

Please check that this question paper contains 38 questions and 10 printed pages.

Roll No. : _____

**D.A.V. INSTITUTIONS, CHHATTISGARH
PRACTICE PAPER 2**

CLASS: X

SUBJECT: MATHEMATICS (STANDARD)

TIME: 3 HOURS

MAX MARKS: 80

General Instructions:

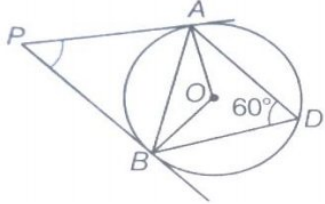
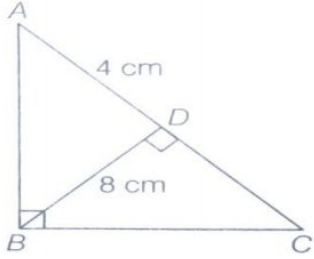
1. This Question Paper has 5 sections A – E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice of 2 questions of 5 marks, 2 questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

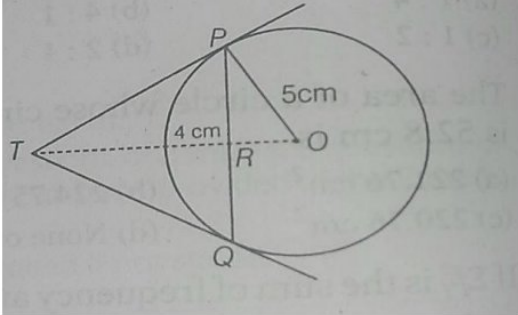
SECTION A

Section A consists of 20 questions of 1 mark each.

Q. No.		Marks
1	If the product of the zeroes of the polynomial $f(x) = ax^3 - 6x^2 + 11x - 6$ is 4, then the value of a is (a) -11 (b) $\frac{1}{6}$ (c) $\frac{3}{2}$ (d) $\frac{11}{4}$	1
2	The value of k, for which $2k+7$, $6k-2$ and $8k+4$ are 3 consecutive terms of an AP. (a) $\frac{15}{2}$ (b) $\frac{13}{2}$ (c) $\frac{17}{2}$ (d) $\frac{11}{2}$	1
3	If $\tan \theta = \frac{12}{13}$, then the value of $\frac{2\sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta}$ is (a) $\frac{312}{25}$ (b) $\frac{337}{25}$ (c) $\frac{287}{25}$ (d) 13	1

4	If the perimeter of a sector of a circle of radius 6.4 cm is 30 cm, then the area of corresponding sector is (a) 60 cm^2 (b) 50 cm^2 (c) 55.04 cm^2 (d) 57 cm^2	1
5	If two concentric circles are of radii 10cm and 8cm, then the length of the chord of the larger circle which touches the smaller circle is (a) 6cm (b) 12cm (c) 18cm (d) 9 cm	1
6	If ΔABC and ΔDEF are similar triangles, such that $\angle A=47^\circ$, $\angle E=83^\circ$, then $\angle C$ is equal to (a) 47° (b) 83° (c) 50° (d) 60°	1
7	The distance between the points $((a \sin \theta + b \cos \theta, 0)$ and $(0, a \cos \theta - b \sin \theta)$ is (a) $a^2 + b^2$ (b) $a^2 - b^2$ (c) $\sqrt{a^2 + b^2}$ (d) $\sqrt{a^2 - b^2}$	1
8	The sum of the probabilities of all the elementary events is (a) 0 (b) 1 (c) 1.5 (d) None of these.	1
9	The value of $2\cos^2 30^\circ + \sec^2 30^\circ + 2\cos 0^\circ + 3\sin 90^\circ - \tan^2 60^\circ$ is (a) $\frac{6}{29}$ (b) $\frac{4}{25}$ (c) $\frac{29}{6}$ (d) $\frac{3}{26}$	1
10	What is the nature of roots of the quadratic equation $5y^2 - 4y + 3 = 0$? (a) Four real roots (b) Two real roots (c) No real root (d) one real root.	1
11	The pair of linear equation $2x + ky - 3 = 0$, $6x + \frac{2}{3}y + 7 = 0$ has a unique solution, if (a) $k = \frac{2}{3}$ (b) $k \neq \frac{2}{3}$ (c) $k \neq 5$ (d) $k \neq \frac{2}{9}$	1
12	If four vertices of a parallelogram taken in order are $(-3,-1)$, (a,b) , $(3,3)$ and $(4,3)$, then $a:b$ is equal to (a) 1:4 (b) 4:1 (c) 1:2 (d) 2:1	1
13	The median of a given data is 20. If each item is increased by 2, then the new median will be (a) 40 (b) 10 (c) 22 (d) 20	1
14	A cylindrical vessel 32cm high and 18cm as the radius of the base, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24cm, then the radius of its base is (a) 30 cm (b) 36 cm (c) 34 cm (d) 35 cm.	1
15	If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80° , then the value of $\angle POA$ is	1

	(a) 60° (b) 90° (c) 0° (d) 50°	
16	If $\operatorname{cosec} A = 2$, then the value of $\frac{1}{\tan A} + \frac{\sin A}{1+\cos A}$ is (a) 0 (b) 1 (c) 2 (d) 3	1
17	In the given figure, O is the center of the circle with PA and PB as tangents.  <p>If measure of $\angle ADB = 60^\circ$, then ΔPAB is an (a) Isosceles triangle (b) Equilateral triangle (c) Scalene triangle (d) None of these.</p>	1
18	In the given figure, $\angle ABC = 90^\circ$ and $BD \perp AC$. If $BD=8$ cm and $AD=4$ cm, then the value of CD is  <p>(a) 16 cm (b) 8 cm (c) 4 cm (d) 10 cm.</p>	1
19	Assertion (A): 2 is a rational number. Reason (R): The square roots of all positive integers are irrationals. 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.	1
20	Assertion (A) : $4x + 3y = 18$ is a line which is parallel to X-axis. Reason (R): The graph of linear equation $ax = b$, where $a \neq 0$ is parallel to Y-axis. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1

	<p>b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).</p> <p>c) Assertion (A) is true but Reason (R) is false.</p> <p>d) Assertion (A) is false but Reason (R) is true.</p>	
SECTION B		
Section B consists of 5 questions of 2 marks each.		
21	In ΔABC , D and E are points on the sides AB and AC respectively, such that $DE \parallel BC$. If $AD=4x - 3$, $AE= 8x - 7$, $BD= 3x - 1$ and $CE= 5x - 3$, then find the value of x .	2
22	<p>If two tangents are inclined at 60° are drawn to a circle of radius 3 cm, then find length of each tangent.</p> <p style="text-align: center;">Or</p> <p>If PQ is a tangent to a circle with centre O at point P. If ΔOPQ is an isosceles triangle, then find $\angle OPQ$.</p>	2
23	<p>PQ is a chord of length 8cm of a circle of radius 5cm. The tangents at P and Q intersect at a point T. Find the length TP.</p>  <p style="text-align: center;">Or</p> <p>In a circle of radius 28 cm, an arc subtends an angle of 45° at the centre. Find</p> <p>(i) The length of the arc.</p> <p>(ii) The area of the sector.</p>	2
24	If $\cos \alpha = \frac{1}{2}$ and $\tan \beta = \frac{1}{\sqrt{3}}$, then find $\sin(\alpha + \beta)$, where α and β are both acute angles.	2
25	Two numbers are in the ratio 5:6. If 8 is subtracted from each of the numbers, the ratio becomes 4:5, then find the numbers.	2
SECTION C		
Section C consists of 6 questions of 3 marks each.		

26	If α and β are the zeros of the quadratic polynomial $(x) = 3x^2 - 4x + 1$, then find a quadratic polynomial whose zeroes are $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$.	3																
27	Three sets of English, Hindi and Mathematics book have to be stacked in such a way that all the books are stored topic-wise and the height of each stack is the same. The number of English book is 96, the number of Hindi books is 240 and the number of Mathematics books is 336. Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Mathematics books.	3																
28	If the roots of the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ are equal, prove that $\frac{a}{b} = \frac{c}{d}$. OR Solve for x , $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$	3																
29	Prove that $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$ OR Prove that, $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$	3																
30	If all the side of a parallelogram touch a circle, show that the parallelogram is a rhombus.	3																
31	Two dice are thrown simultaneously. What is the probability that: (i) 5 will not come up on either of them? (ii) 5 will come up on at least one? (iii) 5 will come up at both dice?	3																
SECTION D																		
Section D consists of 4 questions of 5 marks each.																		
32	A utensil is in the form of hemispherical bowl, in which a hollow cylinder is kept on it. The radius of sphere is 7cm and the height of utensil is 13cm. Find the capacity of utensil.	5																
33	The following frequency distribution shows the daily savings of 64 children in a locality <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>Daily savings</td> <td>1-3</td> <td>3-5</td> <td>5-7</td> <td>7-9</td> <td>9-11</td> <td>11-13</td> <td>13-15</td> </tr> <tr> <td>Number of children</td> <td>7</td> <td>6</td> <td>X</td> <td>13</td> <td>y</td> <td>5</td> <td>4</td> </tr> </tbody> </table> <p>If mean savings is 8, then find the missing frequencies x and y.</p>	Daily savings	1-3	3-5	5-7	7-9	9-11	11-13	13-15	Number of children	7	6	X	13	y	5	4	5
Daily savings	1-3	3-5	5-7	7-9	9-11	11-13	13-15											
Number of children	7	6	X	13	y	5	4											

OR

An incomplete distribution is given as follows

Class interval	Frequency
0-10	10
10-20	20
20-30	?
30-40	40
40-50	?
50-60	25
60-70	15

The median value is 35 and sum of all the frequencies is 170. Using the median formula, fill up the missing frequencies.

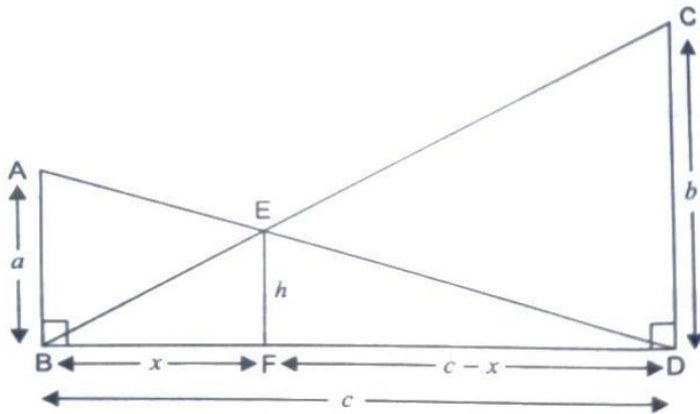
34 The sum of areas of two squares is $468m^2$. If difference of their perimeters is 24m, then find their sides of both squares.

5

35 State and prove Basic proportionality theorem .

OR

Two poles of height a and b ($b > a$) are c metres apart. Prove that the height h metres of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is $\frac{ab}{a+b}$.



SECTION E

Section E consists of 3 questions of 4 marks each.

36 Your friend veer wants to participate in a 200m race . He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds.



On the basis of above information, answer the following questions.

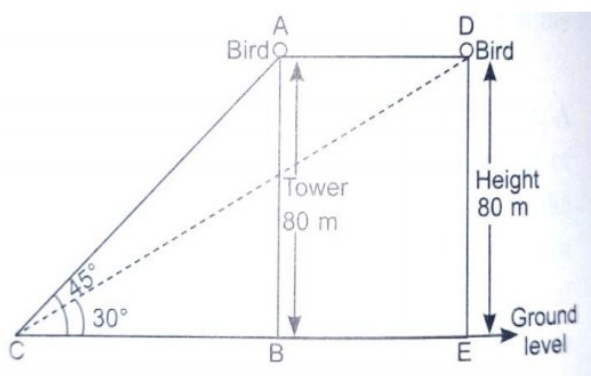
- (i) What is the minimum number of days he needs to practice till his goal is achieved ?
- (ii) Write down the A.P for the given situation.
- (iii) The value of x , for which $2x, x + 10, 3x + 2$ are three consecutive terms of an AP.

1
1
2

OR

The 17th term of an AP exceeds its 10th term by 14, then find common difference.

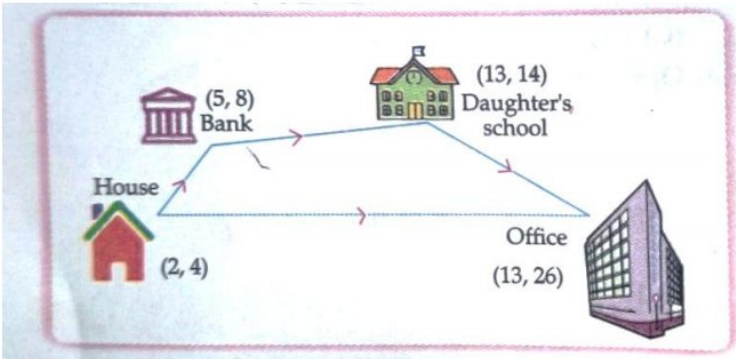
37 In figure , a tower is shown of height 80m. A bird is sitting on the top of tower as shown at point A. After 2 seconds the birds flies away horizontally but remain at constant height. Now, the angle of elevation from observation point C, changes from 45° to 30° as shown.



Answer the questions based on above

	<p>(i) Find the distance BC.</p> <p>(ii) Find the distance CE.</p> <p>(iii) Find the speed of bird , when flies from point A to D.</p> <p style="text-align: center;">OR</p> <p>If bird covers distance AD in 5 seconds then find the speed of bird in m/s.</p>	<p>1</p> <p>1</p> <p>2</p>
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38 Aayush starts walking from his house to office. Instead of going to the office directly, he goes to a bank first, from there to his daughters school and then reaches the office.(assume that all distances covered are in straight lines). If the house is situated at (2,4), bank at (5,8), school at (13,14) and office at (13,26) and coordinates are in km.



Answer the question based on above

- | | |
|---|---|
| (i) Find the distance between house and bank. | 1 |
| (ii) What is the distance between house and office? | 1 |
| (iii) What is the total distance travelled by Aayush to reach the office? | 2 |

OR

What is the extra distance travelled by Aayush ?