

NAVODAYA VIDYALAYA SAMITI

PRACTICE QUESTION PAPER-1

CLASS X MATHEMATICS

TIME : 3 Hours

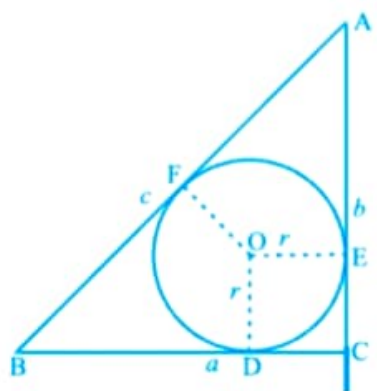
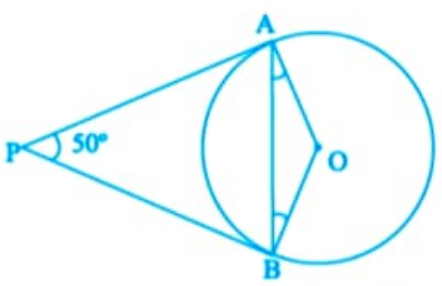
MAX. MARKS : 80

General Instructions:

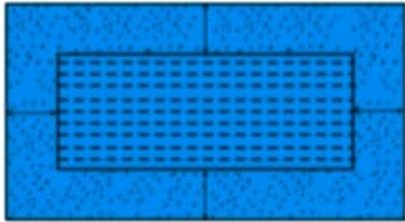
Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This question paper is divided into 5 Sections A,B,C,D and E.
3. In Section A, Question no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In section B, Questions no. 21-25 are very short answer {VSA} type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer {SA} type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Sections C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks Questions of Section E.
9. Draw neat and clean figure wherever is required.
10. Take $\pi = 22/7$ wherever required if not stated.

Section A		
Section A consists of 20 questions of 1 mark each.		
1	Let a and b be two consecutive natural numbers such that $a = p^4q^3$ and $b = p^3q^2$, where p and q are prime numbers. If $HCF\{a,b\} = p^m q^n$ and $LCM\{a,b\} = p^r q^s$ then $(m+n) - (r+s)$ is A) 2 B) -2 C) 5 D) 7	1
2	The values of x and y satisfying the equations $32x + 33y = 34$ and $33x + 32y = 31$ respectively are A) -1, 2 B) -1, 4 C) 1, -2 D) -1, -4	1
3	A quadratic polynomial, the product and sum of whose zeroes are 8 and 5 respectively is A) $K[x^2 - 8x + 5]$ B) $K[x^2 + 8x + 5]$ C) $K[x^2 - 5x + 8]$ D) $K[x^2 + 5x + 8]$	1
4	If 8, $x_1, x_2, x_3, 56$ are in A.P., then x_3 is A) 40 B) 44 C) 48 D) 32	1

5	The radii of two cones are in the ratio 2:3 and their volumes in the ratio 1:3. The ratio of their heights is A) 3:2 B) 2:3 C) 4:3 D) 3:4	1												
6	If $A = 2 \sec^2 x$ and $B = 2 \tan^2 x - 3$, then $A - B$ is equal to A) 2 B) 5 C) 3 D) -1													
7	In triangle ABC, $\angle C = 90^\circ$ and $AB = c$, $BC = a$ and $CA = b$. The radius r of the circle which touches the sides of the ΔABC is given by  A) $r = \frac{a+b-c}{2}$ B) $r = \frac{a-b+c}{2}$ C) $r = \frac{a+b+c}{2}$ D) $r = \frac{a-b-c}{2}$	1												
8	The value of k , if one zero of quadratic polynomial $x^2 + 2\sqrt{2}x + k$ is $\sqrt{2}$, is A) 8 B) 6 C) -8 D) -6	1												
9	For the following distribution: <table border="1"> <thead> <tr> <th>Class</th> <th>0-5</th> <th>5-10</th> <th>10-15</th> <th>15-20</th> <th>20-25</th> </tr> </thead> <tbody> <tr> <td>Frequency</td> <td>10</td> <td>15</td> <td>12</td> <td>20</td> <td>9</td> </tr> </tbody> </table> the sum of lower limits of the median class and modal class is A) 15 B) 25 C) 30 D) 35	Class	0-5	5-10	10-15	15-20	20-25	Frequency	10	15	12	20	9	1
Class	0-5	5-10	10-15	15-20	20-25									
Frequency	10	15	12	20	9									
10	In adjoining figure PA and PB are tangents to the circle with centre O such that $\angle APB = 50^\circ$, then $\angle OAB$ is equal to 	1												
11	The roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$ are A) Rational and unequal B) Irrational and unequal C) Real and equal D) Not real	1												
12	If $\sqrt{3} \tan \theta = 3 \sin \theta$, then the value of $\cos \theta$ is	1												

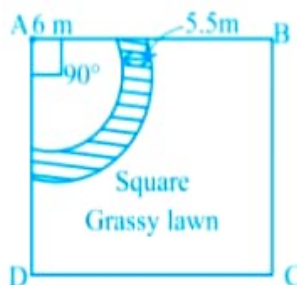
	A) $\frac{\sqrt{3}}{2}$ B) $\frac{1}{2}$ C) 1 D) $\frac{1}{\sqrt{3}}$	
13	The ratio between the volumes of two spheres is 8:27, the ratio between their surface areas is A) 2:3 B) 4:5 C) 5:6 D) 4:9	1
14	Two dice are thrown simultaneously. The probability of getting a doublet is A) $\frac{1}{36}$ B) $\frac{1}{6}$ C) $\frac{1}{3}$ D) $\frac{1}{12}$	1
15	AOBC is a rectangle whose three vertices are A(0,3), O(0,0) and B(5,0). The length of each diagonal is A) 5 units B) 3 units C) $\sqrt{37}$ units D) $\sqrt{34}$ units	1
16	Which of the following is not a measure of central tendency A) Mean B) Range C) Median D) Mode	1
17	The ratio in which the line $3x+y-9=0$ divides the line segment joining the points (1,3) and (2,7) is A) 2:3 B) 3:2 C) 4:3 D) 3:4	1
18	Three coins are tossed simultaneously. The probability of getting atmost 2 heads is A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{7}{8}$ D) $\frac{5}{8}$	1
	DIRECTION: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A) C) Assertion (A) is true but reason (R) is false. D) Assertion (A) is false but reason (R) is true	
19	Assertion(A) : An arc of circle is of length 5π cm and the sector it bounds has an area of 20π cm ² .The radius of this circle is 4cm Reason(R) : Length of arc of circle is $\frac{2\pi r\theta}{360^\circ}$ and area of sector is $\frac{\pi r^2\theta}{360^\circ}$	1
20	Assertion (A): $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{7}, \sqrt{11}, \sqrt{13}, \sqrt{17}$, etc. are irrational numbers. Reason(R): If p is positive prime, then \sqrt{p} is always an irrational number.	1
	Section B	
	Section B consists of 5 questions of 2 marks each.	
21	(A) Six bells commence tolling together and toll at intervals of 2,4,6,8,10,12 minutes respectively. In 30 hours, how many times do they toll together. OR (B) Find the maximum number of students among whom 1001 pens and 910 pencils can be distributed in such a way that each student get the same number of pens and same number of pencils.	2
22	(A) All the three face cards of spades are removed from a well shuffled pack of 52 playing cards. A card is then drawn at random from the remaining pack. Find the probability that the card drawn is a (i) Black face card	2

	<p>(ii) A Black card</p> <p style="text-align: center;">OR</p> <p>(B) A carton consist of 200 shirts of which 176 are good, 16 have minor defects and 8 have major defects. Gimmy, a trader, will only accepts the shirts which are good. But Sujata, another trader, will only reject the shirts which have the major defects. One shirt is drawn at random. Find the probability that</p> <p>(i) It is acceptable to Gimmy</p> <p>(ii) It is acceptable to Sujata</p>	
23	Evaluate: $\frac{\cos 60^\circ + \sin 45^\circ - \cot 30^\circ}{\tan 60^\circ - \cos 45^\circ - \sin 30^\circ}$	2
24	Let A(4,2), B(6,5) and C(1,4) be the vertices of ΔABC . D is the midpoint of side BC. Find the length of the median AD	2
25	Three consecutive vertices of a parallelogram ABCD are A(-2,-1), B(1,0) and C(4,3). Find the coordinate of the fourth vertex.	2
SECTION C		
Section C consists of 6 questions of 3 marks each.		
26	<p>(A) Prove that if a line is drawn parallel to one side of a triangle to intersect other two sides in distinct points the the other two sides are divided in the same ratio.</p> <p style="text-align: center;">OR</p> <p>(B) Prove that a line drawn parallel to parallel sides of a trapezium divides non parallel sides in the same ratio</p>	3
27	<p>In the centre of a rectangular lawn of dimensions 50 m \times 40 m, a rectangular pond has to be constructed so that the area of the grass surrounding the pond would be 1184 m². Find the length and breadth of the pond.</p> <div style="text-align: center;">  </div>	3
28	If α and β are the zeroes of a polynomial $f(x)=x^2+px+q$, then form a aquadratic polynomial whose zeroes are $(\alpha+ \beta)^2$ and $(\alpha- \beta)^2$	3
29	If $\sec\theta+\tan\theta=p$, the prove that $\sin\theta=\frac{p^2-1}{p^2+1}$	3
30	(A) A chord of a circle of radius 10 cm subtends an angle of 90° at the centre. Find the area of the corresponding major segment of the circle. (Use $\pi = 3.14$).	3



OR

(B) A calf is tied with a rope of length 6 m at the corner of a square grassy lawn of side 20 m. If the length of the rope is increased by 5.5m, find the increase in area of the grassy lawn in which the calf can graze



31 Prove that $7+3\sqrt{2}$ is an irrational number, if it is given that $\sqrt{2}$ is an irrational number 3

SECTION D

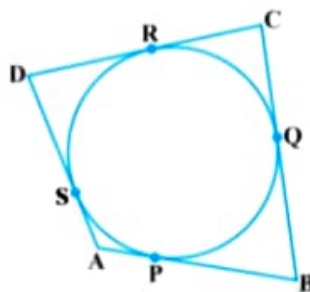
Section D consists of 4 questions of 5 marks each

32 (A) A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days, and an additional charge for each day thereafter. Latika paid Rs 22 for a book kept for six days, while Anand paid Rs 16 for the book kept for four days. Find the fixed charges and the charge for each extra day 5


OR

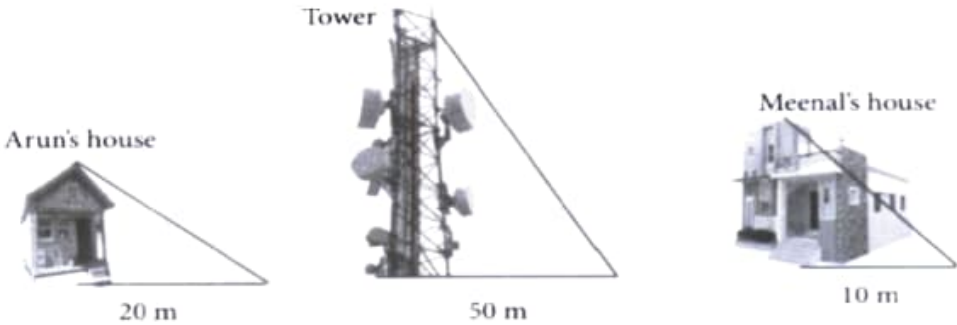
(B) Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

33 Prove that the lengths of tangents drawn from an external point to a circle are equal. Using above theorem, prove that $AB+CD=AD+BC$, if ABCD is a quadrilateral circumscribing a circle with centre O, as shown in adjoining figure 5



34 A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30° , which is approaching the foot of the 5

	tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from this point.																															
35	<p>Find the mean, median and mode of the following frequency distribution:</p> <table border="1"> <tr> <td>Class</td> <td>0-10</td> <td>10-20</td> <td>20-30</td> <td>30-40</td> <td>40-50</td> <td>50-60</td> <td>60-70</td> </tr> <tr> <td>Frequency</td> <td>4</td> <td>5</td> <td>7</td> <td>10</td> <td>12</td> <td>8</td> <td>4</td> </tr> </table> <p style="text-align: center;">OR</p> <p>The following table shows the ages of the patients admitted in a hospital during a month:</p> <table border="1"> <tr> <td>Age(in years)</td> <td>5-15</td> <td>15-25</td> <td>25-35</td> <td>35-45</td> <td>45-55</td> <td>55-65</td> </tr> <tr> <td>Number of patients</td> <td>6</td> <td>11</td> <td>21</td> <td>23</td> <td>14</td> <td>5</td> </tr> </table> <p>Find the mode and mean of the data given above.</p>	Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Frequency	4	5	7	10	12	8	4	Age(in years)	5-15	15-25	25-35	35-45	45-55	55-65	Number of patients	6	11	21	23	14	5	5
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SECTION E																																
Section E consists of 3 case study based questions of 4 marks each.																																
36	<p>As a part of social awareness activity on Environment day, students of Durgapura Higher Secondary School thought of planting trees in and around their school to reduce air pollution. It was decided that each section of each class would plant twice as many plants as class which they belong to. There were 4 sections of each standard from 1 to 12. So, if there are four sections in class 1 say 1A, 1B, 1C and 1D, then each section would plant 2 trees. Similarly, each section of class 2 would plant 4 trees and so on. Thus, the number of trees planted by classes 1 to 12 formed an AP given by 8, 16, 24, Ratan, who is a student of Class 10 B decided to frame a set of questions and answers based on the above information. Help him to do so.</p>  <p>(i) Find the n^{th} term of A.P. (ii) Find the total number of trees planted by class 10 students of all the sections together. (iii) The members of the Nature Club of the School decided to find the total number of trees planted by the students of the school altogether. Help them to do so.</p> <p style="text-align: center;">OR</p> <p>(iii) Find the number of trees planted by Section A of all classes from 1 to 12.</p>																															

		1 1 2 2
37	<p>Meenal was trying to find the height of tower near his house. She is using the properties of similar triangles. The height of Meenal's house is 20 m. When Meenal's house casts a shadow of 10m long on the ground, at the same time, tower casts a shadow of 50 m long and Arun's house casts a shadow of 20 m long on the ground as shown below.</p>  <p>Based on the above information, answer the following questions.</p> <p>(i) What is the height of tower? (ii) What is the height of Arun house? (iii) What will be the length of shadow of tower when Meenal's house casts a shadow of 15 m?</p> <p style="text-align: center;">OR</p> <p>(iii) If tower casts a shadow of 40 m, then find the length of shadow of Arun's house</p>	1 1 2 2
38	<p>The Great Stupa at Sanchi is one of the oldest stone structures in India, and an important monument of Indian Architecture. It was originally commissioned by the emperor Ashoka in the 3rd century BCE. Its nucleus was a simple hemispherical brick structure built over the relics of the Buddha. .It is a perfect example of combination of solid figures. A big hemispherical dome with a cuboidal structure mounted on it. (Take $\pi = 22/7$)</p>	