MATHS

BOOKS - HT Olympiad Previous Year Paper

IMO QUESTION PAPER 2019-20 SET B

Mathematical Reasoning

1. The value of

$$(-5) \times (-1) \times (-3) \times (-2) \times (-4) + 0 \times 6 \times 7 \times 8 \times 4 \times 5$$

is _____.

A. 120

B. -120

C. 240

D. 0

Answer: B

2. If $\dfrac{\left(-\frac{1}{2}\right)^6}{\left(-\frac{1}{2}\right)^4} \div \dfrac{\left(\frac{1}{4}\right)^{13}}{\left(\frac{1}{4}\right)^{10}} = 2^x$, then find the value of x.

A. 4

B. 0

C. 1

D. -4

Answer: A

3. divide 184 into two parts such that one-third of one part may exceed one-seventh of the other part by 8.

A. 72

B. 110

C. 112

D. 114

Answer: C

4. The product of two fractions is $\dfrac{11}{5}$. If one of the fractions is $\dfrac{3}{5}$, then find the sum of the two fractions.

A. $4\dfrac{4}{15}$

B. $\dfrac{16}{25}$

C. $\dfrac{6}{25}$

D. $3\dfrac{4}{15}$

Answer: A

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5. How many faces and edges does the pentagonal pyramid have ?

A. 8,12

B. 8,8

C. 6,10

D. 5,10

Answer: C

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6. Find the value of $\dfrac{m}{n}$.

Principal (in ₹)	Rate (% p.a.)	Time (in years)	S.I. (in ₹)
2500	12	3	m
n	8	5	1255

A. $70/251$

B. $62/351$

C. $72/251$

D. $60/351$

Answer: C

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7. Which of the following statements is incorrect ?

A. Every integer is a rational number

B. Reciprocal of zero is not defined

C. The product of two rational numbers is always a rational number.

D. Every negative rational number is greater than zero.

Answer: D

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8. Find the value of x.

$$3890 + 12.952 - x = 3854.002$$

A. 48.095

B. 48.752

C. 48.932

D. 48.95

9. The mean of three numbers is 51. All the three numbers are different natural numbers. If two of them are 29 and 59, then find the third number.
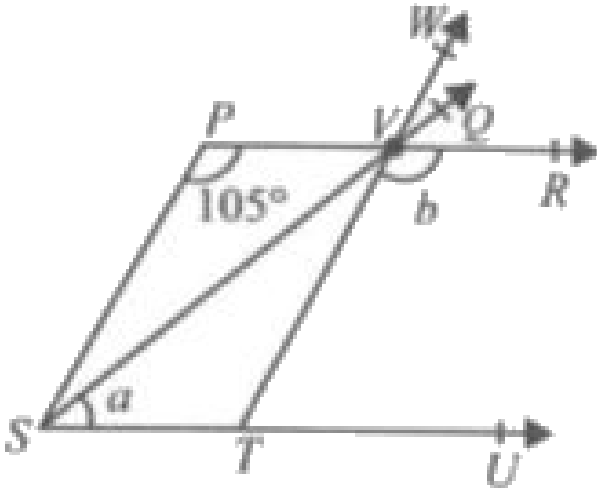
A. 65

B. 40

C. 100

D. 71

10. In the given figure (not drawn to scale), if PR||SU, $\angle WVQ = 10°$ and PS||VT, then the sum of a and b is _____.

A. 170°

B. 150°

C. 115°

D. 180°

Answer: A

11. Find the area of the unshaded region. (Take $\pi = 3.14$)
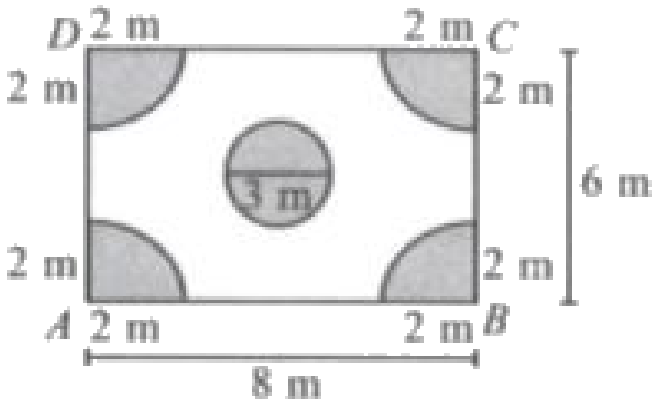
A. $28.375m^2$

B. $48.478m^2$
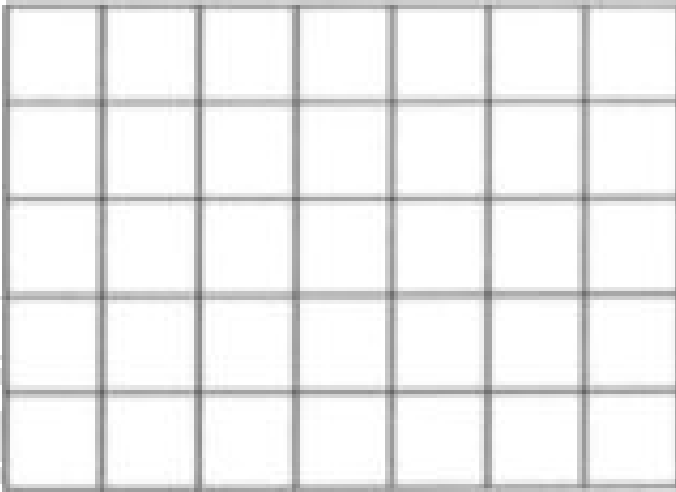
C. $25.766m^2$

D. $36.472m^2$

12. The given figure is divided into equal squares. How many squares should not be shaded to show 60% of the whole figure shaded ?

A. 14

B. 7

C. 18

D. 21

Answer: A

13. To fence a circular field, the total cost is $Rs.$ 26400 at the rate of $Rs.$ 50 per metre. Find the cost of ploughing the field at the rate of $Rs.$ 10 per metre square.

    A. $Rs.$ 221760

    B. $Rs.$ 154740

    C. $Rs.$ 212706

    D. $Rs.$ 202500

Answer: A

14. Two numbers are in the ratio 3 : 5. If each number is increased by 10, then the ratio becomes 5 : 7. The numbers are _____.
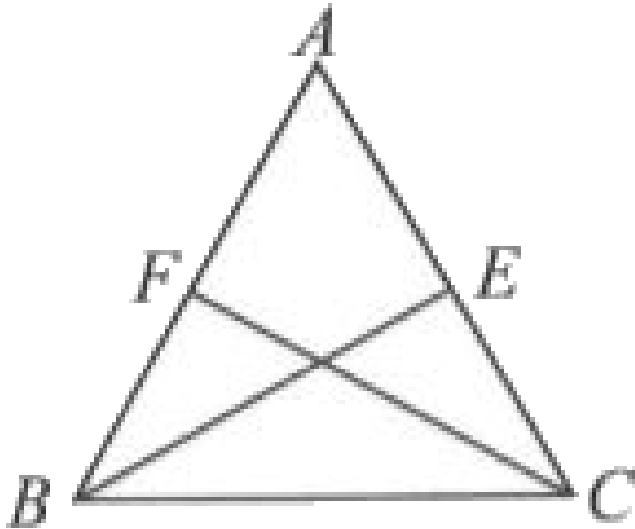
A. 3,5

B. 7,9

C. 13,22

D. 15,25

Answer: D

15. In the given figure, ABC is an isosceles triangle in which AB=AC. If E and F are the midpoints of AC and AB respectively, then which of

the following is correct ?

I. BE=CF

II. $\triangle BCF \cong \triangle CBE$

III. $\angle EBC = \angle FCB$

A. Only I and III

B. Only II and III

C. Only II

D. I, II and III

Answer: D

16. The sum of number of lines of symmetry and the order of rotaional symmetry of the given figure is _____.

A. 2

B. 1

C. 0

D. 3

17. Subtract the sum of $\left(9x - 4y + 6z^2\right)$ and $\left(-5x - 4y - z^2\right)$ from the sum of $\left(6z + 9y - 2z^2\right)$ and $\left(-x - y - z^2\right)$.

A. $5x - 16y - 8z + 6z^2$

B. $4x + 14z^2 - 9y + 7z$

C. $-5x + 16y + 6z - 8z^2$

D. $5x - 14y + 8z - 16z^2$

18. If 6 is added to five times of a number, then it becomes the same as 9 is subtracted from eight times of the same number. Which of the following equations would you use to find the number ?

   A. $6x + 5 = 8x + 9$

   B. $5x + 6 = 8x - 9$

   C. $6 + 5x = 9 - 8x$

   D. $6x + 5 = 8x - 9$

Answer: B

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19. The given table shows the production of three different types of cars over the years. Study it carefully and answer the following

question.

Years	Production of Car P	Production of Car Q	Production of Car R
2001	76	59	28
2002	82	62	36
2003	65	47	42
2004	70	54	31
2005	85	57	49
2006	80	68	38

The average production of which of the following types of cars was

maximum ?

A. Q

B. P

C. R

D. Cant'be determined

Answer: B

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20. Which of the following steps is incorrect while constructing a $\triangle XYZ$, given that $XY = 8cm, YZ = 9cm$ and $XZ = 10cm$?

Step 1 : Draw a line segment YZ of length 9 cm.

Step 2 : With Y as centre, draw an arc of radius 8cm.

Step 3 : With Z as centre, draw an arc of radius 9cm.

Step 4 : Mark the point of intersection of arcs as X. Join XY and XZ.

A. Only Step 1

B. Only Step 3

C. Both Step 2 and Step 3

D. Both Step 3 and Step 4

Answer: B

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Everday Mathematics

1. Ram's father's age is 3 years more than two times of Ram's age. Ram's father is 45 years old. Form an equation to find Ram's age.

A. $2x + 3 = 45$

B. $3x + 2 = 45$

C. $6x + 3 = 45$

D. $5x + 1 = 45$

Answer: A

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2. A rectangular lawn measuring 44 m by 32 m is to be surrounded externally by a path which is 4m wide. Find the area of the path.

A. $248m^2$

B. $246m^2$

C. $1088m^2$

D. $672m^2$

Answer: D

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3. There are some flowers in a garden and some butterflies are hovering around. If one butterfly lands on each flower, then one butterfly will be left. If two butterflies land on each flower, then one flower will be left. Find the number of flowers and butterflies respectively.

A. 3,4

B. 4,3

C. 2,3

D. 3,2

Answer: A

4. If 65% of the people in a meeting are males and the number of females are 504, then the number of males is _____.

A. 1176

B. 1408

C. 1440

D. 936

Answer: D

5. Two jackets were bought at the same cost. One was sold at a profit of 9% and the other at a profit of 15%. If the difference in the selling price of both the jackets was Rs. 105, then what was the cost price of each jacket ?

   A. Rs. 1155

   B. Rs. 1750

   C. Rs. 1050

   D. Rs. 950

Answer: B

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6. After travelling 27km, Karan found that $\dfrac{3}{5}$ of his journey was still left. Find the distance of his whole journey.

A. 135km

B. $60.5km$

C. $155km$

D. $67.5km$

Answer: D

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7. Priyanka has 8 red hair clips and 12 green hair clips. She chooses a hair clip randomly. Find the probability that the chosen hair clip is of green colour.

A. $\dfrac{5}{3}$

B. $\dfrac{7}{12}$

C. $\dfrac{1}{6}$

D. $\dfrac{3}{5}$

Answer: D

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8. A tower is broken at a height of 12m from the floor and its top touches the floor at a distance of 5 m from the base of the tower. Find the actual height of the tower.

A. 20m

B. 36m

C. 18m

D. 25m

Answer: D

9. A submarine is 397 feet below sea level . A helicopter is directly above the submarine. The helicopter is 1964 feet above sea level. What is the distance between the helicopter and submarine ?

A. 2361 feet

B. 983 feet

C. 1570 feet

D. 1567 feet

Answer: A

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10. Simran has a certain sum deposited in a bank at 5% per annum. Rajat also have the same sum deposited in the same bank

at 9% per annum. The difference between the annual interest received by both of them is Rs. 220. Find the sum.

    A. Rs. 4500

    B. Rs. 5500

    C. Rs. 6792
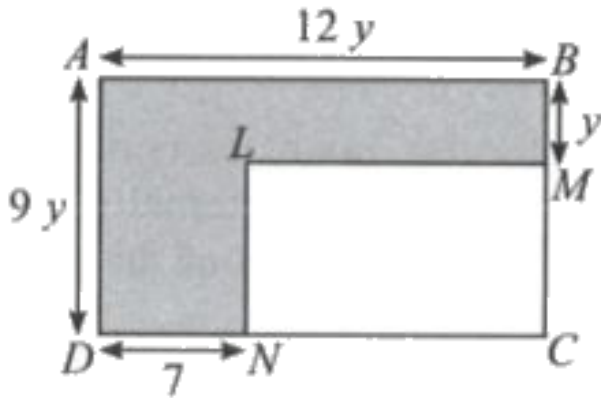
    D. Rs. 10000

Answer: B

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Achievers Section

1. In the given figure (not drawn to scale), ABCD and LMCN are rectangles . The dimensions shown in the figure are in metres. If the perimeter of the rectangle LMCN is 66m, then find the area of

the shaded region.

A. $124m^2$

B. $432m^2$

C. $160m^2$

D. $284m^2$

Answer: C

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2. Read the following statements carefully and select the correct option.

Statement-1 : The perimeter of a triangle whose sides are $2p^2 + 3p + 1$, $p^2 + 7$ and $3p^2 - 2p + 3$ is $6p^2 - p + 11$.

Statement-2 : The value of the expression $x^5 - y^4 + y^3 - x^2 + 1$, when x=2 and y=1 is 29.

A. Statement-1 is true but Statement-2 is false

B. Statement-1 is false but Statement-2 is true

C. Both Statement-1 and Statement-2 are true
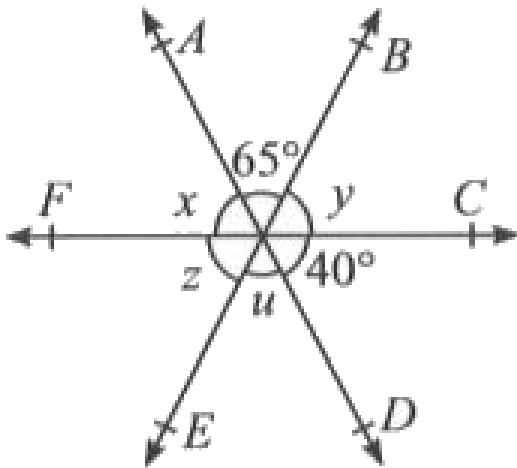
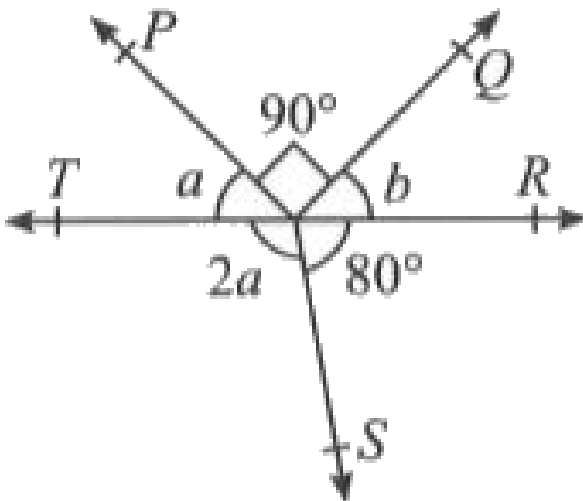D. Both Statement-1 and Statement-2 are false

Answer: B

3. Answer the following questions.

(i) Find the value of z-x.

(ii) Find the value of a+2b.

	i	*ii*
A.	35°	145°
B.	35°	130°
C.	30°	145°
D.	30°	130°

Answer: B

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4. Fill in the blanks and select the correct option .

(i) The difference between the lengths of any two sides of a triangle is _____than the length of the third side.

(ii) If the three angles of a triangle are in the ratio $1:5:4$, then the measure of the greatest angle is _____.

(iii) In an equilateral triangle, all angles are _____.

(iv) In a right angled triangle, the side opposite to the right angle is called _____.

		i	*ii*	*iii*	*iv*
A.		Smaller	72°	obtuse	perpendicular
B.		Greater	72°	right	base
C.		Greater	90°	acute	hypotenuse
D.		Smaller	90°	acute	hypotenuse

Answer: D

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5. Match the following and select the correct option.

Column-A	Column-B

(i) If $\dfrac{\left(\frac{8}{9}\right)^2 \times (3)^7 \times \left(\frac{1}{2}\right)^3}{(27)^2 \times 64} = \dfrac{1}{6^x}$,   P. 5

then $x =$

(ii) If $\dfrac{(4^3)^2 \times (2\times5)^2 \times 2^3}{(2^2)^3 \times (5\times4)^2} = 2^{x+2}$,   Q. 6

then $x =$

(iii) If $6^{2x} \times 36^2 = 6^{16}$, then $x =$ R. 3

	(i)	(ii)	(iii)
A.	P	Q	R
B.	Q	P	R
C.	R	Q	P
D.	R	P	Q

A.
i	ii	iii
P	Q	R

B.
i	ii	iii
Q	P	R

C.
i	ii	iii
R	Q	P

D.
i	ii	iii
R	P	Q

Answer: D

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