



## MATHS

### BOOKS - OSWAAL PUBLICATION

#### SOLVED PAPER 2018-1

#### Exercise

1. If  $A = \phi$  the empty set, then write the number of elements in  $P(A)$ .

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2. If  $A = \{1, 2\}$  and  $B = \{3, 4\}$  then write  $A \times B$ .

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3. Convert  $240^\circ$  into radian measure.

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4. write the additive inverse of the complex number  $4-3i$

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5. If  ${}^n C_8 = {}^n C_2$  find the value of 'n'.

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6. If  $a_n = \frac{n^2}{2^n}$ , then find  $a_7$ .

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7. Find the slope of the line passing through the points  $(3,-2)$  and  $(-1,4)$



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8. Evaluate  $\lim_{x \rightarrow 0} \frac{ax + b}{cx + 1}$



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9. Write the negation of the statement "The number 2 is greater than 7"



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10. A coin is tossed 3 times, Write the sample space.



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11. If  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ ,  $A = \{1, 2, 3, 4\}$  and  $B = \{2, 4, 6, 8\}$ , then find  $(A \cup B)'$ .



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12. If  $A = \{1, 2, 3, 4, 5, 6\}$ ,  $B = \{2, 4, 6, 8\}$ , then find  $A - B$  and  $B - A$ .

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13. Let  $A = \{1, 2, 3, 4, 5, 6\}$ . Define a relation  $R$  from  $A$  to  $A$  by  $R = \{(x, y) : y = x + 1\}$

(i) Depict this relation using an arrow diagram.

(ii) Write down the domain, codomain and range of  $R$ .

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14. Find the radius of the circle in which a central angle of  $60^\circ$  intercepts an arc of length 37.4 cm (use  $\pi = \frac{22}{7}$ )

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15. Find the value of  $\sin\left(\frac{31\pi}{3}\right)$ .

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16. Find the modulus and the argument of the complex number  $-\sqrt{3} + i$

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17. Solve  $7x + 3 < 5x + 9$ . Show the graph of the solution on number line.

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18. Find the equation of the line, which makes intercepts -3 and 2 on X and Y-axes respectively.

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19. Find the distance of the point (3,-5) from the line  $3x - 4y - 26 = 0$

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20. The centroid of a triangle ABC is at the point (1,1,1) . If the co-ordinates of A and B are (3, -5,7} and (-1,7,6) respectively find the coordinates of the point C .

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21. Evaluate  $\lim_{x \rightarrow 0} \left( \sin a \frac{x}{\sin b} \right)$ .

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22. Write the converse and contrapositive of the statement "If x is prime then x is odd".

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23. The coefficient of variation for a distribution is 60 and standard deviation is 21. Find the arithmetic mean.

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24. A and B are two events such that  $P(A) = 0.54, P(B) = 0.69$  and  $P(A \cap B) = 0.35$ . Find

(a)  $P(A \cup B)$  (ii)  $P(A' \cap B')$  (iii)  $P(A \cap B')$  (iv)  $P(B \cap A')$

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25. In a class of 35 students, 24 like to play cricket and 16 like to play football. Also, each student likes to play at least one of the two games. How many students like to play both cricket and football ?

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26. Let  $f(x) = x^2$  and  $g(x) = 2x + 1$  be two real functions. Find  $(f + g)(x)$ ,  $(f - g)(x)$ ,  $(fg)(x)$ ,  $\left(\frac{f}{g}\right)(x)$ .

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27. Let  $f(x) = x^2$  and  $g(x) = 2x + 1$  be two real functions. Find  $(f + g)(x)$ ,  $(f - g)(x)$ ,  $(fg)(x)$ ,  $\left(\frac{f}{g}\right)(x)$ .

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28. Let  $f(x) = x^2$  and  $g(x) = 2x + 1$  be two real functions. Find  $(f + g)(x)$ ,  $(f - g)(x)$ ,  $(fg)(x)$ ,  $\left(\frac{f}{g}\right)(x)$ .

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29. Find the general solution of the equation  $\cos 2x + 3 \sin x = 0$

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30. Solve  $\sqrt{2}x^2 + x + \sqrt{2} = 0$

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31. If  $\left(\frac{1+i}{1-i}\right)^m = 1$ , then find the least positive integral value of  $m$ .

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32. Find  $r$ , if  $5 \times {}^4P_r = 6 \times {}^5P_{r-1}$ .

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

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34. In an A.P if  $m^{th}$  term is n and  $n^{th}$  term is m, where  $m \neq n$ , find the  $p^{th}$  term .

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35. Insert five numbers between 8 and 26 such that the resulting sequence is in AP.

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36. Find the coordinates of the vertices, length of the latus rectum and eccentricity of the ellipse

$$\frac{x^2}{49} + \frac{y^2}{36} = 1$$

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37. Compute the derivative of  $\sin x$  using first principal method ?

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**38.** Verify by the method of contradiction  $P: \sqrt{5}$  is irrational.



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**39.** A die is thrown. Find the probability that

- (i) A prime number will appear.
- (ii) A number greater than or equal to 3 will appear.
- (iii) A number more than 6 will appear.



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**40.** A die is thrown. Write the sample space. Also find the probability of the event "A number greater than or equal to 3 will appear".



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**41.** A die is thrown. Find the probability that

- (i) A prime number will appear.
- (ii) A number greater than or equal to 3 will appear.
- (iii) A number more than 6 will appear.

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**42.** Out of 100 students, two sections of 40 and 60 are formed. If you and your friend are among the 100 students, what is the probability that

- (a) you both enter the same section ?
- (b) you both enter the different section?

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**43.** Draw the graph of the signum function write its domain and range.

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44. Prove that :  $\frac{\sin 5x - 2 \sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$

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45.

$$1.2 + 2.3 + 3.4 + \dots + n(n+1) = \frac{n}{3}(n+1)(n+2) \forall n \in N.$$

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46. Solve the following system of inequalities graphically

$$2x + y > + 4, x + y \leq 3, 2x - 3y \leq 6,$$

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

(1) Four cards are of same suit

(2) Four cards belong to four different suits.

(3) Four face cards

(4) Two cards are red cards and two are black cards.



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

(1) Four cards are of same suit

(2) Four cards belong to four different suits.

(3) Four face cards

(4) Two cards are red cards and two are black cards.



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

(1) Four cards are of same suit

(2) Four cards belong to four different suits.

(3) Four face cards

(4) Two cards are red cards and two are black cards.

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

Two cards are red cards and two are black cards.

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51. Prove that the Binomial theorem

$(a + b)^n = {}^n C_0 a^n + {}^n C_1 a^{n-1} b + {}^n C_2 a^{n-2} b^2 + \dots + {}^n C_n b^n$  for any

positive integer 'n'.

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52. Derive the formula to find the angle between two lines with slopes  $m_1$  and  $m_2$

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53. Derive the formula to find the co-ordinates of a point which divide the line joining the points  $A(x_1, y_1, z_1)$  and  $B(x_2, y_2, z_2)$  internally in the ratio  $m : n$ .

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54. Prove that  $\lim_{x \rightarrow 0} \left( \frac{\sin x}{x} = 1 \right)$  ?

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55. (a) Derive geometrically that  $\cos(x + y) = \cos x \cos y - \sin x \sin y$ . Hence deduce the value of  $\cos 75^\circ$



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56. Find the sum to  $n$  terms of the series

$$\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots\dots\dots$$

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57. Find the equation of hyperbola in the form  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ , given that length of transverse axis = 10 and eccentricity = 2.

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58. (b) Find the derivative of  $\frac{x^5 - \cos x}{\sin x}$  with respect to  $x$ .

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