

#### **MATHS**

### **BOOKS - OSWAAL PUBLICATION**

#### **SAMPLE PAPER 3**

#### Exercise

1. Define an empty set.



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**2.** If 
$$\left(\frac{x+1}{2}, 7\right) = (6, 7)$$
.find x.



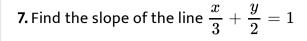
- **3.** Convert  $\frac{7\pi}{6}$  radians in degree measure ?
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**4.** Find the real number x if (x-2i)(1+i) is purely imaginary.



- **5.** Given 4 flags of different colours, how many different signals can be generated, if a signal requires the use of 2 flags one below the other?
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- **6.** For what values of x, the numbers  $-\frac{2}{7}$ , x,  $-\frac{7}{2}$  are in G.P?
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- **9.** write the negation of 'For all  $a,b\in I, a-b\in I'$  .
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**10.** The probability of a sure event is:



11. In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teach mathematics and 4 teach both physics and mathematics.



How many teach physics?



**12.** If P={1,2}, form the set  $P \times P \times P$ 



**13.** Taking the set of natural numbers as the universal set, write down the complements of the following sets:

$$\{x : x \in N \text{ and } 2x + 1 > 10\}$$



**14.** Find the value of  $\cos(-1710^{\circ})$ .

**15.** Prove that 
$$\sin 2x = \frac{2 \tan x}{1 + \tan^2 x}$$



# **16.** Find the least positive integer m such that $\left(rac{1+i}{1-i} ight)^{4m}=1.$



- **17.** Solve  $\{3(2x-5)-7\} \geq -9(x-5)$ .
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- **18.** Find the distance of a point(3,-5) from the line3x 4y 5 = 0
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$$y - \sqrt{3}x - 5 = 0$$
 and  $\sqrt{3}y - x + 6 = 0$ 



## **20.** Evaluate: $\lim_{x \to -2} \frac{rac{1}{x} + rac{1}{2}}{x+2}$



**21.** Show that the points P(- 2 , 3, 5) , Q (1, 2, 3) and R(7, 0, -1) are collinear.



**22.** Write the contrapositive and converse of "If a paralleogram is a square, then it is a rhombus".



23. Write the mean of the given data: 6,7,10,12,13,4,8,12?



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**24.** If A and B are mutually exclusive events, given that  $P(A)=\frac{3}{5}, P(B)=\frac{1}{5}, \text{then P(A or B) is}$ 



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**25.** There are 200 individuals with a skin disorder, 120 had been exposed to the chemical  $C_1$ , 50 to chemical  $C_2$ , and 30 to both the chemicals  $C_1$  and  $C_2$ . Find the number of individuals exposed to

- (i) Chemical  $C_1$  but not chemical  $C_2$
- (ii) Chemical  $C_2$  but not chemical  $C_1$
- (iii) Chemical  $C_1$  or chemical  $C_2$



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**27.** Let A={1,2},B={1,2,3,4},C={5,6}.Verify that 
$$A\times (B\cap C)=(A\times B)\cap (A\times C).$$

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**28.** In any triangle ABC,  $\sin \frac{A}{2}$  is



**29.** Express  $\frac{-1+i}{\sqrt{2}}$  in the polar form.



**30.** Solve the equation  $x^2 + \frac{x}{\sqrt{2}} + 2 = 0$ 



31. In how many ways can 5 girls and 3 boys be selected in a row so that no two boys are together?



**32.** Find the middle term in the expansion of  $\left(\frac{x}{3}+9y\right)^{10}$ 



**33.** The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally, how many bacteria will be present at the end of  $2^{\rm nd}$  hour,  $4^{\rm th}$  hour and  $n^{\rm th}$  hour?



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**34.** The difference between any two consecutive interior angles of a polygon is  $5^{\circ}$  .If the smallest angle is  $120^{\circ}$  , find the number of the sides of the polygon.



**35.** Find the equation of the ellipse, with major axis along the x-axis and passing through the points (4,3) and (-1,4)



**36.** Find the derivative of (tanx) w.r.t x from first principal method?



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**37.** Verify by the method of contradiction that  $\sqrt{2}$  is irrational .



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38. One card is drawn from a well shuffled deck of 52 cards. If each outcomes is equally likely, calculate the probability that the card will be

- (i) a diamond
- (ii) not a ace

(iii) a black card (i.e., a club or, a spade) (iv) not a diamond

(v) not a black card.



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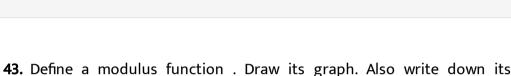
**40.** One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be (a) a diamond (b) not a diamond (c) a black card.



**41.** A fair coin with 1 marked on one face and 6 on the other and a fair die are both tossed Find the probability that the sum of numbers that turn up is (i) 3 (ii) 12



are both tossed Find the probability that the sum of numbers that turn up is (i) 3 (ii) 12 **Watch Video Solution** 



**44.** Prove that  $\cos^2 2x - \cos^2 6x = \sin 4x \cdot \sin 8x$  ?

42. A fair coin with 1 marked on one face and 6 on the other and a fair die



domain and range.



$$rac{1}{2 \cdot 5} + rac{1}{5 \cdot 8} + rac{1}{8 \cdot 11} + \dots rac{1}{(3n-1)(3n+2)} = rac{n}{(6n+4)} \, orall \, n \in N$$

45.

**46.** Solve the following system of inequalities graphically:

5x + 4y < 20, x > 1, y > 2



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- **47.** What is the number of ways of choosing 4 cards from a pack of 52
- playing cards? In how many of these
- (i) four cards are of the same suit,
- (ii) four cards belong to four different suits,
- (iii) are face cards,
- (iv) two are red cards and two are black cards,
- (v) cards are of the same colour?



48. What is the number of ways of choosing 4 cards from a pack of 52 cards? In how many of these



Four face cards

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- 49. What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these
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- (iii) are face cards,
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51. Derive the expression for the length of the perpendicular drawn from

(v) cards are of the same colour?



the point  $(x_1,y_1)$  yo the line ax+by+c=0



**52.** Prove that  $\lim_{x \to 0} \left( \frac{\sin x}{x} = 1 \right)$  ?



**53.** The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?



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**55.** prove that  $\cos(A+B)=\cos A\cos B-\sin A\sin B$ 



**56.** Find the derivative of  $f(x)=2x^2+3x-5$ ,also prove that f'(0)+3f'(-1)=0.



**57.** Find the sum to n terms of the series  $1^2+\left(1^2+2^2\right)+\left(1^2+2^2+3^2\right)+\ldots$  .

