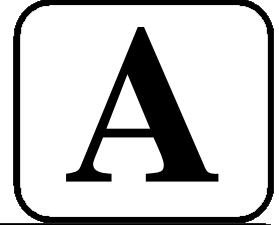


DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

PATHFINDERS' ACADEMY PUNE

By Dr. Prashant Jagtap Sir Asst. Comdt. CISF



Time Allowed:

Maximum Marks:

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET **DOES NOT** HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. **Please not that it is the candidate's responsibility to encode and fill in the Roll number and Test Booklet Series A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.**
3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write *anything else* on the Test Booklet.
4. This Test Booklet contains **100** items (questions). Each item is printed in **English**. Each item comprises four responses (answer). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
5. You have to mark all your responses **ONLY** on the separate Answer Sheet provided. See direction in the Answer Sheet.
6. **All** items carry equal marks.
7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator **only the Answer Sheet**. You are permitted to take away with you the Test Booklet.
9. Sheets for rough work are appended in the Test Booklet at the end.
10. **Penalty for wrong answer:**
THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.
 - (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to that question.
 - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.
 - (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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Directions for the following two (2) items:

The median of the following distribution is 14.4 and the total frequency is 20:

Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	4	x	5	y	1

1. What is x equal to?

- a) 4
- b) 5
- c) 6
- d) 7

2. What is the relation between x and y ?

- a) $2x = 3y$
- b) $3x = 2y$
- c) $x = y$
- d) $2x = y$

Directions for the following four (4) items:

Read the following information and answer the four items that follow:

A survey of film watching habits of people living in five cities P, Q, R, S and T is summarized below in a table. The column I in the table gives percentage of film-watchers in each city who see only one film a week. The column II gives the total number of film-watchers who see two or more films per week.

City	I	II
P	60	24000
Q	20	30000
R	85	24000
S	55	27000
T	75	80000

3. How many film-watchers in city R see only one film in a week?

- a) 24850
- b) 36000
- c) 136000
- d) 160000

4. Which city has the highest number of film-watchers who see only one film in a week?

- a) P
- b) R
- c) S
- d) T

5. A city with the lowest number of film-watchers is:

- a) P
- b) Q
- c) R
- d) S

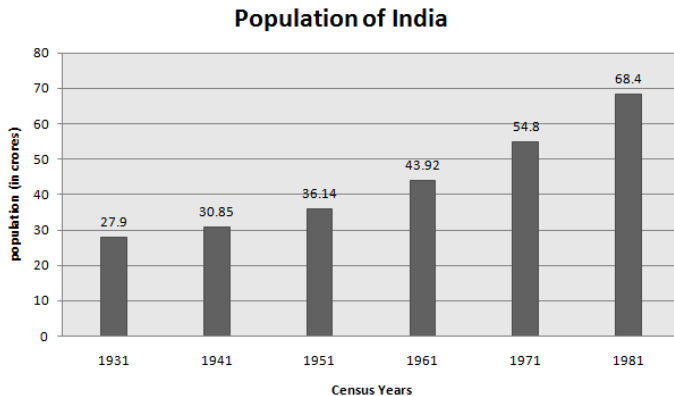
6. The total number of all film-watchers in the five cities who see only one film in a week is:

- a) 113000
- b) 425200
- c) 452500
- d) 500000

Directions for the following four (4) items:

Read the following information and answer the four items that follow:

The Bar Graph given here shows the population (in crores) of India in various census years. Observe the graph and answer the question based on it



7. The per cent increase in population from 1971 to 1981 is:

- a) 24.8
- b) 20
- c) 16.7
- d) 22.9

8. In which census year, the per cent increase in population is highest as compared to that in the previous census year?

- a) 1951
- b) 1961
- c) 1971
- d) 1981

9. In which census year, the per cent increase in population is least as compared to that in the previous census year?

- a) 1961
- b) 1951

c) 1971

d) 1941

10. Per year increase in population from the year 1931 to 1981 is:

- a) 8100000
- b) 7600000
- c) 8900000
- d) 6700000

11. For integers a, b and c, if $HCF(a, b) = 1$ and $HCF(a, c) = 1$, then which one of the following is correct?

- a) $HCF(a, bc) = 1$
- b) $HCF(a, bc) = a$
- c) $HCF(a, bc) = b$
- d) None of the above.

12. If k is a positive integer, then every square integer is of the form

- a) $4k$ only
- b) $4k$ or $4k + 3$
- c) $4k + 1$ or $4k + 3$
- d) $4k$ or $4k + 1$

13. The pair of rational numbers that lies between $\frac{1}{4}$ and $\frac{3}{4}$ is

- a) $\frac{262}{1000}, \frac{752}{1000}$
- b) $\frac{24}{100}, \frac{74}{100}$
- c) $\frac{9}{40}, \frac{31}{40}$
- d) $\frac{252}{1000}, \frac{748}{1000}$

14. If m and n are natural numbers, then $\sqrt[m]{n}$ is

- a) always irrational
- b) irrational unless n is the m^{th} power of an integer
- c) irrational unless m is the n^{th} power of an integer
- d) irrational unless m and n are co-prime

15. The difference between Simple Interest and Compound Interest for 1st two years is Rs. 42 and the total Simple Interest earned in this period is Rs. 1680. What is the rate of Interest?

- a) 4 %
- b) 5 %
- c) 6 %
- d) 7 %

16. The quantity which must be added to

$(1 - x)(1 + x^2)$ to obtain x^3 is

- a) $2x^3 + 3x^2 + x + 1$
- b) $2x^3 + x^2 + x - 1$
- c) $2x^3 - x^2 + x - 1$
- d) $-x^2 + x - 1$

17. A train running at the speed of 72 km/h goes past a pole in 15 seconds. What is the length of the train?

- a) 150m
- b) 200m
- c) 300m
- d) 350m

18. If m is the mean of p, q, r, s, t, u, v then what is $(p - m) + (q - m) + (r - m) + (s - m) + (t - m) + (u - m) + (v - m)$ equal to?

- a) 0
- b) s
- c) $(p + v)/2$
- d) None of the above.

19. What is $26^2 + 97^2$ equal to

- a) $27^2 + 93^2$
- b) $34^2 + 93^2$
- c) $82^2 + 41^2$
- d) $79^2 + 62^2$

20. Which is the smallest number among the following?

- a) $[(5^{-2})^{-2}]^{-2}$
- b) $[(5^{-2})^2]^{-2}$
- c) $[(2^{-5})^{-2}]^{-2}$
- d) $[(2^{-5})^2]^{-2}$

21. $x(y^2 - z^2) + y(z^2 - x^2) + z(x^2 - y^2)$ is divisible by

- a) $(y - z)$ only
- b) $(z - x)$ only
- c) both $(y - z)$ and $(z - x)$
- d) neither $(y - z)$ nor $(z - x)$

22. A person's salary has increased from 7,200 to 8,100. What is the percentage increase in his salary?

- a) 25%
- b) 18%
- c) $16\frac{2}{3}\%$
- d) $12\frac{1}{2}\%$

23. X can do a work in 16 days. In how many days will the work be completed by Y if the efficiency of Y is 60% more than that of X?

- a) 10 days
- b) 12 days
- c) 25 days
- d) 30 days

24. If $\frac{x}{2} + \frac{y}{4} = 4$ and $\frac{2}{x} + \frac{3}{y} = 4$ then what is $x + y$ equal to?

- a) 11
- b) 10
- c) 9
- d) 8

25. For what values of k will

$$4x^5 + 9x^4 - 7x^3 - 5x^2 - 4kx + 3k^2$$

contain $x - 1$ as a factor?

- a) 3, -1/2

- b) 3, -1
- c) 0, 1/3
- d) 1, 1/3

26. If $(49)^2 - (25)^2 = 37x$, then what is x equal to?

- a) 64
- b) 74
- c) 48
- d) 42

27. $19^5 + 21^5$ is divisible by

- a) 10 only
- b) 20 only
- c) both 10 and 20
- d) neither 10 nor 20

28. If $x^2 = 6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \infty}}}$, then what is one of the values of x equal to?

- a) 6
- b) 5
- c) 4
- d) 3

29. The HCF of two numbers is 98 and their LCM is 2352. The sum of the numbers may be

- a) 1372
- b) 1398

c) 1426

d) 1484

30. Consider the following statements:

1. To obtain prime numbers less than 121, we are to reject all the multiples of 2, 3, 5 and 7.

2. Every composite number less than 121 is divisible by a prime number less than 11.

Which of the above statements is/are correct?

a) 1 only

b) 2 only

c) Both 1 and 2

d) Neither 1 and 2

31. Which one is one of the factors of

$$x^2 + \frac{1}{x^2} + 8\left(x + \frac{1}{x}\right) + 14 ?$$

a) $x + \frac{1}{x} + 1$

b) $x + \frac{1}{x} + 3$

c) $x + \frac{1}{x} + 6$

d) $x + \frac{1}{x} + 7$

32. What is the HCF of

$$a^2b^4 + 2a^2b^2 \text{ and } (ab)^7 - 4a^2b^9 ?$$

a) ab

b) a^2b^3

c) a^2b^2

d) a^3b^2

33. What is the LCM of $x^2 + 2x - 8$,

$$x^3 - 4x^2 + 4x \text{ and } x^2 + 4x ?$$

a) $x(x + 4)(x - 2)^2$

b) $x(x + 4)(x - 2)$

c) $x(x + 4)(x + 2)^2$

d) $x(x + 4)2(x - 2)$

34. A can do a piece of work in 4 days and B can complete the same work in 12 days. What is the number of days required to do the same work together?

a) 2

b) 3

c) 4

d) 5

35. Consider the following statements:

1. $x + 3$ is the factor of $x^3 + 2x^2 + 3x + 8$.

2. $x - 2$ is the factor of $x^3 + 2x^2 + 3x + 8$.

Which of the statements given above is/are correct?

a) 1 only

b) 2 only

c) Both 1 and 2

d) Neither 1 nor 2

36. A person sold an article for 3,600 and got a profit of 20%. Had he sold the article for 3,150 how much profit would he have got?

- a) 4%
- b) 5%
- c) 6%
- d) 10%

37. If $x + y - 7 = 0$ and $3x + y - 13 = 0$, then what is $4x^2 + y^2 + 4xy$ equal to?

- a) 75
- b) 85
- c) 91
- d) 100

38. What is $\frac{(x^2+y^2)(x-y)-(x-y)^3}{x^2y-xy^2}$ equal to?

- a) 1
- b) 2
- c) 4
- d) -2

39. If the expression $x^3 + 3x^2 + 4x + k$ has a factor $x + 5$, then what is the value of k ?

- a) -70
- b) 70
- c) 48
- d) -48

40. In a class of 110 students, x students take both Mathematics and Statistics, $2x + 20$ students take Mathematics and $2x + 30$ students take Statistics. There are no students who take neither Mathematics nor Statistics. What is x equal to?

- a) 15
- b) 20
- c) 25
- d) 30

41. Two lots of onions with equal quantity, one costing 10 per kg and the other costing 15 per kg, are mixed together and whole lot is sold at 15 per kg. What is the profit or loss?

- a) 10% loss
- b) 10% profit
- c) 20% profit
- d) 20% loss

42. If b is the largest square divisor of c and a^2 divides c , then which one of the following is correct? (a, b, c is integers)

- a) b divides a
- b) a does not divide b
- c) a divides b
- d) a and b are co-prime

43. Every prime number of the form $3k + 1$ can be represented in the form $6m + 1$ (k, m is integers) when

- a) k is odd
- b) k is even
- c) k can be both odd and even
- d) No such form is possible

44. How many 200 mm lengths can be cut from 10m of ribbon?

- a) 50
- b) 40
- c) 30
- d) 20

45. 2 men and 1 woman can complete a piece of work in 14 days, while 4 women and 2 men can do the same work in 8 days. If a man gets 90 per day, what should be the wages per day of a woman?

- a) 48
- b) 60
- c) 72
- d) 135

46. What is the last digit in $7^{402} + 3^{402}$?

- a) 0
- b) 4
- c) 8
- d) None of the above

47. 18 men earn 360 in 5 days. How much money will 15 men earn in 9 days?

- a) 600
- b) 540
- c) 480
- d) 360

48. A bus starts with some passengers. At the first stop, one-fifth of the passengers gets down and 40 passengers get in. At the second stop, half of the passengers gets down and 30 get in. The number of passengers now is 70. The number of passengers with which the bus started was

- a) 40
- b) 50
- c) 60
- d) 70

49. If x is positive even integer and y is negative odd integer, then x^y is

- a) odd integer
- b) even integer
- c) rational number
- d) None of the above

50. Two cars A and B start simultaneously from a certain place at the speed of 30 km/hr and 45 km/hr respectively. The car B reaches the destination 2 hours earlier than A. What is the distance between the starting point and destination?

- a) 90 km
- b) 180 km
- c) 270 km
- d) 360 km

51. 4 goats or 6 sheep can graze a field in 50 days. 2 goats and 9 sheep can graze the field in

- a) 100 days
- b) 75 days
- c) 50 days
- d) 25 days

52. A man cycles with a speed of 10 kmph and reaches his office at 1 p.m. However, when he cycles with a speed of 15 kmph, he reaches his office at 11 a.m. At what speed should he cycle so that he reaches his office at 12 noon?

- a) 12.5 kmph
- b) 12 kmph
- c) 13 kmph
- d) 13.5 kmph

53. 20 workers working for 5 hours a day complete a work in 10 days. If 25 workers are employed to work 10 hours a day, what is the time required to complete the work?

- a) 4 days
- b) 5 days
- c) 6 days
- d) 8 days

54. Consider the following statements in respect of the quadratic equation $ax^2 + bx + b = 0$, where $a \neq 0$:

1. The product of the roots is equal to the sum of the roots.

2. The roots of the equation are always unequal and real.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

55. If α and β are the roots of the equation $x^2 - x - 1 = 0$, then what is

$\frac{\alpha^2 + \beta^2}{(\alpha^2 - \beta^2)(\alpha - \beta)}$ equal to?

- a) $\frac{2}{5}$
- b) $\frac{3}{5}$
- c) $\frac{4}{5}$
- d) None of the above.

56. The perimeter of a rectangle having area equal to 144 cm^2 and sides in the ratio 4: 9 is

- a) 52 cm
- b) 56 cm
- c) 60 cm
- d) 64 cm

57. Let A be a pyramid on a square base and B be a cube. Let a, b, c denotes the number of edges, number of faces and number of corners respectively. Then the result $a = b + c$ is true for

- a) A only
- b) B only
- c) both A and B
- d) Neither A and B

58. What is the area between a square of side 10 cm and two inverted semicircular cross sections each of radius 5 cm inscribed in the square?

- a) 17.5 cm^2
- b) 18.5 cm^2
- c) 20.5 cm^2
- d) 21.5 cm^2

59. One side of a parallelogram is 8.06 cm and its perpendicular distance from opposite side is 2.08 cm. What is the approximate area of the parallelogram?

- a) 12.56 cm^2
- b) 14.56 cm^2
- c) 16.76 cm^2
- d) 22.56 cm^2

60. What is the volume of a cone having a base of radius 10 cm and height 21 cm?

- a) 2200 cm^3
- b) 3000 cm^3
- c) 5600 cm^3
- d) 6600 cm^3

61. What is the area of a circle whose area is equal to that of a triangle with sides 7 cm, 24 cm and 25 cm?

- a) 80 cm^2
- b) 84 cm^2
- c) 88 cm^2
- d) 90 cm^2

62. If the area of an equilateral triangle is x and its perimeter is y , then which one of the following is correct?

- a) $y^4 = 432x^2$
- b) $y^4 = 216x^2$
- c) $y^2 = 432x^2$
- d) None of these

63. A rectangular field is 22 m long and 10m wide. Two hemispherical pit holes of radius 2 m are dug from two places and the mud is spread over the remaining part of the field. The rise in the level of the field is

- a) $8/93$ m
- b) $13/93$ m
- c) $16/93$ m
- d) $23/93$ m

64. The diameter of a circle with center at C is 50 cm. CP is a radial segment of the circle. AB is a chord perpendicular to CP and passes through P. CP produced intersects the circle at D. If $DP = 18$ cm, then what is the length of AB?

- a) 24 cm
- b) 32 cm
- c) 40 cm
- d) 48 cm

65. A regular hexagon is inscribed in a circle of radius 5 cm. If x is the area inside the circle but outside the regular hexagon, then which one of the following is correct?

- a) $13 \text{ cm}^2 < x < 15 \text{ cm}^2$
- b) $15 \text{ cm}^2 < x < 17 \text{ cm}^2$
- c) $17 \text{ cm}^2 < x < 19 \text{ cm}^2$
- d) $19 \text{ cm}^2 < x < 21 \text{ cm}^2$

66. If x is the curved surface area and y is the volume of a right circular cylinder, then which one of the following is correct?

- a) The ratio of height to radius of the cylinder is independent of x only
- b) The ratio of height to radius of the cylinder is independent of y only
- c) Either a) or b)
- d) Neither a) and b)

67. A triangle DEF is formed by joining the midpoints of the sides of triangle ABC. Similarly, a triangle PQR is formed by joining the midpoints of the sides of the triangle DEF. If the sides of the triangle PQR are of lengths 1, 2 and 3 units, what is the perimeter of the triangle ABC?

- a) 18 units
- b) 24 units
- c) 48 units
- d) Cannot be determined due to insufficient data

68. A tent is in the form of a right circular cylinder surmounted by a cone. The diameter of the cylinder is 24 m. The height of the cylindrical portion is 11 m, while the vertex of the cone is 16 m above the ground. What is the area of the curved surface for conical portion?

- a) $3434/9 \text{ m}^2$
- b) $3431/8 \text{ m}^2$
- c) $3432/7 \text{ m}^2$
- d) $3234/7 \text{ m}^2$

69. What is the whole surface area of a cone of base radius 7 cm and height 24 cm?

- a) 654 square cm

- b) 704 square cm
- c) 724 square cm
- d) 964 square cm

70. A conical cap has the base diameter 24 cm and height 16 cm. What is the cost of painting the surface of the cap at the rate of 70 paisa per square cm?

- a) 520
- b) 524
- c) 528
- d) 532

71. The area of an isosceles triangle ABC with $AB = AC$ and altitude $AD = 3$ cm is 12 square cm. What is its perimeter?

- a) 18 cm
- b) 16 cm
- c) 14 cm
- d) 12 cm

72. If the total surface area of a cube is 6 square unit, then what is the volume of the cube?

- a) 1 cubic unit
- b) 2 cubic unit
- c) 4 cubic unit
- d) 6 cubic unit

73. The diameter of the moon is approximately one-fourth of the diameter of the earth. What is the ratio (approximate) of their volumes?

- a) 1: 16
- b) 1: 64
- c) 1: 4
- d) 1: 128

74. A hospital room is to accommodate 56 patients. It should be done in such a way that every patient gets 2.2 m^2 of floor and 8.8 m^3 of space. If the length of the room is 14 m, the breadth and the height of the room are respectively

- a) 8.8 m, 4 m
- b) 8.4 m, 4.2 m
- c) 8 m, 4 m
- d) 7.8 m, 4.2 m

75. If the diagonals of a rhombus are 4.8 cm and 1.4 cm, then what is the perimeter of the rhombus?

- a) 5 cm
- b) 10 cm
- c) 12 cm
- d) 20 cm

76. Consider the following statements in respect of two chords XY and ZT of a circle intersecting at P:

1. $PX.PY = PZ.PT$

2. PXZ and PTY are similar triangles.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

77. ABCD is a quadrilateral such that $BC = BA$ and $CD > AD$. Which one of the following is correct?

- a) $\angle BAD = \angle BCD$
- b) $\angle BAD < \angle BCD$

- c) $\angle BAD > \angle BCD$
- d) $\angle 2BAD = \angle BCD$

78. ABC and XYZ are two similar triangles with $\angle C = \angle Z$, whose areas are respectively 32 cm^2 and 60.5 cm^2 . If $XY = 7.7 \text{ cm}$, then what is AB equal to?

- a) 5.6 cm
- b) 5.8 cm
- c) 6.0 cm
- d) 6.2 cm

79. A quadrilateral ABCD is inscribed in a circle. If AB is parallel to CD and $AC = BD$, then the quadrilateral must be a

- a) parallelogram
- b) rhombus
- c) trapezium
- d) None of the above

80. ABC is a triangle right angled at A and a perpendicular AD is drawn on the hypotenuse BC. What is $BC \cdot AD$ equal to?

- a) $AB \cdot AC$
- b) $AB \cdot AD$
- c) $CA \cdot CD$
- d) $AD \cdot DB$

81. In a triangle ABC, $\angle B = 90^\circ$ and $\angle C = 2\angle A$, then what is AB^2 equal to?

- a) $2 BC^2$
- b) $3 BC^2$
- c) $4 BC^2$
- d) $5 BC^2$

82. E is the mid-point of the median AD of a triangle ABC. If BE produced meets the side AC at F, then CF is equal to

- a) $AC/3$
- b) $2AC/3$
- c) $AC/2$
- d) None of the above

83. PQR is an equilateral triangle. O is the point of intersection of altitudes PL, QM and RN. If $OP = 8 \text{ cm}$, then what is the perimeter of the triangle PQR?

- a) $8\sqrt{3} \text{ cm}$
- b) $12\sqrt{3} \text{ cm}$
- c) $16\sqrt{3} \text{ cm}$
- d) $24\sqrt{3} \text{ cm}$

84. ABC is an equilateral triangle inscribed in a circle. D is any point on the arc BC. What is $\angle ABD$ equal to?

- a) 90°
- b) 60°
- c) 45°
- d) None of the above

85. The side AC of a triangle ABC is produced to D such that $BC = CD$. If $\angle ACB$ is 70° , then what is $\angle ABD$ equal to?

- a) 35°
- b) 45°
- c) 70°
- d) 110°

86. Consider the following statements:

1. If G is the centroid of triangle ABC, then $GA = GB = GC$.
2. If H is the orthocenter of triangle ABC, then $HA = HB = HC$.

Which of the statements given above is/are correct?

- a) 1 only
- b) 2 only
- c) Both 1 and 2
- d) Neither 1 nor 2

87. If the bisectors BI and CI of the angles B and C of a triangle ABC meet at the point I, then what is $\angle BIC$ equal to?

- a) $2A$
- b) $90^\circ + \frac{A}{2}$
- c) $90^\circ - \frac{A}{2}$
- d) $90^\circ + A$

88. If $\sin\theta + \cos\theta = \sqrt{3}$, then what is

$\tan\theta + \cot\theta$ equal to?

- a) 1
- b) $\sqrt{2}$
- c) 2
- d) $\sqrt{3}$

89. What is the angle of elevation of the sun when the shadow of a pole of height x m is $\frac{x}{\sqrt{3}}$ m?

- a) 30°
- b) 45°
- c) 60°
- d) 75°

90. What is $\frac{\cos^2(45+\theta) + \cos^2(45-\theta)}{\tan(60+\theta)\tan(30-\theta)}$ equal to?

- a) -1
- b) 0
- c) 1
- d) 2

91. If $\tan\theta + \sec\theta = m$, then what is $\sec\theta$ equal to?

- a) $\frac{m^2-1}{2m}$
- b) $\frac{m^2+1}{2m}$
- c) $\frac{m+1}{2m}$
- d) $\frac{m^2-1}{m}$

92. If $5\sin\theta + 12\cos\theta = 13$, then what is $5\cos\theta - 12\sin\theta$ equal to?

- a) -2
- b) -1
- c) 0
- d) 1

93. If $4\tan\theta = 3$, then what is $\frac{4\sin\theta - \cos\theta}{4\sin\theta + 9\cos\theta}$ equal to?

- a) $1/2$
- b) $1/3$
- c) $1/4$
- d) $1/6$

94. If $\sin\theta - \cos\theta = 0$, then what is

$\sin^4\theta + \cos^4\theta$ equal to?

- a) 1
- b) $3/4$
- c) $1/2$
- d) $1/4$

95. What is $\operatorname{cosec}(75^\circ + \theta) - \sec(15^\circ - \theta)$ equal to?

- a) 0
- b) 1

c) $2\sin\theta$

d) $2\cos\theta$

96. If triangle ABC is right angled at C, then what is $\cos(A + B) + \sin(A + B)$ equal to?

a) 0

b) $1/2$

c) 1

d) 2

97. If α, β, γ are acute angles such that $\sin\alpha = \frac{\sqrt{3}}{2}$, $\cos\beta = \frac{\sqrt{3}}{2}$, $\tan\gamma = 1$, then what is $\alpha + \beta + \gamma$ equal to?

a) 105°

b) 120°

c) 135°

d) 150°

98. What is $\sin^6\theta + \cos^6\theta + 3\sin^2\theta\cos^2\theta$ equal to?

a) 0

b) 1

c) 2

d) 4

99. What is $\frac{(\sin\theta + \cos\theta)(\tan\theta + \cot\theta)}{\sec\theta + \operatorname{cosec}\theta}$ equal to?

a) 1

b) 2

c) $\sin\theta$

d) $\cos\theta$

100. A spherical balloon of radius r subtends angle 60° at the eye of an observer. If the angle of elevation of its center is 60° and h is the height of the center of the balloon, then which one of the following is correct?

a) $h = r$

b) $h = \sqrt{2}r$

c) $h = \sqrt{3}r$

d) $h = 2r$