

SSLC (SAY) EXAMINATION 2021
MATHEMATICS
 (English)

Time : 2½ Hours

Total Score : 80

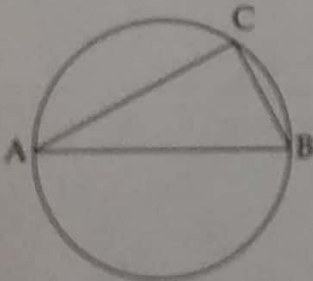
Instructions :

- 20 minutes is given as cool-off time.
- Use cool-off time to read the questions and plan your answers.
- Attempt the questions according to the instructions.
- Keep in mind, the score and time while answering the questions.
- The maximum score for questions from 1 to 45 will be 80.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc. use approximations unless you are asked to do so.

Score

Questions from 1 to 5, choose the correct answer from brackets. Each carries 1 score. 5x1=5

1. What is the common difference of the arithmetic sequence $5n + 4$? 1
 [5, 4, 9, 1]
2. In the figure, AB is the diameter of the circle. What can you say about the measure of $\angle C$? 1



[will be 90° , more than 90° , less than 90° , any measure other than 90°]

3. In the figure, $\angle P = 30^\circ$, $\angle Q = 90^\circ$, $QR = 2$ centimetres. What is the length of PR in centimetres? 1



[2, $2\sqrt{2}$, $2\sqrt{3}$, 4]

P.T.O.

4. Which of the following is not a point on the line through the points (3, 5) and (3, 8)? Score 1
 [(3, 4), (3, 7), (3, 3), (4, 3)]

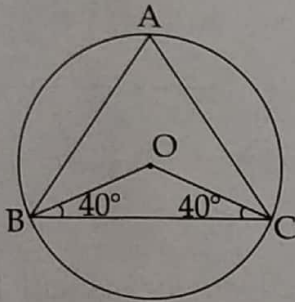
5. What is the slope of the line joining the points (2, 3) and (3, 5)? 1
 $\left[1, 2, \frac{1}{2}, \frac{3}{2}\right]$

Questions 6 to 10 carries 2 scores each.

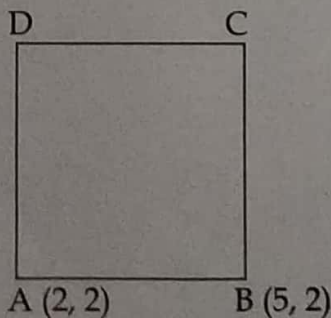
5x2=10

6. (a) What is the sum of first 10 natural numbers? 1
 (b) Find the sum of first 10 terms of the arithmetic sequence 2, 3, 4,

7. In the figure, O is the centre of the circle. $\angle OBC = \angle OCB = 40^\circ$.



- (a) What is the measure of $\angle BOC$? 1
 (b) What is the measure of $\angle A$? 1
8. A bag contains 7 red balls and 3 yellow balls. If a ball is taken from the bag without looking into it:
- (a) What is the probability of getting a red ball? 1
 (b) What is the probability of getting a yellow ball? 1
9. In the figure, ABCD is a square. A (2, 2) and B (5, 2) are two corners of the square.



- (a) What is the length of AB? 1
 (b) Write the coordinates of C. 1

10. $p(x) = (x-3)(x+2)$.

- (a) Write a first degree factor of $p(x)$.
 (b) What number is $p(2)$?

1

1

Questions 11 to 20 carries 3 scores each.

10x3=30

11. $x, x+3, x+6, \dots$ is an arithmetic sequence.

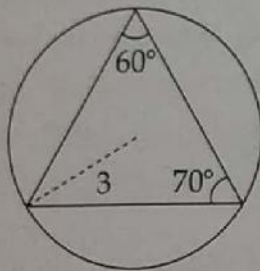
- (a) What is the common difference of this sequence ?
 (b) What is its 4th term ?
 (c) Find its 11th term.

1

1

1

12. In the figure, a triangle and its circumcircle are shown. Radius of the circle is 3 centimetres. Draw this figure with the given measures.



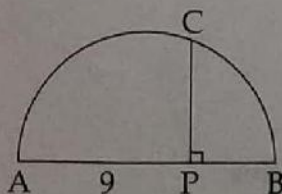
13. The length of a rectangle is 3 centimetres more than its breadth. Its area is 130 square centimetres.

- (a) If the breadth is taken as x , how will you write the length ?
 (b) Find the lengths of sides of the rectangle.

1

2

14. In the figure, AB is the diameter of the semicircle. PC is perpendicular to AB . $AP = 9$ centimetres and $AB = 13$ centimetres.



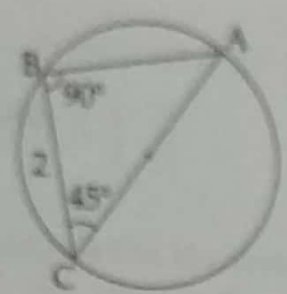
- (a) What is the length of PB ?
 (b) Find the length of PC .

1

2

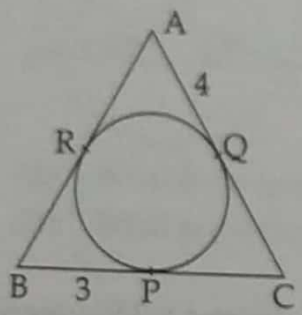
P.T.O.

15. Triangle ABC and its circumcircle are shown in the figure. $\angle B = 90^\circ$, $\angle C = 45^\circ$.
 $BC = 2$ centimetres.



- (a) What is the length of AB? 2
- (b) What is the diameter of the circle? 1

16. In the figure, sides of triangle ABC touches the circle at P, Q, R. $AQ = 4$ centimetres, $BP = 3$ centimetres, $AB = AC$.



- (a) What is the length of BR? 1
- (b) Find the length of AB. 1
- (c) What is the perimeter of triangle ABC? 1

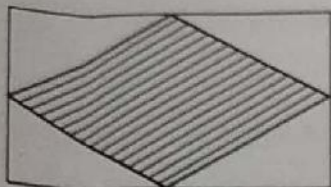
17. Consider a circle centred at the origin and radius 5 units.

- (a) Draw a rough figure. 1
- (b) Write the coordinates of two points on the circle. 2

18. Radius of a cone is 3 centimetres and its slant height is 5 centimetres.

- (a) Find the height of the cone. 2
- (b) Find the volume of the cone. 1

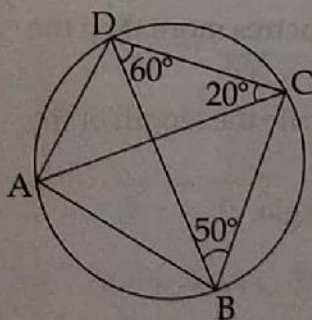
19. Draw a circle and mark a point on it. Draw a tangent to the circle, through this point.
20. In the figure, the quadrilateral joining the midpoints of sides of a rectangle is shaded. Area of the rectangle is 20 square centimetres.



- (a) What is the area of the shaded quadrilateral? 2
- (b) If a dot is put in the figure, without looking into it, what is the probability that it is in the shaded region? 1

Questions 21 to 30 carries 4 scores each : 10x4=40

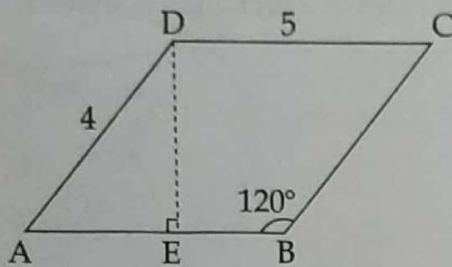
21. Consider the arithmetic sequence 5, 8, 11,
- (a) Write the 5th term of this sequence. 1
- (b) What is the sum of its first 9 terms? 2
- (c) Find the sum of first 9 terms of the arithmetic sequence 10, 16, 22,
22. Consider the arithmetic sequence 10, 8, 6,
- (a) At what position will zero be a term of this sequence? 2
- (b) What is the sum of first 11 terms of this sequence? 1
- (c) Write an arithmetic sequence with sum of first 5 terms zero. 1
23. In the figure, A, B, C, D are points on the circle. $\angle DBC = 50^\circ$, $\angle ACD = 20^\circ$, $\angle CDB = 60^\circ$.



- (a) What is the measure of $\angle CAB$? 1
- (b) What is the measure of $\angle ABD$? 1
- (c) Write the measures of all angles of the quadrilateral ABCD. 2

P.T.O.

24. In the figure, ABCD is a parallelogram with $CD = 5$ centimetres, $AD = 4$ centimetres, $\angle B = 120^\circ$.



- (a) What is the measure of $\angle A$? 1
- (b) Find the length of DE. 2
- (c) Calculate the area of the parallelogram. 1
25. The weights of some students (in kilograms) of a class are given below.
44, 47, 42, 48, 52, 54, 43, 48, 45
- (a) Find the mean weight. 2
- (b) What is the median weight of these students? 2
26. Draw a circle of radius 3.5 centimetres. Mark a point 8 centimetres away from its centre. Draw tangents from this point to the circle. Measure the length of the tangents. 4
27. The sides of a rectangle are parallel to the axes. Coordinates of one pair of its opposite vertices are (3, 4) and (7, 8).
- (a) Draw a rough figure and mark the points. 2
- (b) Find the co-ordinates of other two vertices. 2
28. One of the perpendicular sides of a right angled triangle is 2 centimetres more than the other. Its hypotenuse is 10 centimetres.
- (a) If the length of the smaller perpendicular side is taken as x , write the length of the other perpendicular side. 1
- (b) Form an equation connecting the lengths of sides of the triangle. 1
- (c) Compute the lengths of the perpendicular sides. 2
29. (a) If $p(x) = x^2 - 6x + 7$, what number is $p(1)$? 1
- (b) Find $p(x) - p(1)$. 1
- (c) Write $p(x) - p(1)$ as the product of two first degree polynomials. 2

30. Numbers 2, 3, 5, 8 are written on paper slips and put in a box. Numbers 1, 4, 7 are written on paper slips put in another box. If one slip is taken from each :
- | | |
|---|---|
| (a) What is the possible number of pairs ? | 1 |
| (b) What is the probability that both the numbers are even ? | 2 |
| (c) What is the probability to get one odd number and one even number ? | 1 |

Questions 31 to 45 carries 5 scores each.

15x5=75

31. 1

2 3

4 5 6

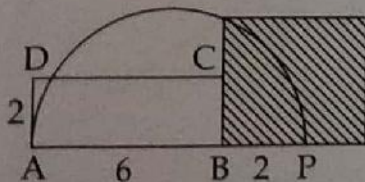
7 8 9 10

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- | | |
|---|---|
| (a) Write next two lines of the above number pattern. | 2 |
| (b) Find the first and last numbers in the 10 th line. | 2 |
| (c) Find the sum of the numbers in the 10 th line. | 1 |
32. A boy saw the top of a building under construction at an elevation of 30° . The completed building was 10 metres higher and the boy saw its top at an elevation of 60° from the same spot.
- | | |
|---|---|
| (a) Draw a rough figure based on the given facts. | 1 |
| (b) Find the height of the completed building. | 4 |

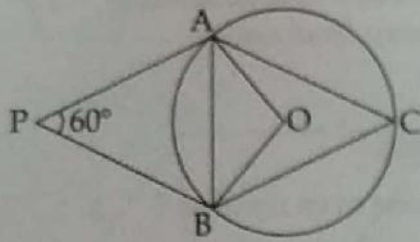
33.



- | | |
|--|---|
| (a) In the figure, AP is the diameter of the semicircle. ABCD is a rectangle. AD = 2 centimetres, AB = 6 centimetres and BP = 2 centimetres. What is the area of the shaded square ? | 2 |
| (b) Draw a rectangle of sides 5 centimetres and 3 centimetres. Then draw a square of the same area. | 3 |

P.T.O.

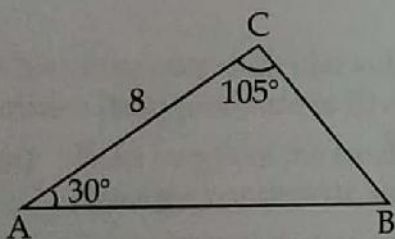
34.



In the figure, O is the centre of the circle. PA and PB are tangents, $\angle P = 60^\circ$.

- (a) What is the measure of $\angle AOB$? 2
- (b) Write the measure of $\angle ACB$. 1
- (c) What is the measure of $\angle PAB$? 1
- (d) If $AB = 7$ centimetres, what is the length of the tangents? 1
35. (a) Draw the x, y axes and mark the points A (2, 3), B (8, 3), C (5, 7). 2
- (b) Compute the area of triangle ABC. 3
36. A solid metal cone has base radius 2 centimetres and height 8 centimetres.
- (a) Compute the volume of this cone. 2
- (b) If this cone is melted and recast into a sphere of maximum size, what will be its radius? 3

37.



In the figure $\angle A = 30^\circ$, $\angle C = 105^\circ$, $AC = 8$ centimetres.

- (a) What is the measure of $\angle B$? 1
- (b) Find the height from C to AB. 2
- (c) What is the area of triangle ABC? 2

38. The table below shows some students sorted according to their scores in an exam.

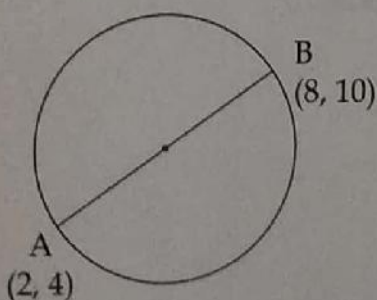
Score	Number of students
20 - 30	3
30 - 40	6
40 - 50	7
50 - 60	10
60 - 70	9
70 - 80	4

- (a) If the students are arranged in ascending order of their scores, what is assumed as the score of the 17th student? 2
- (b) Find the median score. 3

39. Consider the arithmetic sequence 3, 5, 7,

- (a) What is its common difference? 1
- (b) What is the algebraic form of sum of this sequence? 1
- (c) Sum of how many terms of this sequence, starting from the first, is 224? 3

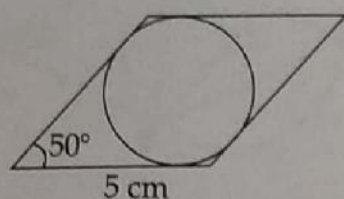
40. In the figure, A (2, 4), B (8, 10) are the end points of the diameter of the circle.



- (a) Write the coordinates of the centre of the circle. 2
- (b) Find the radius of the circle. 2
- (c) Justify that D(8, 4) is a point on this circle. 1

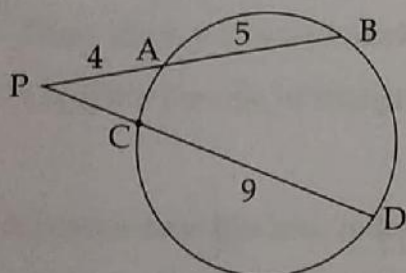
P.T.O.

41. Draw a rhombus with sides 5 centimetres and one angle 50° .
Draw a circle touching the sides of the rhombus.



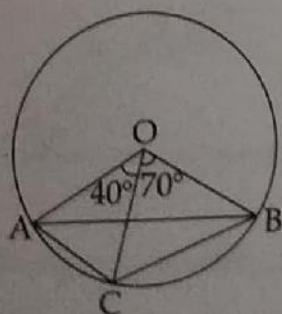
42. A sector of central angle 120° is cut from a circular disc of radius 12 centimetres. The sector is then rolled up to make a cone.
- What is the slant height of the cone? 1
 - What is the base radius of the cone? 2
 - Compute the curved surface area of the cone. 2

43.



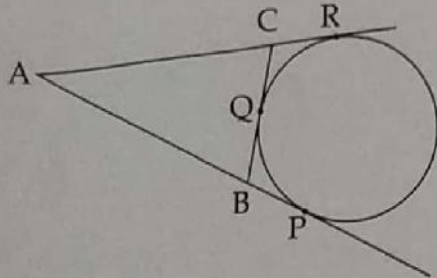
In the figure, $AB = 5$ centimetres, $PA = 4$ centimetres, $CD = 9$ centimetres.

- What is the length of PB ? 1
 - Find the lengths of PC and PD . 4
44. In the figure, O is the centre of the circle. $\angle AOC = 40^\circ$, $\angle BOC = 70^\circ$.



- Find the measure of $\angle ABC$. 1
- Write the measure of $\angle BAC$. 1
- Find the measures of all angles of quadrilateral $AOBC$. 3

45. Read the following, understand the mathematical idea expressed and then answer the questions that follow.



In the figure, the circle touches the side BC of the triangle at Q. The sides AB and AC are extended to touch the circle at P and R. Such a circle touching the sides of a triangle externally is called the excircle of the triangle. Here AP, AR, CQ, CR, BQ, BP are tangents to the circle. Tangents from a point to any circle are equal in length.

- | | |
|---|---|
| (a) If $BQ = 2$ centimetres, what is the length of BP ? | 1 |
| (b) If $QC = 3$ centimetres, write the length of CR. | 1 |
| (c) If $AB = 6$ centimetres and $AC = 5$ centimetres, what is the perimeter of triangle ABC ? | 1 |
| (d) What is the length of the tangent AR ? | 1 |
| (e) If the perimeter of triangle was 20 centimetres, what would be the length of the tangent AR ? | 1 |

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