MATHS

BOOKS - OSWAL PUBLICATION

OLYMPIAD 2019-20

1 Real Numbers

1. How many positive integers N give remainder 8, when 2008 is divided by N where N > 8 ?

A. 12

B. 13

C. 14

D. 15

Answer: D

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2. LCM of two numbers is 5775. Which of the following cannot be their HCF ?

A. 175

B. 231

C. 385

D. 455

Answer: D

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2 Polynomials

1. Find the remainder is : When x^{51} is divided by $x^2 - 3x + 2$.

A. x

B. $\left(2^{51}-2\right)x=2-2^{51}$

C. $\left(2^{51}-1\right)x+2-2^{51}$

D. 0

Answer: C

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3 Pair Of Linear Equations In Two Variables

1. If a,b,c are distinct real numbers such that $a+\frac{1}{b}=b+\frac{1}{c}=c+\frac{1}{a}$, then evaluate abc.

A. $\pm\sqrt{2}$

B. $\sqrt{2}-1$

C. $\sqrt{3}$

D. ± 1

Answer: D

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2. The numbers of triples (x,y,z) such that any one of these numbers is added to the product of the other two, the result is 2, is :

A. 1

B. 2

C. 4

D. Infinitely many

Answer: A

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1. Let α and β be the roots of $x^2 - 5x + 3 = 0$ with $\alpha > \beta$. If $a_n = a^n - \beta^n$ for $n \geq 1$, then the value of $\frac{3a_6 + a_8}{a_7}$ is :

A. 2

B. 3

C. 4

D. 5

Answer: D

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2. The product of the roots of the equation $\sqrt{5x+8} = \sqrt{x^2-16}$ is :

A. -64

B. -24

C. 64

D. 24

Answer: B

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3. If the sum of the roots of equation $\frac{1}{x+a}+\frac{1}{x+b}=\frac{1}{c}$ is zero, then the product of roots is :

A. 0

B. $\frac{a+b}{2}$

C. $-\frac{1}{2}\left(a^2+b^2\right)$

D. $2\left(a^2+b^2\right)$

Answer: C

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4. If the equation

$$(\alpha^2 - 5\alpha + 6)x^2 + (\alpha^2 - 3\alpha + 2)x + (\alpha^2 - 4) = 0$$

has more than two roots, then the value of α is :

A. 2

B. 3

C. 1

D. None of these

Answer: A

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5 Arithmetic Progressions

1. How many numbers lie between 11 and 1111 which when divided by 9 leave a remainder of 6 and when divide by 21 leave a remainder of 12 ?

A. 18

B. 28

C. 8

D. None of these

Answer: A

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2. The solution of the equation $1 + 4 + 7 + \ldots\ldots\ldots + x = 925$ is :

A. 73

B. 76

C. 70

D. 74

Answer: A

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7 Triangles

1. In rectangle ABCD, AB = 5 cm and BC = 3 cm. Point F and G are on the line segment CD so that DF = 1 cm and GC = 2 cm. Lines AF and BG intersect at. E. What is the area of AEB ?

A. 10 sq. cm

B. $\frac{15}{2}$ sq. cm

C. $25/2$ sq. cm

D. 20 sq. cm

Answer: C

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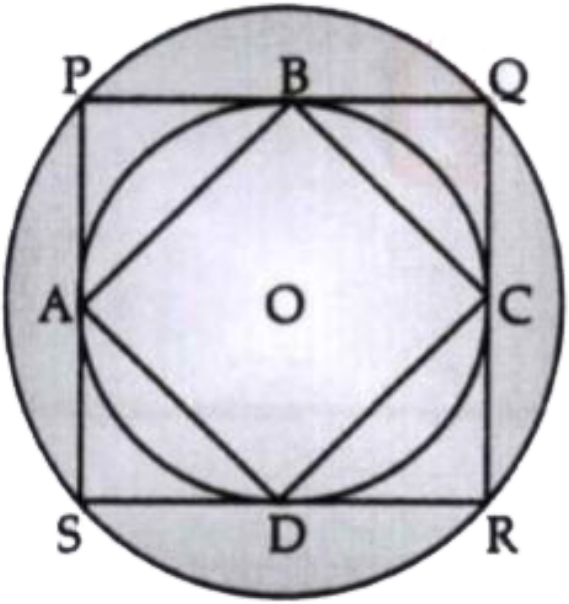
8 Circles

1. In the given figure, two concentric circles are shown with centre O. PQRS and ABCD are squres. What is the ratio of the perimeter of the outer

circle to that of quadrilateral ABCD ?



A. $\frac{\pi}{4}$

B. $\frac{3\pi}{2}$

C. $\frac{\pi}{2}$

D. π

Answer: C

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10 Introduction To Trigonometry

1. If $\tan\theta + \sec\theta = 1.5$, then value of $\sin\theta$ is :

A. $\frac{5}{13}$

B. $\frac{15}{13}$

C. $\frac{3}{5}$

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

Answer: A

11 Heights And Distances

1. An observer standing at the top of a tower, finds that the angle of elevation of a red bulb on the top of a light house of height H is α. Further, he finds that the angle of depression of reflection of the bulb in the ocean is β. Therefore, the height of the tower is :

A. $\frac{H(\tan\beta - \tan\alpha)}{\tan\beta + \tan\alpha}$

B. $\frac{H\sin(\beta - \alpha)}{\cos(\alpha + \beta)}$

C. $\frac{H(\cos\alpha - \cos\beta)}{\cos\alpha + \cot\beta}$

D. H

Answer: A

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12 Areas Related To Circles

1. In an equilateral triangle, three coins of radii 1 unit each are kept so that they touch each other and also the sides of the triangle. The area of the triangle ABC is

A. $4 + 2\sqrt{3}$

B. $4\sqrt{3} + 6$

C. $12 + \frac{7\sqrt{3}}{4}$

D. $3 + \frac{7\sqrt{3}}{4}$

Answer: B

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15 Probability

1. Two unbiased dice are rolled. What is the probability of getting a sum which is neither 7 nor 11 ?

A. $\frac{7}{9}$

B. $\frac{7}{18}$

C. $\frac{2}{9}$

D. $\frac{11}{18}$

Answer: A

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