



# SAMPLE PAPER

International Olympiad Foundation

EXCELLENCE IN EDUCATION

International Olympiad Foundation

14+

OLYMPIADS

MCQ

FORMAT

0

NEGATIVE MARKS

OLYMPIAD

## Mathematics Olympiad

International Olympiad Foundation (IOF) · www.iof.education

CLASS / GRADE

Class 9

SUBJECT

IFMO

DURATION

60 Min

MAX MARKS

50

GENERAL INSTRUCTIONS

- All questions are Multiple Choice Questions (MCQs) with options A, B, C, D, E
- Each correct answer carries 1 mark. No negative marking for wrong answers.
- Rough work should be done separately. Do not write on question paper.

PAPER HIGHLIGHTS

• Multiple Choice Questions (MCQ)

Five options per question (A, B, C, D, E). Select the single most appropriate answer.

• No Negative Marking

1 mark per correct answer. Zero deductions — attempt every question.

• Conducted by IOF

International Olympiad Foundation — fostering excellence among students across India.

SUBJECTS

- Cyber
- English
- Entrepreneurship
- Mathematics
- Commerce
- Economics
- GK & Current Affairs
- Science
- Western Music
- Sanskrit
- Indian Music
- Hindi
- Reasoning & Aptitude
- Spell Talent

ALL IOF OLYMPIAD PROGRAMMES

<b>IFCO</b> International Foundation Cyber Olympiad	<b>IFEOL</b> International Foundation English Olympiad	<b>IFEnO</b> International Foundation Entrepreneurship Olympiad	<b>IFMO</b> International Foundation Mathematics Olympiad	<b>ICS</b> Institute of Company Secretaries of India Commerce Olympiad	<b>IFEcO</b> International Foundation Economics Olympiad	<b>IFGCO</b> International Foundation General Knowledge & Current Affairs Olympiad
<b>IFSO</b> International Foundation Science Olympiad	<b>IFWMuO</b> International Foundation Western Music Olympiad	<b>IFSaO</b> International Foundation Sanskrit Olympiad	<b>IFIMuO</b> International Foundation Indian Music Olympiad	<b>IFHO</b> International Foundation Hindi Olympiad	<b>IFRAO</b> International Foundation Reasoning & Aptitude Olympiad	<b>IFSTO</b> International Foundation Spell Talent Olympiad

**Q1.** Select the number that has the same relationship as in the first pair to complete the second pair.

[+1]  
[-0]

6 : 18 :: 4 : ?

- A. 2
- B. 6
- C. 8
- D. 16
- E. None of these

**Q2.** Select the lettered pair that has the same relationship as the original pair of words.

[+1]  
[-0]

Dislike : Repulsion

- A. Dream : Sleep
- B. Steal : Crime
- C. Reputation : Behaviour
- D. Intelligence : Wit
- E. None of these

**Q3.** Choose the correct option.

[+1]  
[-0]

Zinc is to Galvanisation as Nickel is to ?\_ .

- A. Aircraft
- B. Corrosion
- C. Electroplating
- D. Filament
- E. None of these

**Q4.** Choose the odd one out.

[+1]  
[-0]

Cancel , Change , Repeal , Revoke , Rescind

- A. Cancel
- B. Change
- C. Repeal
- D. Revoke
- E. Rescind

**Q5.** Choose the odd one out.

[+1]  
[-0]

1532 , 8749 , 4268 , 5846 , 6137

- A. 1532
- B. 8749
- C. 4268
- D. 5846
- E. 6137

**Q6.** Choose the correct option to continue the series.

[+1]  
[-0]

5, 16, 49, 104, \_\_\_\_\_

- A. 115
- B. 148
- C. 170
- D. 181
- E. None of these

**Q7.** The missing letters are given in the proper sequence as one of the option. Choose the correct option.

[+1]  
[-0]

\_\_bcc\_ac\_\_aabb\_\_ab\_\_cc

- A. aabca
- B. abaca
- C. bacab
- D. bcaca
- E. None of these

**Q8.** If TABLE is coded as GZYO V, how is JUICE coded in the same way?

[+1]  
[-0]

- A. OZLFZ
- B. QFRXV
- C. HOFAD
- D. QZHMT
- E. None of these

**Q9.** Pointing to a person, a man said to woman, "His mother is the only daughter of your father." How was the woman related to the person?

[+1]  
[-0]

- A. Aunt
- B. Mother
- C. Wife
- D. Daughter
- E. None of these

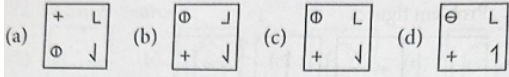
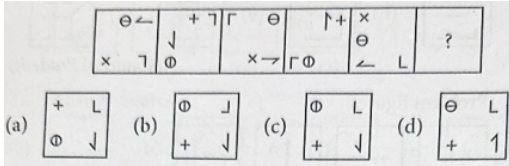
**Q10.** Ritesh went to meet his cousin to another village situated 5km away in north-east direction of Ritesh's village, From there he came to meet his friend living in a village situated 4km in the south of his cousin's village. How far away and in which direction is he now.

[+1]  
[-0]

- A. 3Km, East
- B. 4Km, East
- C. 3Km, North
- D. 4Km, West
- E. None of these

Q11. Choose the correct option to continue the series.

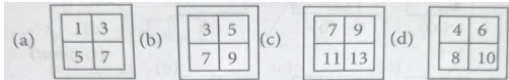
[+1]  
[-0]



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

Q12. Choose the odd one out.

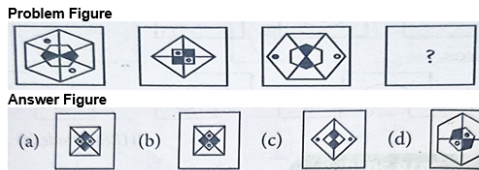
[+1]  
[-0]



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

Q13. Select the figure to complete the second pair in a way that has the same relationship as the first pair.

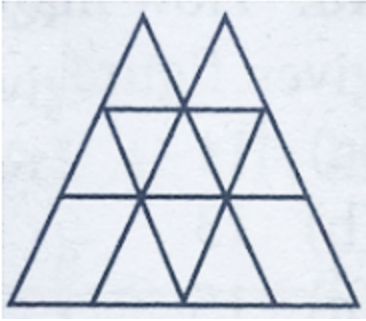
[+1]  
[-0]



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

Q14. Count the number of parallelograms in the given figure.

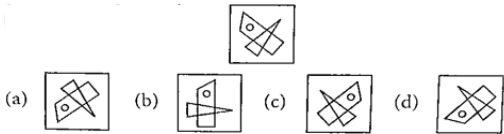
[+1]  
[-0]



- A. 23
- B. 22
- C. 21
- D. 18
- E. None of these

Q15. Choose the correct mirror image of the given figure when mirror is placed vertically on the right side of the figure.

[+1]  
[-0]



- A. (a)
- B. (b)
- C. (c)
- D. (d)
- E. None of these

Q16. A student is asked to find the ratio of the sum of length and breadth to difference of length and breadth of a rectangular field whose length is a side of square and breadth is the diagonal of the same square. If the area of square is 12sq. units then what is the ratio of length to breadth?

[+1]  
[-0]

- A.  $2\sqrt{3} : 2\sqrt{6}$
- B.  $3 + 2\sqrt{2} : 1$
- C.  $1 : 3 + 2\sqrt{2}$
- D.  $3\sqrt{3} : 3\sqrt{6}$

- A. A
- B. B
- C. C
- D. D
- E. None of these

**Q17.** Choose the correct option.

[+1]  
[-0]

If  $(x - a)$  and  $(x - \frac{1}{a})$  are factors of  $px^2 + 5x + q = 0$ , where  $a \neq \pm 1$ , then

- A.  $p = q$                       B.  $p < q$   
C.  $p > q$                       D.  $p + q = 0$

- A. A  
B. B  
C. C  
D. D  
E. None of these

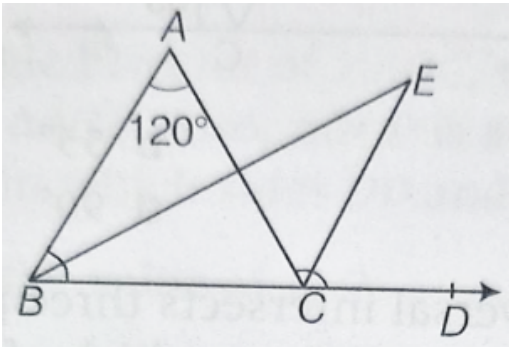
**Q18.** If we write  $2x^2 + 4x + 1 = P(x + 1)^2 - q$ , then the value of  $(p, q)$  will be

[+1]  
[-0]

- A. (2, 1)  
B. (2, -1)  
C. (-2, 1)  
D. (-2, -1)  
E. None of these

**Q19.** In the given figure, side BC is produced to a point D. If the bisectors of  $\angle ABC$  and  $\angle ACD$  meet at point E. What is the value of  $\angle E$  when  $\angle BAC = 120^\circ$ ?

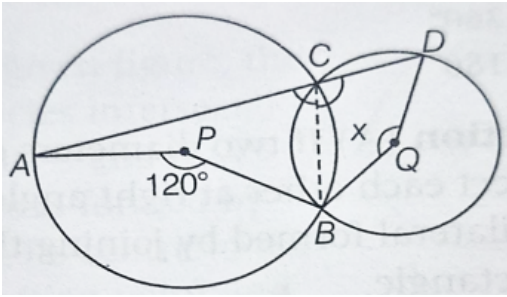
[+1]  
[-0]



- A.  $120^\circ$   
B.  $60^\circ$   
C.  $30^\circ$   
D.  $90^\circ$   
E. None of these

**Q20.** In the following figure, P and Q are centres of two circles, intersecting at B and C. ACD is a straight line. If  $\angle APB=120^\circ$  and  $\angle BQD=x$ , then what is the value of x?

[+1]  
[-0]



- A.  $60^\circ$
- B.  $120^\circ$
- C.  $30^\circ$
- D.  $90^\circ$
- E. None of these

**Q21.** In a school, there are 40 students in which boys and girls are in the ratio 3:1. The mean age of the boys is 20 years and the mean age of girls is 18 years. If there is increase in girls by 5 and decrease in boys by 10. Then, find the new average age (approx.) when the students joining or leaving doesn't change the average age of boys and girls respectively.

[+1]  
[-0]

- A. 15 years
- B. 19 years
- C. 16 years
- D. Can't be determined
- E. None of these

**Q22.** If  $2019^x + 2019^{-x} = 3$ , then the value of

[+1]  
[-0]

$$\sqrt{\frac{2019^{6x} - 2019^{-6x}}{2019^x - 2019^{-x}}} \text{ is}$$

- A. 3
- B. 6
- C. 9
- D. 12
- E. None of these

**Q23.** Let A, M and C be non-negative integers such that  $A+M+C = 12$ , what is the maximum value of  $A.M.C + A.M + M.C + C.A$ ?

[+1]  
[-0]

- A. 112
- B. 62
- C. 72
- D. 92
- E. None of these

**Q24.** Choose the correct option.

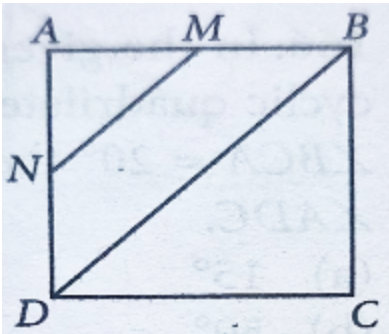
[+1]  
[-0]

If  $x^2 + y^2 = 2\sqrt{2}x + 4\sqrt{2}y - 10$ , then find the value of  $\frac{x}{y}$ ?

- A.  $\frac{1}{2}$
- B.  $\frac{1}{4}$
- C. 2
- D. 4
- E. None of these

**Q25.** In the given figure, ABCD is a square in which M and N are the mid-point of the sides AB and AD respectively. How many square units is the area of quad MNDB, if each side of the square is 2 units long?

[+1]  
[-0]



- A. 1.0
- B. 1.5
- C. 2.0
- D. 2.5
- E. None of these

**Q26.** In a cuboid the length of the diagonal is p, the sum of areas of all the surfaces is q and the sum of lengths of coinitial edges is r. Then which one of the following relation is true?

[+1]  
[-0]

- A.  $r = 4\sqrt{p^2 + q^2}$
- B.  $r = \sqrt{4(p^2 + q)}$
- C.  $r = \sqrt{p^2 + q}$
- D.  $r = 4\sqrt{p^2 - q}$

- A. A
- B. B
- C. C
- D. D
- E. None of these

**Q27.** Sum of the lengths of all edges of a cube is  $x$  metres. If the surface area of the cube is  $x$  sq. metres then what is its volume (in cubic metres)?

[+1]  
[-0]

- A.  $x^3$
- B. 8
- C.  $x$
- D. 2
- E. None of these

**Q28.** A solid consists of a cylinder with an exact fitting right circular cone placed on the top. Height of the cone is 'h'. If total volume of the solid is three times the volume of the cone then what is the height of circular cylinder ?

[+1]  
[-0]

- A.  $\frac{2h}{9}$
- B.  $\frac{2h}{3}$
- C.  $\frac{3h}{2}$
- D.  $\frac{4h}{3}$

- A. A
- B. B
- C. C
- D. D
- E. None of these

**Q29.** Mean of 35 observations is 75. The mean of first 18 observations is 70 and the mean of last 18 observations is 80. Find the 18<sup>th</sup> observation.

[+1]  
[-0]

- A. 80
- B. 70
- C. 68
- D. 75
- E. None of these

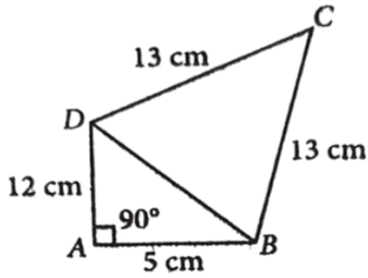
**Q30.** A bag contains 5 red and some blue balls. One ball is taken out of the bag at random. The probability that the ball taken out is blue is double of the probability that the ball drawn is red. Find the total number of balls in the bag.

[+1]  
[-0]

- A. 15
- B. 10
- C. 5
- D. 20
- E. None of these

**Q31.** In the given figure, ABCD is a quadrilateral and if  $\overline{AB} = 5\text{cm}$ ,  $\overline{AD} = 12\text{cm}$ ,  $\overline{BC} = \overline{CD} = 13\text{cm}$ , then find the area of the quadrilateral ABCD.

[+1]  
[-0]

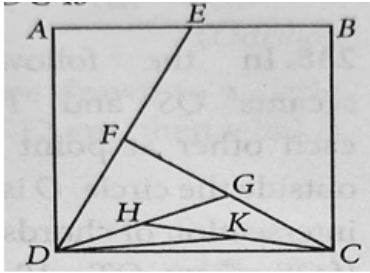


- A.  $\frac{1}{4}(120 + 169\sqrt{3})\text{sq. cm}$       B.  $\frac{1}{4}(120 - 169\sqrt{3})\text{sq. cm}$   
 C.  $\frac{1}{4}(60 + 169\sqrt{3})\text{sq. cm}$       D.  $\frac{1}{4}(60 - 169\sqrt{3})\text{sq. cm}$

- A. A  
 B. B  
 C. C  
 D. D  
 E. None of these

**Q32.** In the given figure, the area of square ABCD is  $4\text{cm}^2$  and E is midpoint of AB. F, G, H and K are the midpoints of DE, CF, DG and CH respectively. What is the area of  $\Delta KDC$ ? ( Scroll down to view complete question )

[+1]  
[-0]



- A.  $\frac{1}{4}\text{cm}^2$       B.  $\frac{1}{8}\text{cm}^2$   
 C.  $\frac{1}{16}\text{cm}^2$       D.  $\frac{1}{32}\text{cm}^2$

- A. A  
 B. B  
 C. C  
 D. D  
 E. None of these

**Q33.** If  $3214a4$  is divisible by 4, then the number of possible values of a is

[+1]  
[-0]

- A. 3  
 B. 4  
 C. 5  
 D. 6  
 E. None of these

Q34. Find the value of the given expression.

[+1]  
[-0]

$$\frac{2^{7m+4} x^3 3^{2m-3n} x^5 5^{5m+3n+4} x^6 6^{m+2n-3}}{10^{2m+4n+7} 15^{3m-n-3} 2^{6m-2n-5}}$$

- A. 1
- B. 0
- C. 2
- D. 1/2
- E. None of these

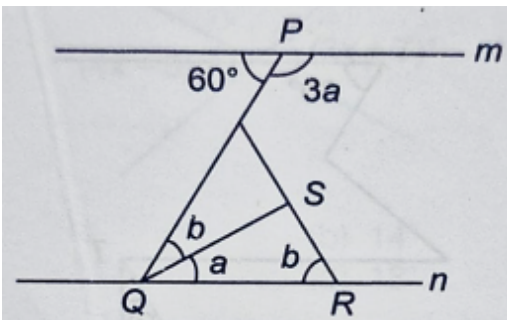
Q35. The age of Sita is 8 years more than twice the age of Sonu. If after n years, the age of Sita will be twice the age of Sonu, then the value of n is

[+1]  
[-0]

- A. 6
- B. 8
- C. 10
- D. Can't be determined
- E. None of these

Q36. If  $m \parallel n$ , then find the value of  $\angle QSR$ .

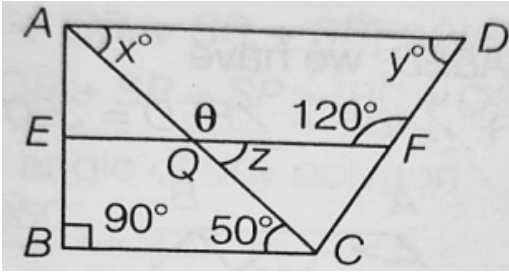
[+1]  
[-0]



- A.  $60^\circ$
- B.  $120^\circ$
- C.  $160^\circ$
- D.  $100^\circ$
- E. None of these

**Q37.** In the given figure, ABCD is a trapezium, If EF is parallel to AD and BC then find the value of  $\angle y$ .

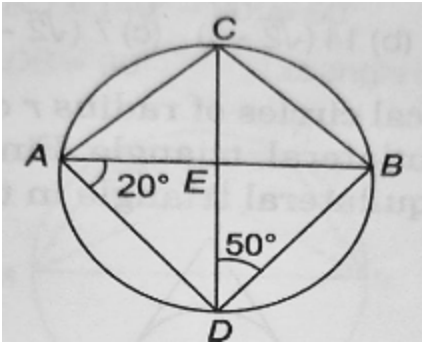
[+1]  
[-0]



- A.  $30^\circ$
- B.  $45^\circ$
- C.  $60^\circ$
- D.  $65^\circ$
- E. None of these

**Q38.** If AB is the diameter of the circle, what is the value of  $\angle BED$ ?

[+1]  
[-0]



- A.  $20^\circ$
- B.  $40^\circ$
- C.  $60^\circ$
- D.  $80^\circ$
- E. None of these

**Q39.** The length of a rectangle is twice its breadth. If the length is decreased by half of the 10cm and breadth is increased by half of the 10cm, the area of the rectangle is increased by 5sq.cm more than 70sq.cm. Find the length of the rectangle.

[+1]  
[-0]

- A. 30cm
- B. 40cm
- C. 21cm
- D. 45cm
- E. None of these

**Q40.** The perimeters of two squares are 68cm and 60cm. Find the perimeter of the third square whose area is equal to the difference of the areas of these two squares.

[+1]  
[-0]

- A. 64cm
- B. 60cm
- C. 32cm
- D. 8cm
- E. None of these

**Q41.** The ratio of the volume of a cube to that of a sphere which will fit inside the cube is

[+1]  
[-0]

- A.  $9 : \pi$
- B.  $2 : \pi$
- C.  $3 : \pi$
- D.  $6 : \pi$
- E. None of these

**Q42.** State 'T' for true or 'F' for false.

[+1]  
[-0]

I. Equation  $y = 3x + 5$  has a unique solution.

II. The solution of a linear equation is not affected when the same number is added to both sides of the equation.

III. The line parallel to y - axis at a distance 'a' units to the left of Y-axis is given by the equation  $x = -a$ .

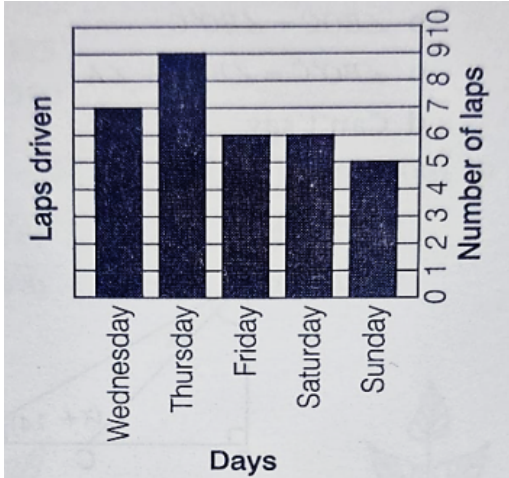
IV. If  $x=2$  and  $y=1$  is the solution of equation  $2x - 3y = k$ , then value of  $k$  is  $-1$

	I	II	III	IV
a	T	F	T	F
b	F	T	T	F
c	T	T	T	F
d	F	F	T	T

- A. a
- B. b
- C. c
- D. d
- E. None of these

**Q43.** A race car driver kept track of the number of laps he drove in the past 5 days. If median of the numbers is  $x$ , then the day corresponding to  $x+3$  is \_\_\_\_\_ . ( Scroll down to view complete question )

[+1]  
[-0]



- A. Sunday
- B. Friday
- C. Saturday
- D. Thursday
- E. None of these

**Q44.** 70 tickets of a lucky draw were sold. If the probability of Krish winning the draw is  $\frac{1}{14}$  then the number of tickets bought by Krish is

[+1]  
[-0]

- A. 5
- B. 10
- C. 15
- D. 20
- E. None of these

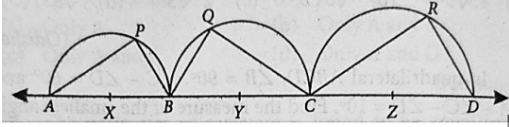
**Q45.** Megha has a piece of land which is in the shape of a trapezium. She wants her one daughter and one son to work on the land and produce different, crops and therefore divided the land in such a way that each of them gets equal share of land. If two parallel sides of the land are 18m and 10m in length. One of the non-parallel sides is 1 more than the other and the perimeter of the land is 62m with height 14m. Then the share of land each one gets, is

[+1]  
[-0]

- A.  $196\text{m}^2$
- B.  $98\text{m}^2$
- C.  $150\text{m}^2$
- D.  $100\text{m}^2$
- E. None of these

- Q46.** In the given figure, semi-circles are drawn whose centres are X, Y, Z respectively. Points (X,Y,Z) are collinear points.  $AX = 2.5$ ,  $BY = 6.5$ ,  $CZ = 8.5$  and  $AP + QC = 16$ ,  $QC + CR = 27$  and  $CR + AP = 19$ , then find the value of  $AP + PB + BQ + QC + CR + RD$ .

[+1]  
[-0]



- A. 37  
B. 41  
C. 53  
D. 47  
E. None of these
- Q47.** Choose the correct option.

[+1]  
[-0]

ABC is a right angled triangle with  $\angle B = 90^\circ$ , M is the midpoint of AC and  $BM = \sqrt{177}$  cm,  $AB + BC = 30$  cm then find the area of triangle.

- A.  $248\text{cm}^2$   
B.  $108\text{cm}^2$   
C.  $156\text{cm}^2$   
D.  $316\text{cm}^2$   
E. None of these
- Q48.** Choose the correct option.

[+1]  
[-0]

For real numbers p,q and a, if the polynomials  $x^3 - 3px + 2q$  is divisible by the polynomial  $x^2 + 2ax + a^2$ , then which of the following is correct?

- A.  $3p = 2q$   
B.  $p^2 = q^3$   
C.  $p^3 = q^2$   
D.  $27p^3 = 4q^2$   
E. None of these
- Q49.** Choose the correct option.

[+1]  
[-0]

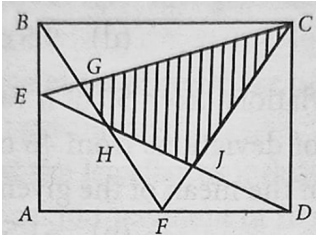
The value of  $(3^{1/2} - 1)(3^{1/2} + 3^{1/4} + 1)(3^{1/2} - 3^{1/4} + 1)$  is

- A. 1  
B.  $3\sqrt{3}$   
C.  $3\sqrt{3} - 1$   
D.  $3\sqrt{3} + 1$   
E. None of these

**Q50.** Choose the correct option.

[+1]  
[-0]

In the given figure,  $ABCD$  is a rectangle, the area of  $\triangle BEG = 503\text{cm}^2$ , the area of  $\triangle JFD = 408\text{cm}^2$  and the area of quadrilateral  $EHFA = 1113\text{cm}^2$ . Find the area (in  $\text{cm}^2$ ) of the shaded region.



- A. 2021
- B. 2019
- C. 1208
- D. 2024
- E. None of these



CLASS / GRADE

**Class 9**

SUBJECT

**IFMO**

TOTAL QUESTIONS

**50**

MAX MARKS

**50**

ANSWER SHEET — 50 QUESTIONS

Q#	ANS	Q#	ANS	Q#	ANS	Q#	ANS	Q#	ANS
Q01	C	Q11	C	Q21	B	Q31	A	Q41	D
Q02	D	Q12	D	Q22	D	Q32	B	Q42	B
Q03	C	Q13	B	Q23	A	Q33	C	Q43	D
Q04	B	Q14	A	Q24	A	Q34	B	Q44	A
Q05	C	Q15	C	Q25	B	Q35	B	Q45	B
Q06	D	Q16	B	Q26	C	Q36	D	Q46	D
Q07	C	Q17	A	Q27	B	Q37	C	Q47	B
Q08	B	Q18	A	Q28	B	Q38	C	Q48	C
Q09	B	Q19	B	Q29	B	Q39	B	Q49	C
Q10	A	Q20	B	Q30	A	Q40	C	Q50	D

◆ ALL IOF OLYMPIAD PROGRAMMES ◆

**IFCO**  
International Foundation  
Cyber Olympiad

**IFEOL**  
International Foundation  
English Olympiad

**IFEnO**  
International Foundation  
Entrepreneurship Olympiad

**IFMO**  
International Foundation  
Mathematics Olympiad

**ICS**  
Institute of Company  
Secretaries of India  
Commerce Olympiad

**IFEcO**  
International Foundation  
Economics Olympiad

**IFGCO**  
International Foundation  
General Knowledge &  
Current Affairs Olympiad

**IFSO**  
International Foundation  
Science Olympiad

**IFWMuO**  
International Foundation  
Western Music Olympiad

**IFSaO**  
International Foundation  
Sanskrit Olympiad

**IFIMuO**  
International Foundation  
Indian Music Olympiad

**IFHO**  
International Foundation  
Hindi Olympiad

**IFRAO**  
International Foundation  
Reasoning & Aptitude  
Olympiad

**IFSTO**  
International Foundation  
Spell Talent Olympiad