

# GLOBAL TALENT SEARCH EXAMINATION

## MATHEMATICS

Class : IX

Max Marks : 80

Time : 9:00 to 10:30 a.m.

### Instructions to Candidates :

01. This question paper has 40 objective questions. In addition to this question paper, you are also given an answer-sheet.
02. Read the instructions carefully for each section before attempting it.
03. For each correct answer **2 marks** will be awarded and there is no negative marking.
04. On the answer-sheet, fill up all the entries carefully in the space provided, **ONLY IN BLOCK CAPITAL LETTERS.**
05. Incomplete / incorrect / carelessly filled information may disqualify your candidature.
06. On the answer-sheet, use **PENCIL / BLUE or BLACK BALL PEN.**
07. No extra sheet will be provided for rough-work. Use the space available in the paper for your rough- work.
08. Use of calculator is not permitted.
09. No student is permitted to leave the examination hall before time is complete.
10. Use of unfair means shall invite cancellation of the test.

Roll No.

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Centre No.

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Male / Female \_\_\_\_\_

Name of the candidate : (In English only, as you would like it to be printed on the certificate).

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Signature of the  
invigilator

Signature of  
the candidate

## AMITY INSTITUTE FOR COMPETITIVE EXAMINATIONS

DELHI CENTRES: • E-25, Defence Colony, New Delhi - 110024. Ph.: 011-24336143/44, 24331000-02.

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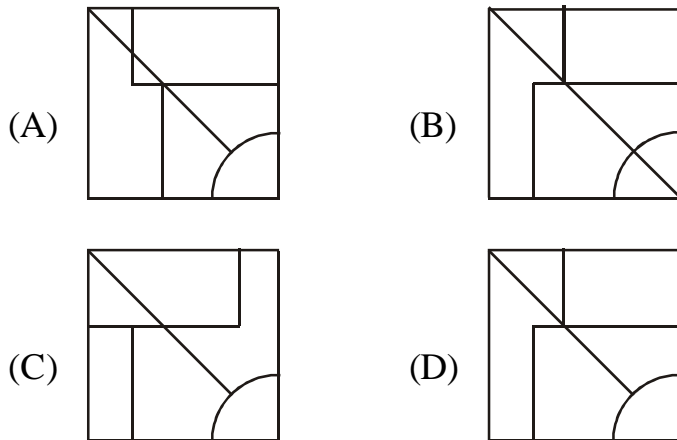
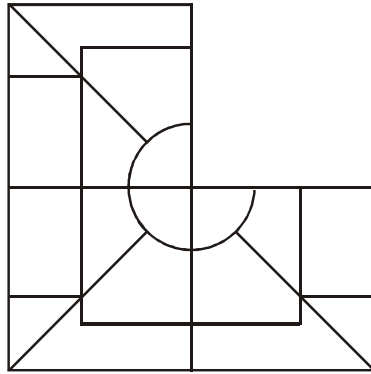
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Each question has four alternatives marked (A), (B), (C) and (D), but only one of these alternatives is the correct answer.

1. Which one of the figures, given in (A), (B), (C) and (D) will complete the figure shown below ?



2. In the equation  $A \frac{3}{8} \times 2 \frac{B}{11} = 18 \frac{3}{11}$ , the values of A and B are, respectively

- (A) 9, 2                      (B) 8, 2  
(C) 7, 2                      (D) 8, 4

3. All the sides of a triangle are increased by 10%. The percentage increase in the area of the triangle could be

- (A) 21%                      (B) 20%  
(C) 25%                      (D) 22.5%

## Rough Work

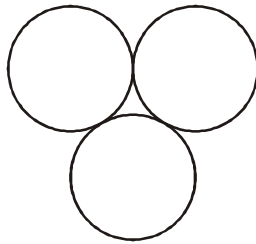
4. Three identical circles, each of radius  $r$  are placed very closely, each circle touching the other two, as shown below. The area enclosed by the circles is

(A)  $\frac{r^2}{2}(3\sqrt{3} - \pi)$

(B)  $\frac{r^2}{2}(3\sqrt{2} - \pi)$

(C)  $\frac{r^2}{2}(2\sqrt{3} - \pi)$

(D)  $\frac{r^2}{2}(\sqrt{3} - \pi)$



**In the following questions, each series follows its own regular pattern of numbers. Try to understand the pattern of numbers in each series and then find the missing number, which is also given as one of the four alternatives below each series.**

5. 7, 14, 28, 49, 77, ...?..., 154

(A) 112

(B) 108

(C) 105

(D) 119

6. 3, 6, 11, 18, 27, 38, ...?...

(A) 55

(B) 53

(C) 51

(D) 49

7. A room is 7 m long and 5 m broad and the doors and windows in its walls occupy  $5 \text{ m}^2$ . The cost of covering the remaining surface of the walls with fancy paper 75 cm wide, at the rate of Rs. 84 per piece of 13 m, is Rs. 784. Find the height of the room

(A) 4.5 m

(B) 4.0 m

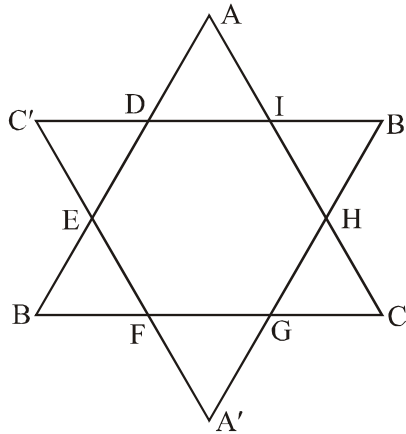
(C) 3.5 m

(D) 3.0 m

## Rough Work

8. Equilateral triangles  $ABC$  and  $A'B'C'$  are so placed that a regular hexagon  $DEFGHI$  is formed as their common area, shown below. If area of each equilateral triangle is  $9\sqrt{3}$  sq. cm, then the area of the hexagon  $DEFGHI$  is

- (A)  $9\sqrt{3}$  sq cm  
 (B)  $8\sqrt{3}$  sq cm  
 (C)  $6\sqrt{3}$  sq cm  
 (D)  $9\sqrt{2}$  sq cm



9. What is the remainder when  $27x^3 - 9x^2 - 3x + 8$  is divided by  $3x + 2$  ?
- (A) + 2                                      (B) - 2  
 (C) + 4                                      (D) - 4

**In the following questions, the numbers in the cells of each square follow some rule. Find the number, which when replaced by the symbol ..?.., maintains the same rule.**

10. (A) 26  
 (B) 19  
 (C) 17  
 (D) 10

25	29	18
10	14	8
27	30	..?..

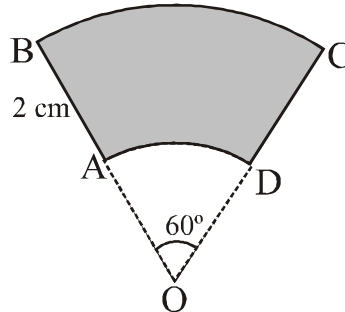
11. (A) 90  
 (B) 88  
 (C) 86  
 (D) 84

18	22	29
33	40	53
57	62	..?..

## Rough Work

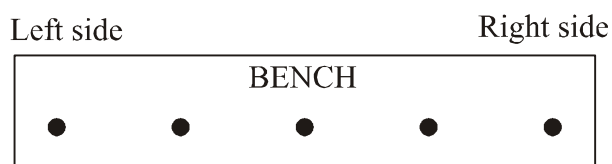
12.  $AD$  and  $BC$  are the arcs of concentric circles with  $O$  as their common centre. If  $OA = AB$ , then the area of the figure  $ABCD$  is

- (A)  $3.5 \pi \text{ cm}^2$
- (B)  $3.0 \pi \text{ cm}^2$
- (C)  $2.0 \pi \text{ cm}^2$
- (D)  $1.5 \pi \text{ cm}^2$



**On the bench at a railway station platform, five friends are sitting in the following order.**

- (i)  $A$  is sitting next to  $B$  and  $C$  is sitting next to  $D$
- (ii)  $E$  is not sitting with  $D$  and is sitting on the extreme left side of the bench
- (iii)  $C$  is on the second position from right side of the bench
- (iv)  $A$  is on right hand side of  $B$  and to right side of  $E$
- (v)  $A$  and  $C$  are sitting together



13. Who is sitting on second position from extreme right ?

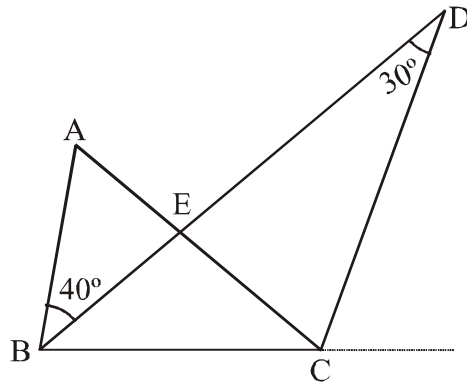
- (A)  $D$  (B)  $C$
- (C)  $B$  (D)  $A$

14. Who is sitting between  $B$  and  $E$  ?

- (A)  $D$  (B)  $C$
- (C)  $A$  (D) None of these

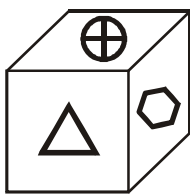
**Rough Work**

15.  $ABC$  is a triangle in which the bisector of  $\angle B$  and the bisector of exterior  $\angle C$  meet at a point  $D$  such that  $\angle BDC = 30^\circ$ . If  $\angle ABD = 40^\circ$ , then  $\angle ACD$  and  $\angle BAC$  are, respectively, equal to

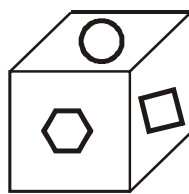


- (A)  $75^\circ$  and  $65^\circ$                       (B)  $60^\circ$  and  $70^\circ$   
 (C)  $65^\circ$  and  $60^\circ$                       (D)  $70^\circ$  and  $60^\circ$

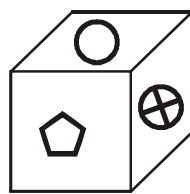
Three views of a cube are given below. Study each view of the cube and answer the following two questions.



1



2



3

16. In figure 2, the symbol opposite to  $\square$  is

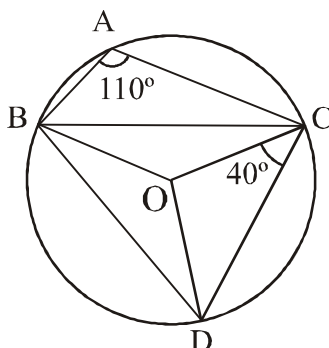
- (A)  $\oplus$     (B)  $\pentagon$   
 (C)  $\triangle$     (D) difficult to find

17. In figure 3, the symbol opposite to  $\bigcirc$  is

- (A)  $\hexagon$     (B)  $\square$   
 (C)  $\triangle$     (D) difficult to find

### Rough Work

- 18.**  $ABDC$  is a cyclic quadrilateral in a circle with centre  $O$ , as shown below. In this circle  $\angle BOC$  and  $\angle OBD$  are, respectively, equal to



- (A)  $140^\circ$  and  $20^\circ$   
 (B)  $140^\circ$  and  $30^\circ$   
 (C)  $120^\circ$  and  $30^\circ$   
 (D)  $120^\circ$  and  $20^\circ$

- 19.** What should be added to  $\frac{\left(\frac{27}{125}\right)^{2/3} \times \left(\frac{0.125}{216}\right)^{1/3}}{\left[\{(27)^{2/3} - 1\}^{2/3} + 5\right]^{1/2}}$  such that the result is 2 ?

- (A) 1.9                              (B) 1.99  
 (C) 0.9                                (D) 0.99

- 20.** The adjacent sides of a parallelogram are 15 cm and 10 cm. If length of one of the diagonals is 20 cm, then the length of the other diagonal is

- (A)  $10\sqrt{5}$  cm                      (B)  $4\sqrt{20}$  cm  
 (C)  $4\sqrt{15}$  cm                        (D)  $5\sqrt{10}$  cm

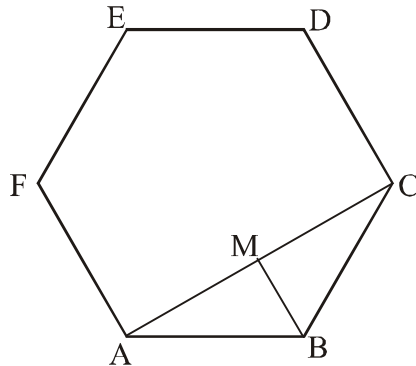
- 21.** When two dice are thrown, what is the probability that sum of the numbers which appear on the dice is less than or equal to 6 ?

- (A)  $\frac{1}{2}$                                       (B)  $\frac{4}{9}$   
 (C)  $\frac{5}{12}$                                       (D)  $\frac{7}{18}$

## Rough Work

22. Each side of a regular hexagon has a length of  $\sqrt{3}$  cm. If  $BM \perp AC$  (as shown), then area of triangle  $AMB$  is closer to

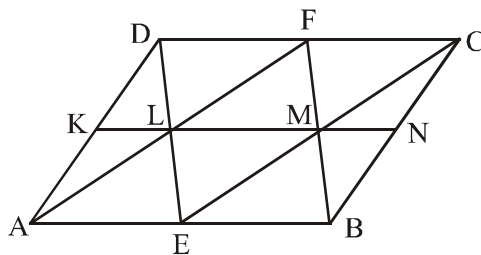
- (A)  $0.65 \text{ cm}^2$   
 (B)  $0.72 \text{ cm}^2$   
 (C)  $0.68 \text{ cm}^2$   
 (D)  $0.75 \text{ cm}^2$



23. The sides of a rectangle are in the ratio 5 : 4. If the length of the rectangle is increased by 1 cm, but its breadth is decreased by 1 cm, then area of the rectangle decreases by  $3.9 \text{ cm}^2$ . The length of the rectangle is

- (A) 15.5 cm                      (B) 15.0 cm  
 (C) 14.5 cm                      (D) 14.0 cm

24.  $ABCD$  is a parallelogram in which  $E$  and  $F$  are the mid-points of sides  $AB$  and  $CD$ , respectively. The mid-points  $E$  and  $F$  are connected to the corners of the parallelogram, as shown. If  $A$  is the area of quadrilateral  $AECF$  then tick-mark( $\surd$ ) the *wrong* statement.



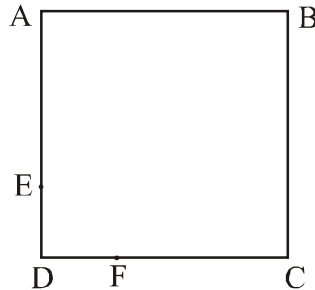
- (A) Area of triangle  $ALD$  is  $A / 4$   
 (B) Area of triangle  $EMB$  is  $A / 4$   
 (C) Area of triangle  $ABF$  is  $A$   
 (D) Area of the quadrilateral  $FLNC$  is  $3A / 4$



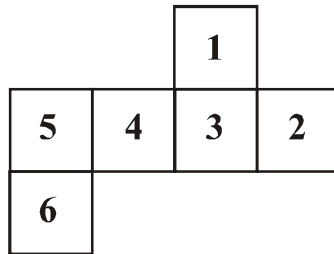
## Rough Work

25.  $ABCD$  is a square in which  $DF = 2$  cm. If  $AE = 2 DF$  and  $CF = AE$ , then the area of the quadrilateral  $BEDF$  would be equal to

- (A)  $15.0 \text{ cm}^2$
- (B)  $13.5 \text{ cm}^2$
- (C)  $12.0 \text{ cm}^2$
- (D)  $9.0 \text{ cm}^2$



26. The following spread of paper is folded along the lines to form a cube.



Which one of the following statements is *not* correct ?

- (A) Numbers 5 and 3 are on opposite faces
  - (B) Numbers 5 and 1 are on opposite faces
  - (C) Numbers 2 and 1 are on adjoining faces
  - (D) Numbers 4 and 2 are on opposite faces
27. The following series follows a regular pattern. Try to understand the pattern of the series

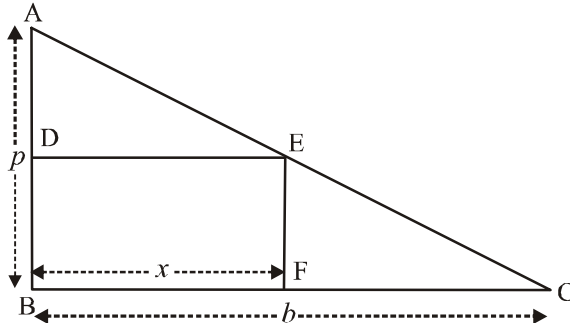
3, 7, 10, 17, 27, 44, ..?.., ..?..

The next two numbers of the series are

- (A) 81, 125
- (B) 73, 115
- (C) 71, 105
- (D) 71, 115

## Rough Work

28. A right angled triangle  $ABC$  has base  $b$  and perpendicular  $p$ . A rectangle  $BDEF$  having a common angle with the triangle  $ABC$  has been inscribed in it with a side of length  $x$ , lying along the base of the triangle.



The area of the triangle  $EFC$  is

- (A)  $\frac{1}{2} \frac{p}{b} (b-x)^2$                       (B)  $\frac{1}{2} \frac{p^2}{b} (b-x)$
- (C)  $\frac{1}{2} \frac{b}{p} (b-x)^2$                       (D)  $\frac{1}{2} \frac{b^2}{p} (b-x)$
29. The ratio of area of the circumcircle of an equilateral triangle to that of its incircle is
- (A) 9 : 1                                      (B) 9 : 4
- (C) 4 : 1                                      (D) 2 : 1
30. Bahadur lives in a small town  $O$ . He earns his livelihood by supplying articles to shops in villages around  $O$ . Daily, he starts on his auto-rickshaw to village  $A$  towards north from his town  $O$ , at a distance of 15 km. From village  $A$ , he goes eastwards to village  $B$ , covering 20 km. Then he moves southwards to another village  $C$ , distant 5 km from village  $B$ . After taking some rest at village  $C$ , he drives his auto-rickshaw westwards for a distance of 15 km to reach village  $D$ . After some time he moves southwards to reach village  $E$ , after covering a distance of 10 km. How far away is village  $E$  from his town  $O$  ?
- (A) 5 km towards south of  $O$
- (B) 10 km towards east of  $O$
- (C) 5 km towards east of  $O$
- (D) 5 km towards north of  $O$

## Rough Work

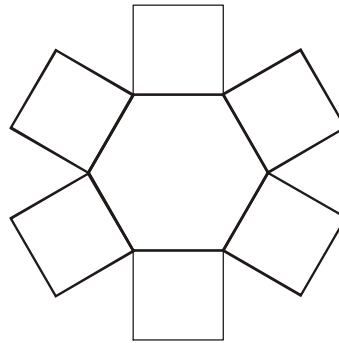
31. In the following diagram, if the perimeter of each square is 24 cm then the area of the whole shape is

(A)  $54 [2 + \sqrt{3}] \text{ cm}^2$

(B)  $54 [3 + \sqrt{3}] \text{ cm}^2$

(C)  $54 [4 + \sqrt{3}] \text{ cm}^2$

(D)  $54 [6 + \sqrt{3}] \text{ cm}^2$



32. Let  $\frac{x^2 - 15}{2x - 8} = A$ . If  $x$  is real then

(A)  $A \leq 3$  or  $A \geq 5$       (B)  $3 < A < 5$

(C)  $A \geq 3$       (D)  $A \leq 5$

33.  $x^4 + 4x^3 - x^2 - 16x - 12$ , on factorisation, gives as

(A)  $(x - 1)(x - 2)(x + 2)(x + 3)$

(B)  $(x + 1)(x - 2)(x + 2)(x - 3)$

(C)  $(x - 1)(x - 2)(x + 2)(x - 3)$

(D)  $(x + 1)(x - 2)(x + 2)(x + 3)$

34. From a pack of one playing card, 2 cards are drawn. What is the probability that no queen is drawn ?

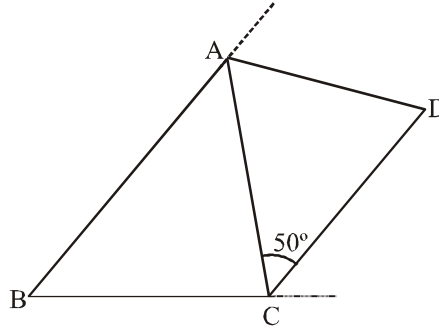
(A)  $\frac{141}{169}$       (B)  $\frac{144}{169}$

(C)  $\frac{188}{221}$       (D)  $\frac{192}{221}$

## Rough Work

35.  $ABC$  is a triangle. The bisectors of exterior angles  $A$  and  $C$  of the triangle meet at  $D$ , forming a trapezium  $ABCD$  in which  $BA \parallel CD$ . If  $\angle ACD = 50^\circ$ , then  $\angle ADC$  is equal to

- (A)  $70^\circ$
- (B)  $65^\circ$
- (C)  $60^\circ$
- (D)  $55^\circ$



36. Two adjacent sides of a parallelogram are, respectively, 13 cm and 17 cm in length. If the length of the diagonal passing through their point of intersection is 20 cm, then area of the parallelogram is closest to (take  $\sqrt{30} = 5.5$ )

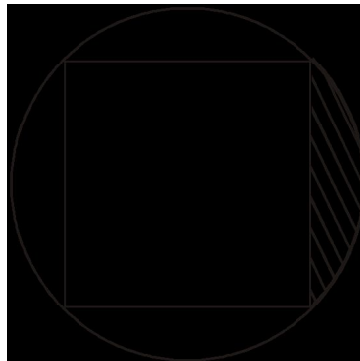
- (A)  $200 \text{ cm}^2$
- (B)  $220 \text{ cm}^2$
- (C)  $230 \text{ cm}^2$
- (D)  $240 \text{ cm}^2$

37. How many diagonals can be drawn in a regular hexagon (six sided figure in a plane) ?

- (A) 15
- (B) 12
- (C) 9
- (D) 8

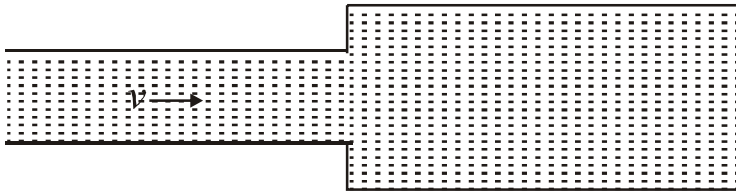
38. A square of maximum area is inscribed in a circle of radius 4.2 cm. Area of the one of the four secants (shown shaded) is nearly equal to

- (A)  $4.2 \text{ cm}^2$
- (B)  $5.04 \text{ cm}^2$
- (C)  $5.60 \text{ cm}^2$
- (D)  $6.02 \text{ cm}^2$



## Rough Work

39. A liquid is flowing with speed  $v$  through a horizontal pipe of cross-sectional area  $A$ . On entering the other pipe of double the radius, the speed of the liquid would



- (A) become  $v/8$                       (B) become  $v/2$   
(C) become  $v/4$                       (D) remain  $v$
40. A cube of maximum volume is cut from a sphere. Find the ratio of the masses of the cube and the original sphere.
- (A)  $3 : 2\pi$                               (B)  $3 : \sqrt{6} \pi$   
(C)  $3 : \sqrt{2} \pi$                               (D)  $2 : \sqrt{3} \pi$

## ANSWERS : CLASS IX MATHS

1	D	2	B	3	A	4	C	5	A
6	C	7	B	8	C	9	B	10	B
11	B	12	C	13	B	14	D	15	D
16	A	17	C	18	B	19	B	20	D
21	C	22	A	23	C	24	D	25	C
26	B	27	D	28	A	29	C	30	C
31	C	32	A	33	D	34	C	35	B
36	B	37	C	38	B	39	C	40	D