

PRACTICE PAPER 5

CLASS X

TIME: 3 Hours

SUBJECT: MATHEMATICS (STANDARD)

MAX MARKS: 80

General Instructions:

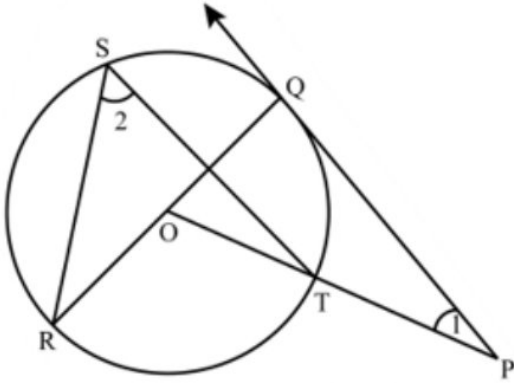
- 1 This Question Paper has 5 Sections A-E.
- 2 Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of 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 in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 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 $\pi = 22/7$ wherever required if not stated.

SECTION A

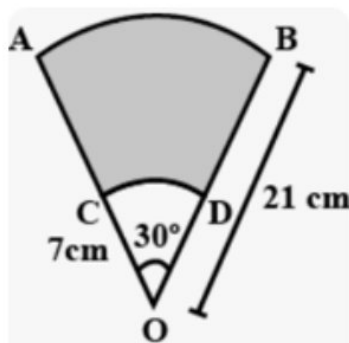
Section A consists of 20 questions of 1 mark each

Q No.		MARKS
1	If n is even prime number, $2(7^n + 8^n)$ ends with a) 0 b) 2 c) 3 d) 6	1
2	What should be added to $x^2 - 5x + 4$, so that 3 is a zero of the resulting polynomial? a) -10 b) -2 c) 2 d) 10	1
3	If $x = a, y = b$ is the solution of the equations $x - y = 2$ and $x + y = 4$, then the values of a and b are a) $x = 3, y = -1$ b) $x = 3, y = 1$ c) $x = 1, y = 3$ d) $x = -3, y = 1$	1
4	If $(p - 1)$ is a root of the quadratic equation $x^2 + px + (1 - p) = 0$, then both the roots are a) 0, -1 b) -1, 1 c) 0, 1 d) -1, 2	1
5	If 18, a, b, -3 are in A.P. then $a + b =$ a) 19 b) 15 c) 11 d) 7	1
6	One end of a line of length 17 units is at a point (3,4). If the abscissa of the other end is 11, then its ordinate will be a) 11 or -19 b) -11 or -19 c) -11 or 19 d) 11 or 19	1

7	The vertices of a triangle are (0,0), (3,0) and (0,4). The centroid of the triangle is a) $(\frac{1}{2}, 2)$ b) $(1, \frac{4}{3})$ c) (1,1) d) (0,3)	1
8	ΔABC is an equilateral triangle such that $AD \perp BC$, then $AD^2 =$ a) $4CD^2$ b) $3CD^2$ c) $2CD^2$ d) CD^2	1
9	If the angle between two radii of a circle is 110° , then the angle between the tangents at the ends of the radii is a) 90° b) 70° c) 50° d) 40°	1
10	At one end A of a diameter AB of a circle of radius 5 cm, tangent XAY is drawn to the circle. The length of the chord CD parallel to XY and at a distance 8 cm from A is a) 4 cm b) 5 cm c) 6 cm d) 8 cm	1
11	$(\sin 30^\circ + \cos 60^\circ) - (\sin 60^\circ + \cos 30^\circ) =$ a) 0 b) $1 - \sqrt{3}$ c) $1 + \sqrt{3}$ d) $1 + 2\sqrt{3}$	1
12	$x \tan 45^\circ \sin 30^\circ = \cos 30^\circ \tan 30^\circ$ then x is a) $\sqrt{3}$ b) 1 c) $\frac{1}{2}$ d) $\frac{1}{\sqrt{2}}$	1
13	If two towers of heights h_1 and h_2 subtend angles of 60° and 30° respectively at the midpoint of the line joining their feet, then $h_1:h_2 =$ a) 1:3 b) 1: 2 c) 2:1 d) 3: 1	1
14	The area of a sector of a circle with radius 6 cm if the angle of the sector 60° a) $\frac{142}{7}$ b) $\frac{152}{7}$ c) $\frac{132}{7}$ d) $\frac{122}{7}$	1
15	If the sum of the areas of two circles with radii R_1 and R_2 is equal to the area of a circle of radius R, then a) $R_1 + R_2 = R$ b) $R_1^2 + R_2^2 = R^2$ c) $R_1 + R_2 < R$ d) $R_1^2 + R_2^2 < R^2$	1
16	A die is thrown. The probability of getting an odd number is a) $\frac{1}{4}$ b) $\frac{1}{3}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$	1
17	The sum of the probabilities of all elementary events of an experiment is p, then a) $0 < p < 1$ b) $0 \leq p < 1$ c) $p = 1$ d) $p = 0$	1
18	The mode and mean is given by 7 and 8 respectively, then the median is a) $\frac{1}{13}$ b) $\frac{13}{3}$ c) $\frac{23}{3}$ d) 33	1
19	Assertion: The sum of the length, breadth, and height of a cuboid is 19 cm and its diagonal is $5\sqrt{5}$ cm. Its surface area is 236 cm^2 . Reason: The lateral surface area of a cuboid is $2(l + b)$. 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 but 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>	
20	<p>Assertion: Sum of first 10 terms of the arithmetic progression 0.5, 1.0, 1.5, is 27.5.</p> <p>Reason: Sum of n terms of an AP is given as $S_n = \frac{n}{2} [2a + (n-1) d]$ where a is first term and d common difference.</p> <p>a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).</p> <p>b) Both assertion (A) and reason (R) are true but 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>	1
SECTION B		
Section B consists of 5 questions of 2 marks each		
21	Show that $3 + 5\sqrt{2}$ is irrational given that $\sqrt{2}$ is irrational.	2
22	If one diagonal of a trapezium divides the other diagonal in the ratio 1 : 3, prove that one of the parallel sides is three times the other.	2
23	<p>In the given figure, PQ is a tangent from an external point P to a circle with centre O and OP cuts the circle at T and QOR is the diameter. If $\angle POR = 130^\circ$ and S is a point on the circle, find $\angle 1 + \angle 2$.</p> 	2
24	<p>If $\cos (40 + x) = \sin 30^\circ$, find the value of x.</p> <p style="text-align: center;">OR</p> <p>If $\sin (A + B) = 1$ and $\cos (A - B) = 1$, find A and B.</p>	2
25	<p>Find the area of the minor segment of a circle of radius 42cm, if length of the corresponding arc is 44cm.</p> <p style="text-align: center;">OR</p> <p>AB and CD respectively the arcs of two concentric circles of radii 21 cm and 7 cm</p>	2

and centre O. If $\angle AOB = 30^\circ$, find the area of the shaded region.



SECTION C

Section C consists of 6 questions of 3 marks each

26 Find the smallest number which when increased by 17 is exactly divisible by 520 and 468. **3**

27 If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of $2x^2 - 5x - 3$, find the value of p and q. **3**

28 Vijay had some bananas, and he divided them into two lots A and B. He sold the first lot at the rate of Rs.2 for 3 bananas and the second lot at the rate of Rs. 1 per banana and got a total of Rs.400. If he had sold the first lot at the rate of Rs. 1 per banana and the second lot at the rate of Rs. 4 for 5 bananas, his total collection would have been Rs. 460. Find the total number of bananas he had. **3**

OR

Solve for x and y:

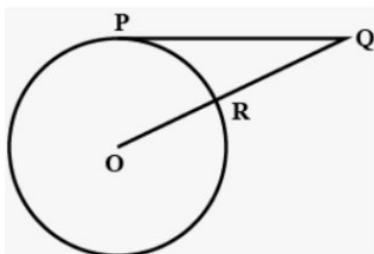
$$99x + 101y = 499$$

$$101x + 99y = 501$$

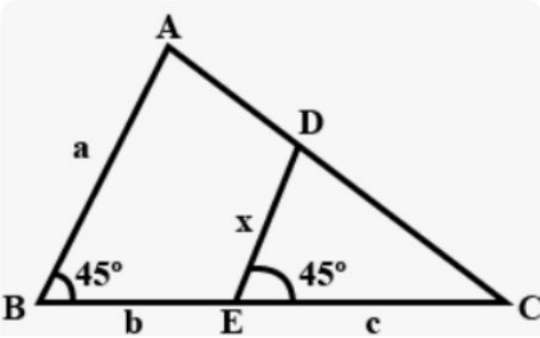
29 O is the centre of a circle passing through the points A, B, C. If $\angle PAB = \angle BAC$, show that PQ is a tangent to the circle at A. **3**

OR

In the given figure, PQ is a tangent drawn at a point P to a circle with centre O. OQ intersects the circle at R such that $OR = RQ$. If $PQ = 3\sqrt{3}$ cm, find the radius of the circle.



30 If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$ **3**

31	If the median of the distribution given below is 28.5, find the values of x and y <table border="1"> <tr> <td>Class Interval</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>Total</td> </tr> <tr> <td>Frequency</td> <td>5</td> <td>x</td> <td>20</td> <td>15</td> <td>y</td> <td>5</td> <td>60</td> </tr> </table>	Class Interval	0 – 10	10 – 20	20 – 30	30 - 40	40 - 50	50- 60	Total	Frequency	5	x	20	15	y	5	60	3
Class Interval	0 – 10	10 – 20	20 – 30	30 - 40	40 - 50	50- 60	Total											
Frequency	5	x	20	15	y	5	60											
SECTION D																		
Section D consists of 4 questions of 5 marks each																		
32	A trader bought a number of articles for Rs. 900. Five articles were found damaged. He sold the remaining articles at Rs. 2 more than what he paid for it. He got a profit of Rs. 80 on the whole transaction. Find the number of articles he bought.	5																
33	i) State and prove Basic Proportionality Theorem. ii) Express x in terms of a,b and c <div style="text-align: center;">  </div>	5																
34	A toy is in the form of a hemisphere surmounted by a right circular cone of the same base radius as that of the hemisphere. If the radius of the base of the cone is 21cm and its volume is $\frac{2}{3}$ of the volume of the hemisphere, calculate the height of the cone and the surface area of the toy. (Use $\pi = 22/7$) <p style="text-align: center;">OR</p> From a solid cylinder whose height is 8 cm and radius 6 cm, a conical cavity of height 8 cm and of base radius 6 cm, is hollowed out. Find the volume of the remaining solid correct to two places of decimals. Also find the total surface area of the remaining solid. (Use $\pi = 3.14$)	5																
35	The following age wise chart of 300 passengers flying from Delhi to Pune is prepared by the Airlines staff.	5																

Age	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80
No of passengers	14	44	82	134	184	245	287	300

Find the mean age of the passengers.

SECTION E

Case study based questions are compulsory

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Case study - 1



Push-ups are a fast and effective exercise for building strength. These are helpful in almost all sports including athletics.

Amit wants to participate in the push-up challenge. He can currently make 3000 push-ups in one hour. But he wants to achieve a target of 3900 push-ups in 1 hour for which he practices regularly. With each day of practice, he is able to make 5 more push-ups in one hour as compared to the previous day. If on first day of practice he makes 3000 push-ups and continues to practice regularly till his target is achieved.

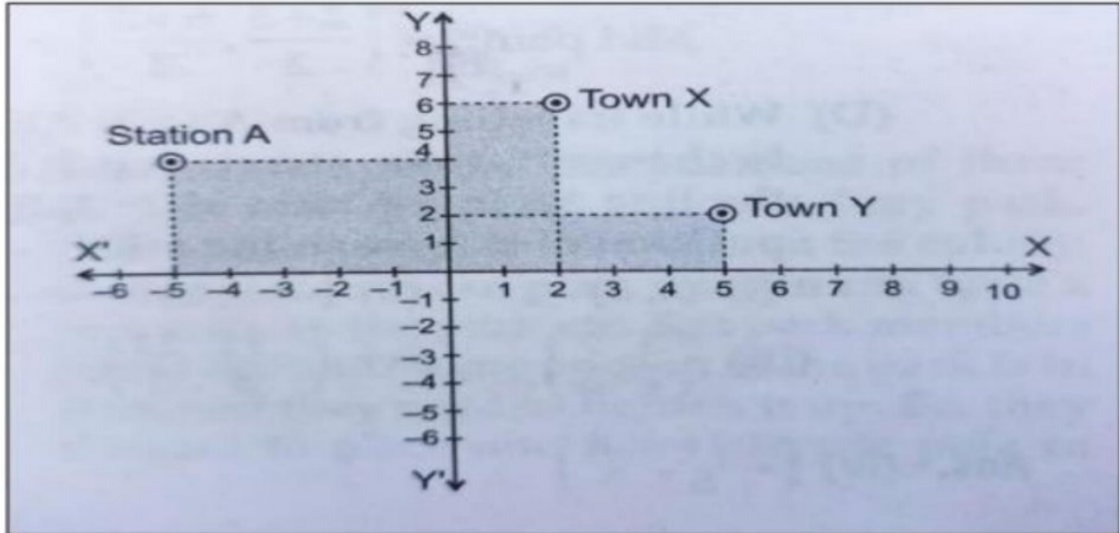
Based on the above information, answer the following questions:

i)	Form an A.P representing the number of push-ups per day .	1
ii)	Find the total number of push-ups performed by Nitesh up to the day his goal is achieved.	2
OR		
	Find the ratio of total number of push-ups performed by Nitesh on 10th day and on 20th day	
iii)	Find the minimum number of days he needs to practice before the day his goal is accomplished?	1

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Case study – 2

Two friends William and Harry works in the same office in Toronto. In the Christmas vacation, they both decided to go to their home towns represented by Town X and Town Y. Town X and Town Y are connected by trains from the same station A near to their office in Toronto. The situation of Town X, Town Y and station A is shown on the coordinate axis.



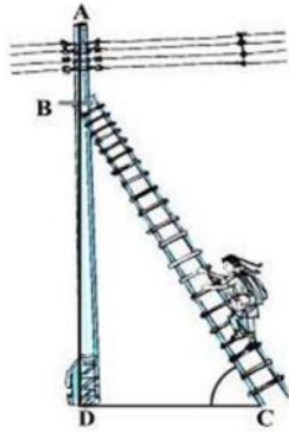
Based on the above information, answer the following questions:

i)	What is the distance that William has to travel to reach his hometown X ?	1
ii)	While travelling from A to Y, Harry had to change the train, at a station, it divides the line AY in the ratio of 1: 3, find the position of station on the grid. OR Find the ratio in which the line $3x + y - 13 = 0$ divide the line joining town X and Town Y	2
iii)	If both of them plan to meet at a place between Town X and Town Y, such that it is the mid-point between both, calculate the coordinates of the meeting point.	1

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Case study – 3

Raj is an electrician a village. One day power was not there in entire village and villagers called Raj to repair the fault. After thorough inspection, he found a fault in one of the poles of height 5 m. He needs to reach a point 1.4 m below the top of the pole to undertake the repair work.



Based on the above information, answer the following questions:

i)	If the ladder is inclined at an angle of α to the horizontal such that $\sqrt{3} \tan \alpha + 2 = 5$, find α .	1
ii)	How far from the foot of the pole should he place the foot of the ladder such that $\sqrt{3} \tan \alpha + 2 = 5$ (Use $\sqrt{3} = 1.73$) OR If $15 \cot \alpha = 8$, find $\sin \alpha$.	2
iii)	If $BD = 3$ m and $BC = 6$ m, Find α .	1