



MATHS

BOOKS - HT Olympiad Previous Year Paper

IMO QUESTION PAPER 2019 SET A

Mathematical Reasoning

1. The L.C.M.of two numbers is 63 times their H.C.F. If one of the numbers is 35 and the sum of H.C.F and L.C.M is 320, then the sum of two numbers is A. 45

B. 150

C. 80

D. 310

Answer: C

Watch Video Solution

2. Simplify :
$$rac{x^8-a^8}{x^6-a^6}$$

A. $rac{ig(x^2+a^2ig)ig(x^2-a^2ig)}{ig(x^2+ax+a^2ig)^2}$

$$\begin{array}{l} \mathsf{B.} \ \displaystyle \frac{\left(x^2+a^2\right)\left(x^4+a^4\right)}{(x^2+ax+a^2)(x^2-ax+a^2)} \\ \mathsf{C.} \ \displaystyle \frac{\left(x^2+a^2\right)\left(x^4+a^4\right)}{\left(x^2-ax+a^2\right)^2} \\ \mathsf{D.} \ \displaystyle \frac{\left(x^2+a^2\right)\left(x^4+a^4\right)}{(x^2+ax-a^2)(x^2-ax+a^2)} \end{array}$$

Answer: B



3. PQRS is a parallelogram and O is a point on SQ. The produced line PO meets QR at T and SR produced at U. If SO=3OQ, then find the value of





A.
$$\frac{3}{2}$$

B. $\frac{1}{2}$
C. $\frac{4}{5}$
D. $\frac{1}{4}$



4. If two times the larger of the two numbers is divided by the smaller one, we get 3 as quotient and 5 as the remainder . Also, if ten times the smaller number is divided by the larger one, we get 4 as quotient and 2 as remainder. Find the numbers.

A. 10 and 4

B. 8 and 5

C. 7 and 3

D. 10 and 3

Answer: C

Watch Video Solution

5. If p times the p^{th} term of an A.P is equal to q times its q^{th} term, then find $(p+q)^{th}$ term of the A.P.

A.
$$p+q^2$$

B. $p-q^2$
C. 0

D. 1

Answer: C



6. Find the area of the triangle whose vertices are

$$Pigg(-rac{2}{5},6igg),Q(2,8)$$
 and $R(-4,3)$

A. 0 sq. Unit

- B. $5\sqrt{2}$ sq. Units
- C. 9 sq. Units
- D. 15 sq. Units

Answer: A



7. In a ΔABC , point D is on side AB and point E is on side Ac, such that BCED is a trapezium. If DE : BC = 3 : 5, then area (ΔADE): area ($\Delta BCED$)=

A. 9:16

B. 10:17

C.3:5

D. 9:25

Answer: A

Watch Video Solution

8. O is the centre of the given circle, AOC is its diameter and B is a point on the circle such that $\angle ACB = 50^{\circ}$. If At is the tangent to the circle at the point A, then $\angle BAT$ =



A. $40^{\,\circ}$

B. $50^{\,\circ}$

 $\mathsf{C.}\,60^\circ$

D. $65^{\,\circ}$

Answer: B

Watch Video Solution

9. From a point on the ground , 20m away from the bottom of a building , the angle of elevation of the top of the building is 60° . Find the distance of the point from the top of the building.

A. 10m

B. $40\sqrt{3}m$

C. 40m

D.
$$rac{20}{\sqrt{3}}m$$

Answer: C



10. The height of a cone is 30 cm .A small cone is cut off at the top by a plane parallel to the base . If its volume be $\frac{1}{27}$ of the volume of the given cone, at what height above the base the section has been made? A. 20cm

B. 21cm

 $\mathsf{C.}\,20.5cm$

 $\mathsf{D.}\,19cm$

Answer: A



11. If the median of the following frequency distribution is 46, then find the value of m and n

respectively.

Classes	10-20	20-30	30-40	40-50	<mark>50-60</mark>	60-70	70-80	Total
Frequency	12	30	m	65	n	25	18	230

A. 30,50

B. 50,30

C. 34,46

D. 46,34

Answer: C



12. Which of the following steps of construction is/are incorrect while drawing a tangent to a circle of radius 5cm and making an angle of 60° with a line passing through the centre? Steps of construction : Step I : Draw a circle with centre O and radius 5 cm. Step II : Draw a radius OA of this circle and produce it to B. Step III : Construct an angle $\angle POA$ equal to the complement of $30^\circ\,$ i.e.equal to $60^\circ\,$.

Step IV : Draw perpendicular to OA at P which intersects OA produced at M .

Clearly, PM is the desired tangent such that $\angle OMP = 60^{\circ}.$

A. Both Step I and Step IV

B. Only Step III

C. Both Step III and Step IV

D. Only Step I

Answer: C



13. The given figure (not drawn to scale) is made up of a square and four identical semi-circles. Find the area of the shaded region. (Use $\pi = 3.14$)



A. $124.85 cm^2$

 $\mathsf{B.}\,310cm^2$

 $\mathsf{C.}\,260 cm^2$

D. $335.75cm^2$

Answer: D



14. A number x is selected from the numbers 1,2,3 and then a second number y is randomly selected from the numbers 1,4,9. What is the probability that the product xy of the two numbers will be less than 9?

A.
$$\frac{5}{9}$$

B. $\frac{7}{9}$
C. $\frac{2}{3}$

Answer: A

Watch Video Solution

15. If
$$sin(A + B + C) = 1$$
, $tan(A - B) = \frac{1}{\sqrt{3}}$
and $sec(A + C) = 2$, then find A, B and C
respectively, when they are acute angles.

A. $60^\circ, 0^\circ, 30^\circ$

 $\texttt{B.}~30^\circ,\,60^\circ,\,90^\circ$

C. 60° , 30° , 0°

D. 0° , 60° , 30°

Answer: C

Watch Video Solution

16. Solve the following quations by using qardratic formula:

$$p^2x^2 + ig(p^2-q^2ig)x - q^2 = 0$$

A.
$$\frac{q^2}{p^2}, \frac{p}{q}$$

B. $\frac{p^2}{q^2}, 2$
C. $\frac{p}{q}, \frac{-q}{p}$

D.
$$rac{q^2}{p^2}, \ -1$$

Answer: D

Watch Video Solution

17. Study the given figure carefully and answer the

following questions



(i) The perpendicular distance of the points P and

R from x-axis are ____units and _____units respectively.

(ii) Find the zero of area of the region RTOU and SVOZ.

A.
$$i$$
 ii
3 3 3:4
B. i ii
2 3 4:3
C. i ii
3 2 2:3
D. i ii
2 4 3:2

18. Which of the following is/are non-terminating

repeating decimal number(s)?

(i)
$$\frac{125}{441}$$
 (ii) $\frac{129}{2^2 \times 5^7 \times 17^7}$
(iii) $\frac{29}{343}$

A. Only (i)

- B. Both (i) and (iii)
- C. (i),(ii) and (iii)
- D. Both (ii) and (iii)

Answer: C



19. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26*cm*, 28*cm* and 30*cm*, and the parallelogram stands on the base 28*cm*, find the height of the parallelogram.

A. 12cm

B. 42cm

C. 28cm

D. None of these

Answer: A



20. ABC is a right angle triangle, right angled at C. If p is the length of the perpendicular from C to AB and a, b,c have the usual meaning , then $rac{1}{a^2}+rac{1}{b^2}=$ \mathcal{C} ba



D. $2p^2$

Answer: A

Watch Video Solution

Everday Mathematics

1. A boat goes 12 km upstream and 40 km downstream in 8 hours. It can go 16 km upstream and 32 km downstream in the same time. Find the

speed of the boat in still water and the speed of

the stream

A. 8km/hr, 3km/hr

B. 10km/hr, 5 km /hr

C. 6km/hr, 2km/hr

D. None of these

Answer: C



2. Rohit wants to buy furniture worth Rs. 12500 . He gets a discount of 5% on it. After getting the discount, he pays 12% sales tax. Find the amount he will have to pay for the furniture.

A. Rs. 10450

B. Rs. 12000

C. Rs. 9500

D. Rs. 13300

Answer: D



3. A man filled a bucket using a mug. If the capacity of the mug is 0.4 litres , then 30 mugs of water will fill the bucket. How many mugs will be needed to fill the same bucket, if the capacity of each mug is 0.8 litres ?

A. 8

B. 15

C. 10

D. 12





4. The difference between simple interest and compound interest on a sum for 3 years at 5%, when the interest is compound annually is Rs. 122. Find the principal value.

A. Rs. 10000

B. Rs.16000

C. Rs.18000

D. Rs.24000





5. A bag contains 1 rupee, 50 paise and 25 paise coins in the ratio 4:7:5 respectively. If the total amount in the bag is Rs. 280, then find the number of 50 paise coins in the bag.

A. 112

B. 224

C. 160

D. 128



6. A manufacturer of cricket bat produced 2000 units in 2^{nd} year and 5000 units in the 5^{th} year. Assuming that production increases uniformly by a fixed number every year, find the total production in 20 years.

A. 125000 units

B. 180000 units

C. 60000 units

D. 210000 units

Answer: D



7. The average monthly income (in Rs.) of male employees of a company is P and that of female employees is Q. If the number of male employees is 11 times that of female employees, then the average monthly income (in Rs.) of all the employees is

A.
$$rac{P+Q}{2}$$

B. $rac{P+11Q}{2}$

C.
$$rac{1}{11P}+Q$$

D. $rac{11P+Q}{12}$

Answer: D



8. If 2 men and 7 women can do a piece of work in 4 days, 4 men and 2 women can do the same work in 5 days, then in how many days 6 men and 27 women can do the same work ?

A.
$$7\frac{1}{2}$$
 days

B.
$$2\frac{1}{3}$$
 days
C. $1\frac{1}{9}$ days

D. None of these

Answer: C



9. There are two temples, one on each bank of a river, just opposite to each other. One temple is 54 m high. From the top of this temple, the angles of depression of the top and the foot of the other temple are 30o and 60o respectively. Find the

width of the river and the height of the other temple.

- A. 18m
- B. $18\sqrt{3}m$
- $\mathsf{C.}\,36m$
- D. $36\sqrt{3}m$

Answer: C



10. Priya buys a dress at a discount of 20%. At what percentage above the cost price should she sell it to make a profit of 30% over the original list price ?

A. 35~%

 $\mathsf{B.}\,60~\%$

 $\mathsf{C.}\,62.5\,\%$

D. None of these

Answer: C



1. Which of the following options is incorrect ?

A.
$$\sec^4 heta - \sec^2 heta = \tan^4 heta + \tan^2 heta$$

B.
$$\cos 60^{\circ} \cos 45^{\circ} - \sin 60^{\circ} \sin 45^{\circ} = \frac{1}{\sqrt{2}}$$

C. $\frac{\sin 60^{\circ}}{\cos^2 45^{\circ}} - \cot 30^{\circ} + 15\cos 90^{\circ} = 0$
D. $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}} = \sec \theta - \tan \theta$

Answer: B

Watch Video Solution

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

Statement-I : If a,b,c, are in A.P., then bc, ca, ab are also in A.P.

Statement-II : If a constant number is subtracted from each term of an A.P. , then the resulting pattern of numbers also forms an A.P.

A. Both Statement-I and Statement-II are true.

B. Both Statement-I and Statement-II are false.

C. Statement-I is true but Statement-II is false

D. Statement-I is false but Statement-II is true

Answer: D



3. If α and β are the zeroes of the quadratic polynomial $f(x) = 5x^2 - 6x - 2$, then match the

columns and select the correct option.

	Column-I		Column-II
1)	$\alpha^2\beta + \alpha\beta^2 =$	(a)	2936 625
11)	$\frac{1}{\alpha} + \frac{1}{\beta} =$	(b)	$\frac{-12}{25}$
iii)	$\alpha - \beta + \frac{1}{2\alpha\beta} =$	(c)	$\frac{8\sqrt{19}-25}{20}$
iv)	$\alpha^4 + \beta^4 =$	(d)	-3

$$egin{aligned} (i) o (b), (ii) o (a), (iii) o (d), (iv) o (c) \ &egin{aligned} {\sf B}. \ (i) o (d), (ii) o (b), (iii) o (c), (iv) o (a) \end{aligned}$$

С.

$$(i)
ightarrow (b), (ii)
ightarrow (d), (iii)
ightarrow (c), (iv)
ightarrow (a)$$

D.

$$(i)
ightarrow (b), (ii)
ightarrow (d), (iii)
ightarrow (a), (iv)
ightarrow (c)$$

Answer: C

Watch Video Solution

4. Read the given statements carefully and state
'T' for true and 'F' for false.
(i) If the points A(6,1), B(8,2), C(9,4) and (p,3) are
the vertices of a parallelogram , taken in order,
then the value of p is 7.
(ii) The points A(2,-2), B(-3,8) and C(-1,4) are
collinear.

(iii) The points A(-3,0), B(1,-3) and C(5,1) are the vertices of an isosceles right angled triangle.

A.
$$\begin{array}{cccc} i & ii & iii \\ T & F & F \end{array}$$

B. $\begin{array}{cccc} i & ii & iii \\ T & T & F \end{array}$
C. $\begin{array}{cccc} i & ii & iii \\ F & T & T \end{array}$

D. $rac{i}{F}$ $rac{ii}{F}$ $rac{iii}{T}$

Answer: B

> Watch Video Solution

5. A die is thrown twice. What is the probability that

(i) a multiple of 2 will come up at least once

(ii) a doublet of an even number occurs ?

$$\begin{array}{cccc} i & ii \\ A. & \frac{24}{6} & \frac{11}{36} \\ i & ii \\ B. & \frac{25}{6} & \frac{13}{36} \end{array}$$

$$\begin{array}{cccc} i & ii \\ {\rm C.} & \frac{11}{6} & \frac{25}{36} \\ i & ii \\ {\rm D.} & \frac{3}{4} & \frac{1}{12} \end{array}$$

Answer: D

