

# MAHARAJA RANJIT SINGH ARMED FORCES PREPARATORY INSTITUTE

Entrance Test

## Sample Question Paper-Mathematics

Date:-30 Jan, 2011

Time-1 PM to 2.30 PM (90 minutes)

-----  
Max Marks : 75  
-----

### General Instructions :-

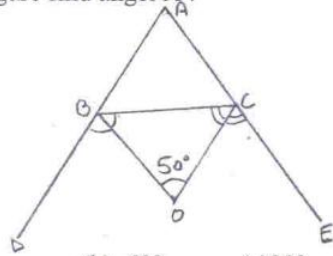
- I. All questions are compulsory and carry equal marks.
  - II. **There will be negative marking for incorrect answer.** One fourth marks will be deducted from the total marks scored.
  - III. There is only one correct answer. Hence mark one choice only.
  - IV. Use of calculator is not permitted.
  - V. Total number of questions is 75.
  - VI. Answers are to be marked on O.M.R Sheets only.
  - VII. Please remember this is a competitive Exam, so do not cheat or permit anybody to do so.
- 

1. Which of the following number is prime?  
(a) 87      (b) 2      (c) 91      (d) 57
2. If we write 0.9 as a rational number, we get :  
(a)  $\frac{9}{10}$  (b) 1      (c)  $\frac{1}{2}$       (d)  $\frac{1}{10}$
3. If one zero of  $3x^2 - 8x + 2K + 1$  is seven times the other, find K :-  
(a)  $\frac{2}{3}$       (b)  $\frac{1}{3}$  (c)  $\frac{4}{3}$       (d)  $\frac{5}{3}$
4. The radius of the cylinder whose lateral surface area is  $704 \text{ cm}^2$  and height 8 cm, is :-  
(a) 6 cm      (b) 4 cm      (c) 8 cm      (d) 14 cm
5. Find the ratio in which the line segment joining the points (-3, 10) and (6, -8) is divided by (-1, 6) :  
(a) 3 : 7      (b) 2 : 7      (c) 1 : 1      (d) 5 : 7
6. In a square side is 10 cm, the length of diagonal will be  
(a)  $\sqrt{100}$       (b)  $10\sqrt{2}$       (c) 10 cm      (d)  $2\sqrt{10}$
7. If one root of the quadratic equation  $2x^2 + px - 6 = 0$  is 2, find the other root :-  
(a)  $-\frac{3}{2}$  (b) -1      (c)  $\frac{2}{3}$       (d) 1
8. Find the value of x, if the distance between the points (4,1) and (3, x) is  $\sqrt{10}$  :-  
(a)  $x = 4$       (b)  $x = -2$       (c)  $x = 4, -2$       (d)  $x = 2$
9. Find the value of x if  $3x \operatorname{cosec} 36^\circ = \operatorname{Sec} 54^\circ$  :-  
(a) 1      (b) 3      (c)  $\frac{1}{3}$       (d) 2
10. If  $\tan A = \sqrt{2} - 1$  find  $\sin A \times \cos A$  :-  
(a)  $\sqrt{2}$       (b)  $\frac{\sqrt{2}}{4}$       (c)  $4\sqrt{2}$       (d)  $\sqrt{5}$

11. Area of a regular hexagon of side 8 cm is :  
 (a)  $96\sqrt{3}$  (b)  $16\sqrt{3}$  (c) 48 (d) 96
12. A cylinder, a cone, a hemisphere are of equal bases and have same height. What is ratios of their volumes :-  
 (a) 3:1:2 (b) 1:2:4 (c) 1:1:1 (d) 1:4:3
13. A student is asked to take out a number from 1 to 100, find the probability that even prime number :-  
 (a) 0 (b)  $\frac{1}{2}$  (c)  $\frac{17}{100}$  (d)  $\frac{1}{100}$

14.  $\frac{\sqrt{1+\sin A}}{\sqrt{1-\sin A}} =$   
 (a)  $\sec A + \tan A$  (b)  $\cot A + \sec A$  (c)  $\tan A + \sin A$  (d)  $\sin A + \cos A$

15. In the given figure find angel A :



- (a)  $50^\circ$  (b)  $60^\circ$  (c)  $90^\circ$  (d)  $80^\circ$
16.  $\frac{1}{\sqrt{8-3\sqrt{2}}}$  is equal to  
 (a)  $\sqrt{2}$  (b)  $-\sqrt{2}$  (c)  $1\sqrt{2}$  (d)  $-1\sqrt{2}$
17. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of  $80^\circ$ , then  $\angle PDA$  is equal to :  
 (a)  $50^\circ$  (b)  $60^\circ$  (c)  $70^\circ$  (d)  $80^\circ$
18. A father is three times as old as his son, after twelve years, his age will be twice that of his son. Find their present ages :  
 (a) 10, 30 (b) 12, 36 (c) 6, 36 (d) 124, 24
19. If  $9x^2 = 121$ ,  $7x^2 = 81$  What is value of  $6x^4$  ?  
 (a) 50 (b) 100 (c) 200 (d) 500
20. If  $P(E) = 0.05$  what is the probability of "not E" :  
 (a) 0 (b) 0.9 (c) 0.95 (d) 1

21. If  $27^x = \frac{9}{3^x}$ , Then find x  
 (a)  $\frac{1}{2}$  (b) 2 (c)  $\frac{2}{3}$  (d) 3
22. Find the number of terms of the given Arithmetic progress 3,6,9,.....111 :  
 (a) 36 (b) 37 (c) 42 (d) 41
23. A metallic sphere of radius 4.2 cm is melted and recast into the shape of a cylinder of radius 6 cm. Find the height of the cylinder :  
 (a) 5.74 (b) 1.74 (c) 3.74 (d) 2.74
24. Find the ratio in which X- axis divides the line segment joining the points (1, 4) and (3, - 8) :  
 (a) 1 :2 internally (b) 1: 2 externally (c) 1 :3 Externally (d) 1 :3 internally
25. If  $\cos 2Q = \sin(3Q - 5)$ , where  $3Q$  is an Acute angle, find Q :  
 (a) 18 (b) 25 (c) 19 (d) 45
26. If  $X = \sqrt{6} + \sqrt{6} + \sqrt{6} + \dots$   
 And X is natural no, then X equals :  
 (a) - 2 (b) 3, - 2 (c) 3.5 (d) 3
27.  $\tan 10^\circ \tan 75^\circ \tan 15^\circ \tan 80^\circ =$   
 (a) 0 (b) 3 (c) 1 (d) 2
28. If  $8 \tan x = 15$ , then value of  $\sin x - \cos x$  is :  
 (a)  $\frac{8}{15}$  (b)  $\frac{7}{17}$  (c)  $\frac{17}{8}$  (d)  $\frac{17}{7}$
29. The least number, which when divided by 10, 14 and 18, leaves remainder 4, is :  
 (a) 630 (b) 634 (c) 252 (d) 496
30. Find a and b so that polynomial  $6x^4 + 8x^3 - 5x^2 + ax + b$  is exactly divisible by  $2x^2 - 5$   
 (a)  $a = 20, b = -25$  (b)  $a = 4, b = -5$  (c)  $a = 20, b = 5$  (d)  $a = -20, b = -25$
31. The line  $3x + 2y - 12 = 0$  meets x - axis at :  
 (a) (0, 1) (b) 4, 0 (c) 2, 3 (d) 0, 6
32. If the hypotenuse and one side of a right angled triangle is  $(a + 1)$ cm and  $2a$  cm. Find third side :  
 (a) a (b)  $2a$  (c)  $(a - 1)$  (d)  $2a + 1$

33.  $(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta) =$   
 (a) 0 (b) 1 (c) 2 (d) - 1
34. Mention the quadrant in which (1, - 1) lie :  
 (a) II (b) III (c) IV (d) I
35. In a rectangle if length is 14 cm breadth is 10 cm, the length of diagonal will be :  
 (a)  $2\sqrt{74}$  (b)  $\sqrt{74}$  (c)  $\sqrt{24}$  (d) None of the three
36. Calculate area of trapezium whose parallel sides are 8 cm and 16 cm and altitude is 15 cm :  
 (a) 180 m (b) 80 m (c) 100 m (d) 300 m
37. For what value of p, the point (p, 4) lies on the line  $3x + y = 10$  :  
 (a) 4 (b) 2 (c) 6 (d) None of these
38. Find the measure of opposite angles of a cyclic quadrilateral if one of them is  $11/4$  of the other :  
 (a)  $48^\circ, 132^\circ$  (b)  $29^\circ, 132^\circ$  (c)  $48^\circ, 264^\circ$  (d) None of these
39. 2 cubes each of volume 64 cm<sup>3</sup> are joined end to end. Find the surface area of resulting cube:  
 (a) 160 (b) 240 (c) 300 (d) 150
40. If we rationalize  $\frac{1}{7 + 3\sqrt{2}}$ , the denominator is :  
 (a) 30 (b) 31 (c) 32 (d) 33
41. If  $x^{51} + 51$  is divided by  $x+1$ , then remainder is :  
 (a) 0 (b) 1 (c) 49 (d) 50
42. In second quadrant x is :  
 (a) 0 (b) - ve (c) + ve (d) None of these
43. Which of following is not a criterion of congruent triangle :  
 (a) SAS (b) SSS (c) SSA (d) ASA
44. The base of right triangle is 8 cm and its hypotenuse is 10 cm. The area will be :  
 (a) 24 cm<sup>2</sup> (b) 40 m<sup>2</sup> (c) 48 cm<sup>2</sup> (d) 80 cm<sup>2</sup>
45. If  $\frac{\sin \theta}{\cos \theta} = 1$  then value of  $\sin^4 \theta + \cos^4 \theta$  is :  
 (a) 1 (b)  $3/4$  (c)  $1/2$  (d)  $1/4$

46. The value of  $\frac{2 \sin 43^\circ}{\cos 47^\circ} - \frac{\cot 30^\circ}{\tan 60^\circ} - \sqrt{2} \sec 45^\circ$
- (a) 0            (b) 2            (c) 4            (d) 7
47. How many prime numbers are there between 1 and 100 :
- (a) 30            (b) 25            (c) 24            (d) 27
48. The value of  $\sin(50^\circ + \theta) - \cos(40^\circ - \theta)$  is :
- (a) 2            (b) 1            (c) -1            (d) 0
49. For what value of a the pair of equations  $7x + 2y - 4 = 0$  and  $ax - y - 3 = 0$  has a unique solution :
- (a)  $a \neq 7/2$             (b)  $a \neq 3/2$             (c)  $a \neq 3$             (d)  $a \neq 2$
50. The largest number which divides 70 and 125, leaving remainder 5 and 8, respectively :
- (a) 13            (b) 65            (c) 875            (d) 1750
51. If the equation given by  $3x + 2ky = 2$  and  $2x + 5y = 1$  are parallel then  $K =$
- (a)  $-5/4$             (b)  $2/5$             (c)  $15/4$             (d)  $3/2$
52. Find the value of K if the points A( 2,3 ), B(4, K) and C(6, -3) are co-collinear :
- (a)  $K = 0$             (b)  $K = 3$             (c)  $K = 1$             (d)  $K = -1$
53. The median can graphically be found from :
- (a) Ogive            (b) Histogram            (c) Frequency polygon            (d) Pie - chart
54. The equations  $3x - 3y = 7$  and  $kx + 3y - 5 = 0$  has no solution, then the value of K is :
- (a) 2.25            (b) - 2.25            (c) 22.5            (d) - 22.5
55. Value of  $\sqrt{0.0289} =$
- (a) 1.6            (b) 0.17            (c) 17            (d) 1.7
56. If  $x = 9 - 4\sqrt{5}$ , then find the value of  $x^3 + 1/x^3$ :
- (a) 5778            (b) 7857            (c) 7000            (d) 8577
57. For what value of K the equation  $Kx(x-2) + 6 = 0$  has equal root:
- (a)  $K = 5$             (b)  $K = 1$             (c)  $K = 2$             (d)  $K = 6$
58. Sum of interior angle of a regular hexagon is :

- (a) 360      (b) 540      (c) 720      (d) 900

59. Solve  $2x + 3y = 11$  and  $2x - 4y = -24$  and hence find value of 'm' for which  $y = mx + 3$

- (a)  $m = -1$       (b)  $m = 1$       (c)  $m = 2$       (d)  $m = -2$

60. If the line given by  $3x + 2ky = 2$  and  $2x + 5y = 1$  are parallel then  $K =$

- (a.)  $^{-5}/4$       (b.)  $^2/5$       (c.)  $^{15}/4$       (d.)  $^3/2$

61. In a triangle  $ABC \angle A = 90^\circ$ ,  $AB = 5\text{cm}$   $AC = 12\text{cm}$ . If  $AD \perp BC$ ,  $AD$  is equal to

- (a)  $^{13}/2$  cm      (b.)  $^{60}/13$  cm      (c.)  $^{13}/60$  cm      (d.)  $^{2\sqrt{15}}/13$  cm

62. Surface area a sphere is :

- (a.)  $2\pi r^2$       (b.)  $4\pi r^2$       (c.)  $\pi r^2$       (d.)  $3\pi r^2$

63.  $(3 + \sqrt{5})(3 - \sqrt{5})$  is :

- (a.) Natural no.      (b.) a rational no.      (c.) a whole no.      (d.) an irrational no.

64. Two concentric circle of radii are 5 cm and 3cm. Find the length of the chord of the larger circle which touched the smaller circle:

- (a.) 10cm      (b.) 8cm      (c.) 5cm      (d.) 7cm

65. If the line given by  $3x + 2ky = 2$  and  $2x + 5y = 1$  are parallel then :

- (a.)  $^{-5}/4$       (b.)  $^2/5$       (c.)  $^{15}/4$       (d.)  $^3/2$

66. The length of each side of an equilateral triangle whose area is  $9\sqrt{3} \text{ cm}^2$

- (a.) 8cm      (b.) 36cm      (c.) 4cm      (d.) 6cm

67. Value of  $(16)^{3/4} \times 125^{-7/3} =$

- (a.)  $^5/8$       (b.)  $^8/5$       (c.)  $^3/5$       (d.)  $^{11}/5$

68. Find area of triangle whose vertices are  $(-5, -1)$ ,  $(3, -5)$ ,  $(5, 2)$  :

- (a) 32      (b) 35      (c) 28      (d) 42

69. In  $\triangle ABC$ ,  $AB = 6\sqrt{3}$ cm,  $AC = 12$ cm,  $BC = 6$ cm, The angle B is :

- (a.)  $120^\circ$     (b.)  $60^\circ$     (c.)  $90^\circ$     (d.)  $45^\circ$

70. A student is asked to take out a number from 1 to 100, find the probability that even prime number :

- (a.) 0    (b.)  $\frac{1}{2}$     (c.)  $\frac{17}{100}$     (d.)  $\frac{1}{100}$

71.  $\frac{1 + \tan^2 A}{1 + \cot^2 A} =$

- (a)  $\sec^2 A$     (b) -1    (c)  $\cot^2 A$     (d)  $\tan^2 A$

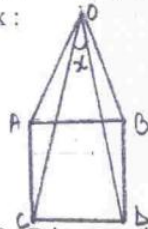
72.  $11^{\text{th}}$  term of the A.P -3,  $-\frac{1}{2}$ , 2--- is :

- (a) 28    (b) 22    (c) -38    (d) 30

73. If  $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$  then value of x equals to :

- (a) 1, 2    (b) 3, 4    (c) 4, 5    (d) 5, 6

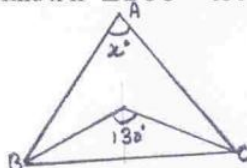
74. In the given figure find x :



Given ABCD is square and OAB is an equilateral triangle.

- (a.)  $60^\circ$     (b.)  $30^\circ$     (c.)  $15^\circ$     (d.)  $90^\circ$

75. In the given figure find x if  $\angle BOC = 130^\circ$



(Given BO and CO bisector of  $\angle B$  and  $\angle C$ )

- (a)  $100^\circ$     (b)  $80^\circ$     (c)  $65^\circ$     (d)  $120^\circ$