सीमा L, सो श्रेणीको बारम्बारता f, श्रेणी अन्तर i, बारम्बारताहरूको जोड N र मध्यिका श्रेणीभन्दा अघिल्लो श्रेणीको सञ्चित बारम्बारता cf छन् भने मध्यिका (Md) पत्ता लगाउने सूत्र लेख्नुहोस् ।  
If the lower limit of the median class of any data is L, frequency of that class is f, class interval i, sum of the frequencies N and the cumulative frequency of pre-median class is cf, then write the formula for finding the median (Md).

3. a) एउटै आधार र उही समानान्तर रेखाहरू बीच रहेका आयत र त्रिभुजका क्षेत्रफलहरू बीचको सम्बन्ध लेख्नुहोस् ।  
Write the relationship between the areas of a rectangle and a triangle standing on the same base and between the same parallel lines.

- b) दिइएको चित्रमा O वृत्तको केन्द्र हो । यदि  $\angle ABC = 120^\circ$  भए वृत्त  $\angle AOC$  को नाप कति हुन्छ ? लेख्नुहोस् ।

In the given figure O is the centre of the circle. If  $\angle ABC = 120^\circ$ , what is the size of the reflex  $\angle AOC$  ? Write it.



## समूह 'ख' (Group 'B') [7 x (2+2) + 3 x (2+2+2) = 34]

4. a) नेपाल राष्ट्र बैंकको मुद्रा विनिमय दर अनुसार अमेरिकन डलर 1 को खरीद दर र विक्रीदर क्रमशः नेपाली रु. 103.72 र रु. 104.32 छन् भने :

According to the money exchange rate of Nepal Rastra Bank, the purchasing and selling rates of 1 American dollar are NRs. 103.72 and NRs. 104.32 respectively, Then.

- i) नेपाली रु. 57,376 संग कति अमेरिकन डलर साट्न सकिन्छ ?  
How many American dollars can be exchanged with NRs. 57,376 ?
- ii) तपाईंले \$500 संग कति नेपाली रुपैयाँ साट्न सक्नुहुन्छ ? पत्ता लगाउनुहोस् ।  
How much Nepali rupees can you exchange with \$500 ? Find it.

- b) वि.सं.2072 को शुरुमा एउटा शहरको जनसंख्या 50,000 थियो । यदि वार्षिक जनसङ्ख्या वृद्धिदर 10% छ

भने वि.सं. 2074 को अन्तमा त्यो शहरको जनसङ्ख्या कति होला ? पत्ता लगाउनुहोस् ।

In the beginning of 2072 B.S., the population of a town was 50,000. If the annual population growth rate is 10%, what will be the population of the town at the end of 2074 B.S. ? Find it.

5. a) भुजाहरू 3से.मी., 4से.मी. र 5 से.मी. भएको एउटा त्रिभुजको क्षेत्रफल निकाल्नुहोस् ।

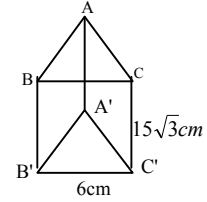
Find the area of a triangle with sides 3 cm, 4 cm and 5 cm.

- b) दिइएको समबाहु त्रिभुजाकार प्रिज्ममा  $B'C'=6$  से.मी. र

$CC' = 15\sqrt{3}$  से.मी. छन् भने सो प्रिज्मको आयतन पत्ता लगाउनुहोस् ।

In the given equilateral triangular prism  $B'C'=6$ cm

and  $CC' = 15\sqrt{3}$  cm. Find the volume of the prism.



- c) यदि एउटा गोलाको आयतन 4851 घन से.मी. छ भने यसको व्यास निकाल्नुहोस् ।

If the volume of a sphere is 4851 cubic cm find its diameter.

6. a)  $x^4-x$  र  $x^2+x+1$  को म.स. पत्ता लगाउनुहोस् ।

Find the H.C.F. of  $x^4 - x$  and  $x^2 + x + 1$

- b) सरल गर्नुहोस् : (Simplify) :  $\sqrt[3]{16} + \sqrt[3]{54} - \sqrt[3]{250}$

7. a) के समीकरण  $\sqrt{2x-1} = -1$  को एकल समाधान हुन्छ कि हुँदैन ? जाँच गर्नुहोस् ।

Whether the equation  $\sqrt{2x-1} = -1$  has a unique solution or not ? Check it.

- b) सरल गर्नुहोस् : (Simplify) :  $\frac{1}{1-x^{b-a}} + \frac{1}{1-x^{a-b}}$

- c) यदि तीनवटा क्रमागत जोर संख्याहरूको योगफल 36 छ भने ती संख्याहरू पत्ता लगाउनुहोस् ।

If the sum of three consecutive even numbers is 36, find the numbers.

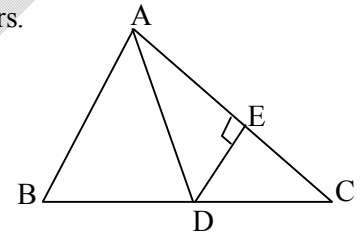
8. a) दिइएको चित्रमा BC को मध्यबिन्दु D हो र  $DE \perp AC$

छ । यदि  $AC=12$  से.मी. र  $DE=5$  से.मी.

छन् भने  $\triangle ABC$  को क्षेत्रफल निकाल्नुहोस् ।

In the given figure D is the mid-point of BC and  $DE \perp AC$ . If

$AC=12$ cm and  $DE=5$ cm. find the area of  $\triangle ABC$ .

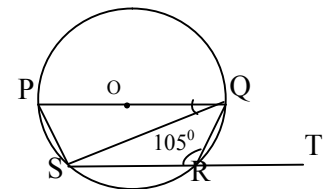


- b) दिइएको चित्रमा O वृत्तको केन्द्रबिन्दु हो । यदि  $\angle QRS=105^\circ$

भए  $\angle PQS$  को मान कति हुन्छ ? पत्ता लगाउनुहोस् ।

In the given diagram O is the centre of the circle. If

$\angle QRS=105^\circ$ , what is the value of  $\angle PQS$  ? Find it.



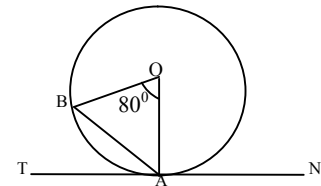
- c) दिइएको चित्रमा O वृत्तको केन्द्र, TN स्पर्शरेखा र A स्पर्शबिन्दु हुन् ।

यदि  $\angle AOB=80^\circ$  भए  $\angle BAT$  को नाप पत्ता लगाउनुहोस् ।

In the given figure O is the centre of the circle, TN,

the tangent and A is the point of contact. If  $\angle AOB=80^\circ$ ,

find the measurement of  $\angle BAT$ .

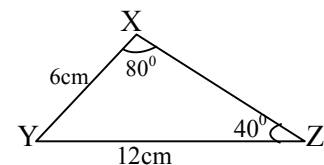


9. a)  $\triangle XYZ$  मा  $\angle x=80^\circ$ ,  $\angle z=40^\circ$ ,  $xy=6$  से.मी. र  $yz=12$

से.मी. छन् भने  $\triangle xyz$  को क्षेत्रफल निकाल्नुहोस् ।

In  $\triangle xyz$ ,  $\angle x=80^\circ$ ,  $\angle z=40^\circ$ ,  $xy=6$  cm and  $yz=12$ cm,

find the area of  $\triangle xyz$ .



- b) एउटा निरन्तर श्रेणीमा यदि मध्यक  $(\bar{x}) = 6$ ,  $\sum fm=72+8k$  र

$\sum f=16+k$  भए जम्मा पदहरूको संख्या पत्ता लगाउनुहोस् ।

In a continuous series, if the mean  $(\bar{x}) = 6$ ,  $\sum fm=72+8k$  and  $\sum f=16+k$ , find the total number

of terms.

10. a) एउटा डाइस र एउटा सिक्का एकैसाथ उफार्दा डाइसमा रुढ संख्या र सिक्कामा शीर आउने सम्भाव्यता पत्ता लगाउनुहोस् ।

Find the probability of getting a prime number on the dice and head on the coin when a dice is rolled and a coin is tossed simultaneously.

- b) राम्ररी फिटिएको 52 पत्तीको एक प्याकेट तासबाट नहेरीकन एकपछि अर्को पुनः नराखीकन दुइवटा तास भिकिएका छन् । वृक्षचित्र खिची अनुहार भएको तास पर्ने र नपर्ने सबै सम्भावित परिणामहरूको सम्भाव्यताहरूलाई देखाउनुहोस् ।

Two cards are drawn randomly in succession without replacement from a well shuffled pack of 52 cards. By drawing a tree diagram show the probabilities of all the possible outcomes of getting and not getting a faced card.

### समूह 'ग' (Group 'C') [10x4=40]

11. 50 जना विद्यार्थीहरूको एक समूहमा 20 जनाले गणित मात्र र 15 जनाले विज्ञान मात्र मन पराउँछन् । यदि यी दुई विषयहरू मध्ये कुनै पनि विषय मन नपराउने विद्यार्थीहरूको संख्या दुवै विषय मन पराउने विद्यार्थीहरूको संख्याभन्दा दोब्बर छन् भने भेन चित्र प्रयोग गरेर बढीमा एउटा विषय मन पराउने विद्यार्थीहरूको संख्या पत्तालगाउनुहोस् ।

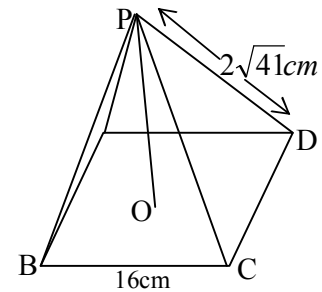
In a group of 50 students 20 like only Maths and 15 like only Science. If the number of students who do not like any of the two subjects is double of the number of students who like both subjects, find the number of students who like at most one subject by using a Venn-diagram.

12. एकजना पर्यटकले 20% छुट र 13% मूल्य अभिवृद्धिकरसहित एउटा नेपाली टोपी किनेछन् । आफ्नो देश फर्कदा उनलाई विमानस्थलमा मूल्यअभिवृद्धिकर रकम रु.83.20 फिर्ता दिईयो भने सो टोपीको अङ्कितमूल्य कति रहेछ ? पत्ता लगाउनुहोस् ।

A tourist bought a Nepali cap with 20% discount and 13% value added tax. When returning to his country the VAT amount Rs. 83.20 returned back to him at the airport. What was the marked price of the cap ? Find it.

13. दिइएको चित्र एउटा वर्गाकार आधार भएको ठोस पिरामिडको हो । यदि आधार भुजाको लम्बाई (BC) 16 से.मी. र छड्के किनाराको लम्बाई (PD)  $2\sqrt{41}$  से.मी.भए सो पिरामिडको आयतन पत्ता लगाउनुहोस् ।

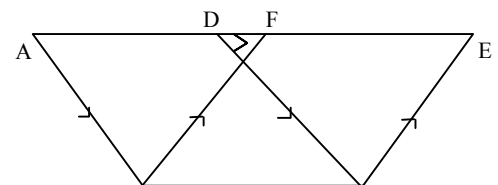
The given figure is of a solid square based pyramid. If the length of side of the base (BC) is 16cm and the length of the lateral edge (PD) is  $2\sqrt{41}$  cm, find the volume of the pyramid.



14. सरल गर्नुहोस् : (Simplify) :  $\frac{x+2}{x^2+2x+4} + \frac{x-2}{x^2-2x+4} + \frac{16}{x^4+4x^2+16}$
15. रु.1000 केही मानिसहरूलाई बराबरी हुनेगरी बाँडियो । यदि 5 जना मानिसहरू बढी भएको भए प्रत्येकले रु.10 कम पाउने थिए भने कतिजना मानिसहरूलाई सो रकम बाँडिएको थियो ? पत्तालगाउनुहोस् ।  
Rs. 1000 was distributed equally among a certain number of people. If there were 5 people more, each would have received Rs. 10 less. Among how many people was the amount distributed ?  
Find it.

16. दिइएको चित्रमा  $AE \parallel BC$ ,  $AB \parallel DC$  र  $BF \parallel CE$  छन् भने, प्रमाणित गर्नुहोस् :

In the given figure,  $AE \parallel BC$ ,  $AB \parallel DC$  and  $BF \parallel CE$ , then prove that :



OCE

i)  $\triangle ABF \cong \triangle DCE$

B &gt; C

ii)  $\square ABCD = \square FBCE$

17. आधार  $BC=6$  से.मी. र उचाइ  $AD=4$  से.मी. भएको एउटा समद्विबाहु त्रिभुज  $ABC$  रचना गर्नुहोस् । त्रिभुज  $ABC$  को क्षेत्रफलसँग बराबर हुनेगरी एउटा कोण  $CDE=45^\circ$  भएको एउटा समानान्तर चतुर्भुज  $CDEF$  को रचना पनि गर्नुहोस् ।

Construct an isosceles triangle  $ABC$  having base  $BC=6$ cm and the altitude  $AD=4$ cm. Also construct a parallelogram  $CDEF$  equal in area to  $\triangle ABC$  and having one angle  $CDE=45^\circ$ .

18. एउटै वृत्तखण्डका कोणहरू बराबर हुन्छन् भनी प्रयोगद्वारा परीक्षण गर्नुहोस् । (कम्तीमा 3 से.मी. अर्धव्यास भएका दुईवटा वृत्तहरू आवश्यक छन् ।)

Verify experimentally that the angles in the same segment of a circle are equal. (Two circles having radii at least 3cm are necessary.)

19. एउटा घरको छतबाट 20 फीट अग्लो एउटा रुखको टुप्पोको अवनति कोण  $30^\circ$  पाइयो । यदि घर र रुखबीचको दूरी  $10\sqrt{3}$  फीट छ भने घरको उचाई पत्ता लगाउनुहोस् ।

From the roof of a house the angle of depression of the top of a tree 20ft. high was found to be  $30^\circ$ . If the distance between the house and the tree is  $10\sqrt{3}$  ft, find the height of the house.

20. दिइएको तथ्याङ्कको पहिलो चतुर्थांश 35 भए  $x$  को मान पत्तालगाउनुहोस् ।

The first quartile of the given data is 35, find the value of  $x$ .

प्राप्ताङ्क (Marks Obtained)	0-20	20-40	40-60	60-80	80-100
विद्यार्थी संख्या (No of Students)	2	$x$	8	5	1

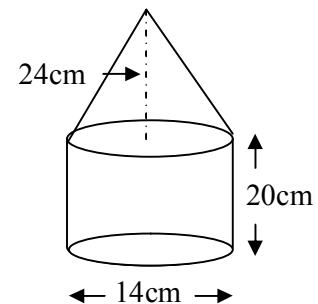
### समूह 'घ' (Group D) [4x5 =20]

21. कुनै धन 3 वर्षसम्म वार्षिक 10% ले साधारण ब्याजमा राखियो र त्यसपछिको मिश्रधनलाई सोही दरमा 2 वर्षसम्म चक्रीय ब्याजमा लगानी गरियो । यदि 5 वर्षमा जम्मा मिश्रधन रु. 471,900 भयो भने मूलधन कति थियो ? पत्ता लगाउनुहोस् ।

A sum of money is placed at simple interest for 3 years at 10% per annum and then the amount is invested for 2 years at the same rate at compound interest. If the total amount of 5 years became Rs. 471,900, what was the sum ? Find it.

22. दिइएको चित्र एउटा सोली र बेलना मिली बनेको ठोस वस्तुको हो । यदि बेलना र सोलीको उचाईहरू क्रमशः 20 से.मी. र 24 से.मी. छन् र आधारको व्यास 14 से.मी. छ भने उक्त वस्तुको पूरा सतहको क्षेत्रफल निकाल्नुहोस् ।

The given figure is of a solid object made up of a cone and a cylinder. If the heights of the cylinder and cone are 20cm and 24cm respectively and the diameter of the base is 14cm, find the total surface area of the object.



23. यदि  $x^2 - 2 = 2^{\frac{2}{3}} + 2^{\frac{-2}{3}}$  भए, प्रमाणित गर्नुहोस् :

If  $x^2 - 2 = 2^{\frac{2}{3}} + 2^{\frac{-2}{3}}$ , then prove that :

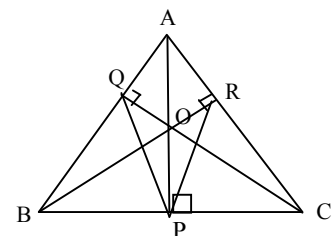
i)  $x = 2^{\frac{1}{3}} + 2^{\frac{-1}{3}}$       ii)  $2x^3 - 6x = 5$

24. दिइएको चित्रमा  $AP \perp BC$ ,  $BR \perp AC$  र  $CQ \perp AB$  छन् भने,

प्रमाणित गर्नुहोस् :  $\angle OPQ = \angle OPR$

In the given figure,  $AP \perp BC$ ,  $BR \perp AC$  and  $CQ \perp AB$ .

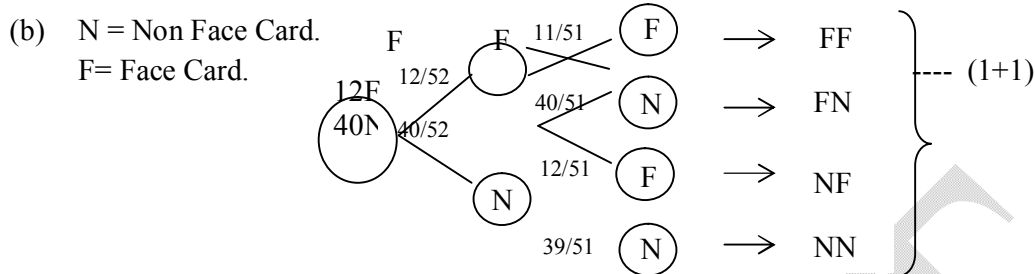
Prove that :  $\angle OPQ = \angle OPR$



Marking Schemes

1. (a) (i)  $P_T = P \left(1 - \frac{R}{100}\right)^T$  ---- (1)  
 (b) (i) Area of isosceles triangle  $= \frac{b}{4} \sqrt{4a^2 - b^2}$  ---- (1)
2. (a) (i) Lowest Common Multiple ---- (1)  
 (b)  $Md = L + \left(\frac{N}{2} - cf\right) \times \frac{i}{f}$  ---- (1)
3. (a) (i) Ar. of rectangle = 2 × Ar. of triangle. ---- (1)  
 (b) (i) Reflex  $\angle AOC = 240^\circ$  ---- (1)
4. (a) (i) \$550 ---- (1)  
 (ii) Rs. 51,860 ---- (1)  
 (b) (i)  $P_T = 50,000 \left(1 + \frac{10}{100}\right)^3$  ---- (1)  
 (ii)  $P_T = 66550$  ---- (1)
5. (a) (i) The triangle is a rt.  $\angle$  d $\Delta$  ---- (1)  
 (ii)  $\Delta = \frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$  ---- (1)  
 (b) (i) Base  $A = \frac{\sqrt{3}}{4} \times 6^2 = 9\sqrt{3} \text{ cm}^2$  ---- (1)  
 (ii) Vol.  $= 9\sqrt{3} \times 15\sqrt{3} = 405 \text{ cm}^3$  ---- (1)  
 (c) (i) For finding  $r = 10.5$  cm ---- (1)  
 (ii) Diameter = 21 cm ---- (1)
6. (a) (i) 1<sup>st</sup> exp  $= x(x^2 + x + 1)$  ---- (1)  
 (ii)  $\therefore$  H.C.F.  $= x^2 + x + 1$  ---- (1)  
 (b) (i)  $2^3\sqrt{3} + 3^3\sqrt{2} - 5^3\sqrt{2}$  ---- (1)  
 (ii) O ---- (1)
7. (a) (i) Finding  $x = 1$  ---- (1)  
 (ii) Checking  $\therefore 1 \neq -1$  ---- (1)  
 or, No unique solution.  
 (b) (i)  $\frac{x^a}{x^a - x^b} - \frac{x^b}{x^a - x^b}$  ---- (1)  
 (ii) 1 ---- (1)  
 (c) (i)  $2x + (2x + 2) + (2x + 4) = 36$  ---- (1)  
 (ii) Regd. Nos are 10, 12, 14 ---- (1)
8. (a) (i)  $\Delta ADC = 30 \text{ cm}^2$  ---- (1)  
 (ii)  $\Delta ABC = 60 \text{ cm}^2$  ---- (1)  
 (b) (i)  $\angle P = 75^\circ$  ---- (1)  
 (ii)  $\angle PQS = 15^\circ$  ---- (1)  
 (c) (i)  $\angle OAB = 50^\circ$  ---- (1)  
 (ii)  $\angle BAT = 40^\circ$  ---- (1)
9. (a) (i)  $\angle y = 60^\circ$  ---- (1)  
 (ii)  $\Delta xyz = \frac{1}{2} \times 6 \times 12 \times \frac{\sqrt{3}}{2} = 18\sqrt{3} \text{ cm}^2$  ---- (1)  
 (b) (i)  $K = 12$  ---- (1)  
 (ii)  $N = 16 + 12 = 28$  ---- (1)

10. (a) (i)  $P(\text{Prime}) = \frac{3}{6} = \frac{1}{2}$  ---- (1)  
 $P(H) = \frac{1}{2}$   
(ii)  $P(\text{Prime} \cap H) = \frac{1}{4}$  ---- (1)



11. (i) Fig + description ---- (1+1)  
(ii)  $20 + x + 15 + 2x = 50$   
 $\therefore x = 5$  ---- (1)

- (iii)  $n(\overline{M} \cap S) = 45$  ---- (1)  
12. (i) 13% of SP = 83.20 ---- (1)  
(ii) Sp = 640 ---- (1)  
(iii) 80% of M.P. = 640 ---- (1)  
(iv)  $\therefore$  M.P. = Rs. 800 ---- (1)

13. (i) Slant ht.  $l = \sqrt{(2\sqrt{41})^2 - 8^2}$   
 $= 10$  cm. ---- (1)

(ii) Vertical ht. ( $h$ ) =  $\sqrt{10^2 - 8^2}$   
 $= 6$  cm ---- (1)

13. (iii)  $V = \frac{1}{3} \times 16^2 \times 6$  ---- (1)  
(iv)  $\therefore v = 512$  c. c. ---- (1)

14. (i)  $\frac{x^3 + 2^3 + x^3 - 2^3}{(x^2 + 2x + 4)(x^2 - 2x + 4)} + \frac{16}{x^4 + 4x^2 + 16}$  ---- (1)

(ii)  $\frac{2x^3}{x^4 + 4x^2 + 16} + \frac{16}{x^4 + 4x^2 + 16}$  ---- (1)

(iii)  $\frac{2(x+2)(x^2 - 2x + 4)}{(x^2 + 2x + 4)(x^2 - 2x + 4)}$  ---- (1)

(iv)  $\frac{2(x+2)}{(x^2 + 2x + 4)}$  ---- (1)

15. (i) Let no. of people be  $x$ .  
then, each received Rs.  $\frac{1000}{x}$  ---- (1)

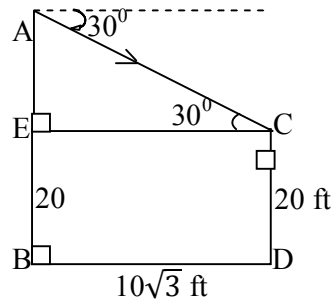
(ii) No. of men =  $x + 5$  ---- (1)  
 $\therefore$  each received Rs.  $\frac{1000}{x + 5}$

(iii)  $\frac{1000}{x} - \frac{1000}{x + 5} = 10$  ---- (1)

(iv)  $\therefore x = 20$  ---- (1)

16. (i)  $\triangle ABF \cong \triangle DCE$  ---- (1+1)  
(ii)  $\triangle ABF = \triangle DCE$  ---- (1)  
(iii)  $\square ABCD = \square FBCE$  ---- (1)

17. (i) For construction of  $\triangle ABC$  ---- (1)  
 (ii) Drawing a line parallel to BC. ---- (1)  
 (iii) Drawing angle  $45^\circ$ . ---- (1)  
 (iv) For construction  $\square CDEF$  ---- (1)  
 18. (i) For correct figures. ---- (1)  
 (ii) For correct measurements. ---- (1+1)  
 (iii) Conclusion. ---- (1)  
 19. (i) For correct figure and description ---- (1)



- (ii)  $\tan 30^\circ = \frac{AE}{EC}$   
 $\therefore \frac{1}{\sqrt{3}} = \frac{AE}{10\sqrt{3}}$  ---- (1)  
 (iii)  $\therefore AE = 10$  ft. ---- (1)  
 (iv)  $\therefore$  Ht. of the house (AB)  
 $= 30$  ft. ---- (1)  
 20. (i) For correct cumulative frequency table. ---- (1)  
 (ii)  $Q_1$  class = 20-40 ---- (1)  
 (iii)  $35 = 20 + \left(\frac{16+M}{4} - 2\right) \times \frac{20}{x}$  ---- (1)  
 (iv)  $\therefore x = 4$  ---- (1)  
 21. (i) Let  $p = Rs. x$   
 $\therefore SI = \frac{x \times 3 \times 10}{100} = \frac{3x}{10}$  ---- (1)  
 (ii) Amount =  $x + \frac{3x}{10} = \frac{13x}{10}$  ---- (1)  
 (iii)  $471900 = \frac{13x}{10} \left(1 + \frac{10}{100}\right)^2$  ---- (1)  
 (iv)  $\therefore x = Rs. 300,000$  ---- (1)  
 22. (i) For finding height of cone. ---- (1)  
 ie,  $h = \sqrt{25^2 - 7^2} = 24$  cm  
 (ii) CSA of cone =  $\frac{22}{7} \times 7 \times 25$   
 $= 550$  cm<sup>2</sup> ---- (1)  
 (iii) CSA of cylinder =  $2 \times \frac{22}{7} \times 7 \times 20$   
 $= 880$  cm<sup>2</sup> ---- (1)  
 (iv) Base Area =  $\frac{22}{7} \times 7^2$   
 $= 154$  cm<sup>2</sup> ---- (1)  
 (v) Total surface area = 1584 cm<sup>2</sup> ---- (1)  
 23. (i) For  $x^2 = \left(2^{1/3}\right)^2 + 2 \cdot 2^{1/3} \cdot 2^{-1/3} + \left(2^{-1/3}\right)^2$  ---- (1)  
 (ii)  $\therefore x = 2^{1/3} + 2^{-1/3}$  ---- (1)

- (iii)  $x^3 = 2 + \frac{1}{2} + 3(2^{1/3} + 2^{-1/3})$  ---- (1)
- (iv)  $x^3 = \frac{4+1+6x}{2}$  ---- (1)
- (v)  $\therefore 2x^3 - 6x = 5$  ---- (1)
- 24. (i) PORC and POQB are cyclic quads. ---- (1)
- (ii) B, C, R and Q are concyclic pts. ---- (1)
- (iii)  $\left. \begin{array}{l} \angle OPR = \angle OCR \text{ and} \\ \angle OPQ = \angle OBQ \end{array} \right\}$  ---- (1)
- (iv)  $\angle OBQ = \angle OCR$  ---- (1)
- (v)  $\therefore \angle OPQ = \angle OPR$  ---- (1)



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