

1. The number 429714 is divisible by:
 - (a) 3 and 5
 - (b) 6 and 5
 - (c) 4 and 6
 - (d) 3 and 6
2. Which number among 38211, 38121, 32118, and 31128 is divisible by 24?
 - (a) 32118
 - (b) 31128
 - (c) 38121
 - (d) 38211
3. If the nine-digit number $9m2365n48$ is completely divisible by 88, what is the value of $(m^2 \times n^2)$ for the smallest value of n , where m and n are natural numbers?
 - (a) 36
 - (b) 64
 - (c) 32
 - (d) 20
4. If 7-digit number $678p37q$ is divisible by 75 and p is not a composite, then the values of p and q are:
 - (a) $p = 5, q = 5$
 - (b) $p = 3, q = 0$
 - (c) $p = 3, q = 5$
 - (d) $p = 2, q = 5$
5. Find the smallest number that can be subtracted from 148109326 so that it becomes divisible by 8.
 - (a) 4
 - (b) 8
 - (c) 6
 - (d) 10
6. What will be the remainder when $(265)^{4081} + 9$ is divided by 266?
 - (a) 8
 - (b) 6
 - (c) 1
 - (d) 9
7. If each of the two numbers 5^{16} and 5^{25} are divided by 6, the remainders are R_1 and R_2 respectively. What is the value of $\frac{R_1 + R_2}{R_2}$?
 - (a) $\frac{1}{6}$
 - (b) $\frac{5}{6}$
 - (c) $\frac{1}{5}$
 - (d) $\frac{6}{5}$
8. If $A \cdot 0.\overline{312} =$, $B \cdot 0.\overline{415} =$ and $C \cdot 0.\overline{309} =$, then what is the value of $A + B + C$?
 - (a) $1141/1100$
 - (b) $1097/1100$
 - (c) $1211/1100$
 - (d) $1043/1100$
9. Choose the option in which the numbers are in correct ascending order.
 - (a) $\frac{4}{5}, \frac{2}{3}, \frac{1}{11}$ and $\frac{2}{9}$
 - (b) $\frac{1}{11}, \frac{2}{9}, \frac{2}{3}$ and $\frac{4}{5}$
 - (c) $\frac{2}{9}, \frac{1}{11}, \frac{4}{5}$ and $\frac{2}{3}$
 - (d) $\frac{2}{3}, \frac{4}{5}, \frac{1}{11}$ and $\frac{2}{9}$
10. Part One While solving a problem, Suhas by mistake took a number as the dividend which was 10% less than the original dividend. He also mistakenly took a number as the divisor which was 20% less than the original divisor. If the correct quotient of the original question of division was 24 and the remainder was 0, then assuming that there was no error in his calculation, what quotient did Suhas get?
 - (a) 27
 - (b) 21.6
 - (c) 26.4
 - (d) 30
11. LCM of two numbers is 56 times their HCF, while the sum of their HCF and LCM being 1710. If one of the two numbers is 240, then what is the other number?
 - (a) 57
 - (b) 171
 - (c) 1680
 - (d) 210
12. 13, a , b and c are four distinct numbers and the HCF of each pair of numbers $(13, a)$; $(13, b)$; $(13, c)$ is 13, where a, b, c are each less than 60 and $a < b < c$. What is the value of $\frac{a+c}{b}$?
 - (a) 3.5
 - (b) 2
 - (c) 5
 - (d) 4.5
13. Out of the total toffees, $\frac{1}{10}$ are wasted. 35% of the rest are given to S and $\frac{1}{8}$ of the total are given to N. If the toffees with N are 10 more than the wasted toffees, then how many toffees were given to S?
 - (a) 126
 - (b) 150
 - (c) 110
 - (d) 135
14. A fruit seller sells 45% of the oranges that he has along with one more orange to a customer. He then

- sells 20% of the remaining oranges and 2 more oranges to a second customer. He then sells 90% of the now remaining oranges to a third customer and is still left with 5 oranges. How many oranges did the fruit seller have initially?
- (a) 100 (b) 111
(c) 121 (d) 120
15. If a shopkeeper sells sugar at Rs. 44.8 per kg, he is able to make a 12% profit. Due to water seepage, $\frac{1}{5}$ of the sugar is damaged. What should now be the selling price per kg of the rest of the sugar to have a 5% profit?
- (a) Rs. 49.5 (b) Rs. 52.5
(c) Rs. 48.5 (d) Rs. 51.5
16. The cost of 3 kg of rice is Rs. 180. The cost of 8 kg of rice is equal to that of 5 kg of pulse. The cost of 15 kg of pulses is equal to that of 2 kg of tea. The cost 3 kg of tea is equal to that of 6 kg of walnuts. What is the cost (in Rs.) of 10 kg of walnuts?
- (a) 2400 (b) 3200
(c) 2800 (d) 3600
17. During a new-year sale, a shopkeeper offers a discount scheme to his customers, 'Buy 5 Sweaters, Get 2 Sweaters Free'. Find the effective percentage discount given by the shopkeeper.
- (a) $28\frac{4}{7}\%$ (b) $25\frac{2}{7}\%$
(c) $22\frac{4}{7}\%$ (d) $30\frac{3}{7}\%$
18. Ramesh purchased some items from a dealer on 19 November 2019. The bill generated was for Rs. 5,480. He had also purchased some items on 10 November 2019 having the bill value of Rs. 9,800. He cleared both the bills this time and paid the total amount in cash. If the dealer gives a scheme of 2% discount on the payments done within 10 days and 5% for the payments made in cash at the time of purchase, then find the amount paid by Ramesh on 19 November 2019.
- (a) Rs. 14850 (b) Rs. 14810
(c) Rs. 14890 (d) Rs. 14950
19. In how much time will Rs. 5000 at 4% per annum simple interest produce the same interest as Rs. 8000 in $2\frac{1}{2}$ years at 8% per annum simple interest?
- (a) 8 years (b) 5 years
(c) 4 years (d) 2 years
20. What is the ratio of the simple interest earned on a certain amount at the rate of 21% per annum for 8 years to the earned on the same sum at the same rate for 21 years?
- (a) 8 : 21 (b) 21 : 5
(c) 5 : 21 (d) 21 : 8
21. Rajnish borrowed Rs. 1,500 from a bank and repaid the entire amount with interest in two equal annual instalments, the first instalment being paid a year after Rajnish borrowed from the bank. If the rate of interest was 40% per annum, compounded annually, then what was the value (in Rs.) of each installment paid by Rajnish?
- (a) 1125 (b) 1470
(c) 1225 (d) 1350
22. Divide Rs. 66,300 between A and B in such a way that the amount that A receives after 8 years is equal to the amount that B receives after 10 years; with compound interest being compounded annually at a rate of 10% per annum.
- (a) A = Rs. 35,520, B = Rs. 30,810
(b) A = Rs. 35,200, B = Rs. 31,100
(c) A = Rs. 37,300, B = Rs. 29,000
(d) A = Rs. 36,300, B = Rs. 30,000
23. A and B have some toffees. If A gives one toffee to B, then they have equal number of toffees. If B gives

- one toffee to A, then the toffees with A are double with B. The total number of toffees with A and B are ____.
- (a) 12 (b) 10
(c) 14 (d) 15
24. Each of Ravi and Kavita had some marbles. Kavita had 12 more marbles than Ravi had. If each of them had one more marble, then three times the number of marbles Kavita would then have had would have been equal to four times the number of marbles Ravi would then have had. How many marbles did Kavita actually have?
- (a) 43 (b) 47
(c) 51 (d) 48
25. A vessel is filled with liquid, 5 parts of which are water and 11 parts syrup. What part of the mixture must be drawn off and replaced with water so that the mixture may be syrup and water in the ratio 3 : 2?
- (a) $\frac{14}{45}$ (b) $\frac{27}{35}$
(c) $\frac{36}{65}$ (d) $\frac{7}{55}$
26. Rini has mixed two colours 'C₁' and 'C₂' in the ratio 2 : 3. If the rate of the colour 'C₁' is Rs. 500 per unit and she is selling the mixture of the two colours at Rs. 650 per unit at breakeven price, then what is the rate (in Rs.) per unit of the second colour, that is, 'C₂'?
- (a) 750 (b) 725
(c) 760 (d) 765
27. Anil and Beena are friends, and the difference between their ages is 5 years. Anil's father Dinesh is three times as old as Anil, and Beena is twice as old as her sister Charu. The ages of Dinesh and Charu differ by 45 years. If Beena is older than Anil, then find the sum of the present ages of both Dinesh and Charu.
- (a) 78 years (b) 69 years
(c) 91 years (d) 100 years
28. Three years ago, the age of a person was six times the age of his younger brother. Eight years later, the age of the person will be three years less than twice the age of his younger brother. Find the present ages of the person and his younger brother.
- (a) 15 years and 5 years (b) 5 years and 15 years
(c) 12 years and 4 years (d) 4 years and 12 years
29. A starts a business with Rs. 75,000 and B joins the business 5 months later with an investment of Rs. 80,000. After 1 year, they earn a profit of Rs. 4,08,800. Find the share of A and B (in Rs.).
- (a) 2,52,000 and 1,56,800
(b) 2,50,000 and 1,58,800
(c) 2,48,000 and 1,60,800
(d) 2,49,500 and 1,59,300
30. A and B entered into a partnership with certain investments. At the end of 8 months. A withdrew and collected back his money. A and B received profit in the ratio 5 : 9 at the end of the year. If B had invested Rs. 36,000, then how much (in Rs.) had A invested?
- (a) 25,000 (b) 30,000
(c) 20,000 (d) 36,000
31. According to Raghav, his weight is more than 64 kg but less than 74 kg. His sister does not agree with Raghav and she thinks that his weight is more than 60 kg but less than 69 kg. His mother's view is that his weight cannot be more than 68 kg. His father's view is that his weight cannot be more than 67 kg. If all are correct in their estimation, then what is the average of different probable weights of Raghav measured (in kg)?

- (a) 66 (b) 67
(c) 68 (d) 65
32. Ram, Shyam, Rohan, Rita and Mukesh are five members of a family who are weighed consecutively and their average weight is calculated after each member is weighed. If the average weight increases by 2 kg each time, how much heavier is Mukesh than Ram?
(a) 14 kg (b) 18 kg
(c) 16 kg (d) 12 kg
33. A alone can finish a work in 15 days. A works only for the first two days and last two days. The rest work is done by B and the work is completed in 20 days. In how many days A and B together can finish the work?
(a) $\frac{90}{8}$ (b) $\frac{80}{7}$
(c) $\frac{80}{9}$ (d) $\frac{70}{8}$
34. A and B can complete a job together in 12.5 days; B and C can complete the same job together in 18.75 days, while C and A can complete the same job together in 15 days. In how many days will A, B and C together be able to complete the same job alongside D, who is only 40% as efficient as C?
(a) $9\frac{1}{3}$ (b) $9\frac{17}{27}$
(c) $9\frac{2}{3}$ (d) $9\frac{7}{27}$
35. Pipe Q can fill the tank in 60 hours while pipe R may fill in 45 hours. Q and R pipes are opened together for 6 hours after which pipe W is also opened to empty the tank. All three pipes are opened simultaneously for 24 hours to reach the half level mark. How much time (in hours) will pipe W alone take to empty the entire tank?
(a) 48 (b) 42
(c) 36 (d) 30
36. A cistern can be filled by two pipes in 8 minutes and 10 minutes, separately. Both the pipes are opened together for a certain time, but due to an obstruction, only $\frac{5}{8}$ of the full quantity of water flowed through the former pipe and $\frac{3}{5}$ through the latter pipe. However, the obstruction was suddenly removed, and the cistern was filled in 3 minutes from that moment. How long did it take before the full flow began?
(a) $3\frac{1}{16}$ minutes (b) $2\frac{6}{17}$ minutes
(c) $9\frac{6}{7}$ minutes (d) $2\frac{30}{37}$ minutes
37. Akshara and Siddharth travel from point P to Q, a distance of 72 km at a rate of 8 km/h and 10 km/h, respectively. Siddharth reaches Q first and returns immediately and meets Akshara at R. Find the distance from P to R.
(a) 65 km (b) 63 km
(c) 64 km (d) 66 km
38. R jogs at twice the speed of walking and runs at twice the speed of jogging. From his home to office, he covers half of the distance by walking and the rest by jogging. From his office to home, he covers half the distance jogging and the rest by running. What is his average speed (in km/h) in a complete round from his home to office and back home if the distance between his office and home is 10 km and he walks at the speed of 5 km/h?
(a) 90/8 (b) 60/8
(c) 80/9 (d) 60/9
39. The speed of a boat in the down stream is 125% of the speed in still water. If the boat takes 30 minutes to cover 20 km in still water, then how much time (in hours) will it take to cover 15 km upstream?
(a) $\frac{3}{4}$ (b) $\frac{1}{2}$

- (c) $\frac{1}{4}$ (d) 1
40. A motorboat whose speed is 20 km/h in still water takes 30 minutes more to go 24 km upstream than to cover the same distance downstream. If the speed of the boat in still water is increased by 2 km/h, then how much time will it take to go 39 km downstream and 30 km upstream?
- (a) 2 h 40 m (b) 3 h 10 m
(c) 3 h 40 m (d) 2 h 50 m
41. $x^9 \times x^5 \times x^{-4} \times x^0 \times x^{-6} = ?$
- (a) x^4 (b) x^{-4}
(c) x^{-6} (d) x^6
42. X is directly proportional to the square of Y. When X is 12, then Y = 2. Find the value of X (when Y is 3).
- (a) 30 (b) 9
(c) 27 (d) 18
43. Simplify the expression $\frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}}$ where $x = 2$ and $y = 3$.
- (a) $2\sqrt{6} - 6$ (b) $\sqrt{6} - 5$
(c) $5 - 2\sqrt{6}$ (d) $2\sqrt{6} - 5$
44. $\sqrt{36x^2 - 108x + 81} = ?$
- (a) $2x - 9$ (b) $6x - 9$
(c) $5x - 9$ (d) $3x - 3$
45. Which of the following statement is correct?
- I. $100^2 - 99^2 + 98^2 - 97^2 + 96^2 - 95^2 + \dots + 2^2 - 1^2 = 5050$.
- II. $8x + \frac{8}{x} = -16, x < 0, x^{197} + x^{197} = 2$.
- (a) Only I (b) Both I and II
(c) Neither I nor II (d) Only II
46. If $x^2 - 15x + 1 = 0$, what is the value of $x^4 - 223x^2 + 6$?
- (a) 9 (b) 5
(c) 6 (d) 0
47. Simplify $\frac{1}{2+2p} + \frac{1}{2+2q} + \frac{1}{2+2r}$ where $p = \frac{x}{y+z}, q = \frac{y}{y+z}$ and $r = \frac{z}{x+y}$.
- (a) 1 (b) $x + y + z$
(c) 2 (d) $\frac{1}{2}$
48. If the system of the following equations has the value of the variables as three consecutive integers, then the value of a is ____.
- $x - y + z = 2a$
 $x + 4y - 2z = 3(4 - a)$
 $2x - 3y + 4z = 6 - 2a$
- (a) 2 (b) 4
(c) 1 (d) 3
49. Find the values of x, y and z, so as to satisfy the equations given below:
- $5x - 3y + 7z = 22; 3x - 5y - 2z = -46; 2x - 2y + 5z = 24$
- (a) $x = -5, y = 3, z = -8$ (b) $x = 5, y = -8, z = 3$
(c) $x = -5, y = 3, z = 8$ (d) $x = -5, y = -3, z = 8$
50. Simplify the following equation. What is the difference between the two values of x?
- $7x + 4\{x^2 \div (5x \div 10)\} - 3$
 $\left\{5\frac{1}{3} - x^3 \div (3x^2 \div x)\right\} = 0$
- (a) 8 (b) 16
(c) 5 (d) 17
51. If $\sin y = x$, then what will be the value of $\cos 2y$ (where $0 \leq y \leq 90^\circ$)?
- (a) $(\sqrt{2} - 1)x$ (b) $(\sqrt{2}x)$
(c) $1 - 2x$ (d) $1 - 2x^2$
52. What is the value of $\sin 75^\circ + \sin 15^\circ$?
- (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{\sqrt{3}}{2}$
(c) $\sqrt{\frac{3}{2}}$ (d) $\frac{3}{\sqrt{2}}$

53. $\theta = 135^\circ$; $\gamma = 15^\circ$ What is the value of $2\cos(\theta) \sin(\gamma)$?

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

54. $\sin 2x + 2 \sin 4x + \sin 6x = ?$

- (a) $4 \cos^2 x \sin 4x$ (b) $4 \cos^2 x \sin x$
(c) $2 \cos^2 x \sin 4x$ (d) $4 \sin^2 x \sin 4x$

55. Let $x = r \cos(t)$, $y = r \sin(t) \cos(u)$, $z = r \sin(t) \sin(u)$. Then the value of $x^2 + y^2 + z^2$ is ____.

- (a) $r^2 \cos(u)$ (b) r^2
(c) $2r$ (d) $r^2 \sin(t)$

56. The value of expression

$$\frac{1-\sin(2t)}{1+\sin(2t)} \times \frac{\cos(t)+\sin(t)}{\cos(t)-\sin(t)} \text{ is:}$$

- (a) $\frac{1-2\tan(t)}{1+2\tan(t)}$ (b) $\frac{1-\tan(t)}{1+\tan(t)}$
(c) $\frac{1+2\tan(t)}{1-2\tan(t)}$ (d) $\frac{1+\tan(t)}{1-\tan(t)}$

57. Simplify the following expression:

$$\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} - \sin A$$

- (a) $1 + \cos A$ (b) $(1 + \sin A) \cos A$
(c) $1 + \sin A$ (d) $\cos A$

58. If $a \cot \theta + b \operatorname{cosec} \theta = p$ and $b \cot \theta + a \operatorname{cosec} \theta = q$ then $p^2 - q^2$ is equal to ____.

- (a) $a^2 + b^2$ (b) $a^2 - b^2$
(c) $b^2 - a^2$ (d) $-a$

59. Evaluate the following:

$$\sqrt{2 + \sqrt{2 + \sqrt{2 + 2 \cos 8\theta}}}$$

- (a) $2 \cos \theta$ (b) $2 \cos 2\theta$
(c) $\sin 2\theta$ (d) $\cos 2\theta$

60. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$; $0^\circ < (A + B) < 90^\circ$; $A > B$, then the values of A and B are _____. respectively.

- (a) 45° & 15° (b) 15° & 45°

- (c) 30° & 30° (d) 60° & 30°

61. If $r = 15(\sin \theta + \cos \theta)$ and $s = 16(\sin \theta - \cos \theta)$, then the value of $\frac{r^2}{15^2} + \frac{s^2}{16^2}$ is ____.

- (a) 8 (b) 6
(c) 4 (d) 2

62. If $\sin \theta + \cos \theta = \frac{\sqrt{3}-1}{2\sqrt{2}}$, then what is the value of $\tan \theta + \cot \theta$?

- (a) $8(\sqrt{3} - 2)$ (b) $12(\sqrt{3} - 2)$
(c) $8(\sqrt{3} + 2)$ (d) $12(\sqrt{3} + 2)$

63. In equilateral $\triangle ABC$, D and E are points on the sides AB and AC , respectively, such that $AD = CE$. BE and CD intersect at F . The measure (in degrees) of $\angle CFB$ is:

- (a) 120° (b) 135°
(c) 125° (d) 105°

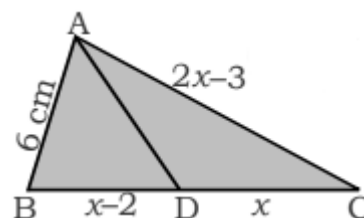
64. In $\triangle PQR$, $PQ = QR$ and O is an interior point of $\triangle PQR$ such that $\angle OPR = \angle ORP$.

- (i) $\triangle POR$ is an isosceles triangle
(ii) O is the centroid of $\triangle PQR$.
(iii) $\triangle PQO$ is congruent to $\triangle RQO$.

Which of the above statements are correct?

- (a) Only (i) and (ii) (b) Only (i) and (iii)
(c) Only (ii) and (iii) (d) Only (ii)

65. In the following figure, AD bisects angle BAC . Find the length (in cm) of BD .

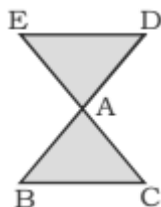


- (a) 4 (b) 5
(c) 9 (d) 6

66. In triangle ABC , $\angle B = 90^\circ$, and $\angle C = 45^\circ$. If $AC = 2\sqrt{2}$ cm, then the length of BC is:

- (a) 3 cm (b) 2 cm
(c) 1 cm (d) 4 cm

67. In the figure, $AB = AD = 7$ cm and $AC = AE$ and $BC = 11$ cm, then find the length of ED .



- (a) 12 (b) 10
(c) 11 (d) 2

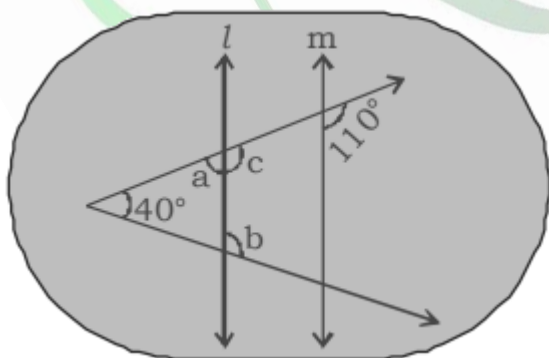
68. In a $\triangle XYZ$, XO is the median and $XO = \frac{1}{2} YZ$. If $\angle YXO = 30^\circ$, then what is the value of $\angle XYZ$?

- (a) 15° (b) 90°
(c) 30° (d) 60°

69. An isosceles $\triangle MNP$ is inscribed in a circle. If $MN = MP = 16\sqrt{5}$ cm, and $NP = 32$ cm, what is the radius (in cm) of the circle?

- (a) 20 (b) $18\sqrt{5}$
(c) 18 (d) $20\sqrt{5}$

70. In the following figure, if $l \parallel m$, then find the measures of angles marked by a and b .



- (a) $a = 90^\circ$ and $b = 90^\circ$ (b) $a = 55^\circ$ and $b = 125^\circ$
(c) $a = 70^\circ$ and $b = 110^\circ$ (d) $a = 60^\circ$ and $b = 120^\circ$

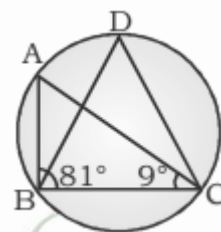
71. An equilateral triangle ABC surmounts a square $BCDE$. The value of $\angle EAB + 3\angle AEB$ is:

- (a) 80° (b) 240°
(c) 280° (d) 60°

72. $ABCD$ is a quadrilateral in which diagonal $BD = 70$ cm, $AL \perp BD$ and $CM \perp BD$ such that $AL = 18$ cm and $CM = 20$. Find the area (in cm^2) of the quadrilateral $ABCD$.

- (a) 1310 (b) 1300
(c) 1330 (d) 1320

73. In the given figure, $\angle ABC = 81^\circ$ and $\angle ACB = 9^\circ$. What is the value of $\angle BDC$?



- (a) 80° (b) 90°
(c) 70° (d) 60°

74. The minute hand of a clock is 20 cm long. Find the area on the face of the clock swept by the minute hand between 8 a.m. and 8:45 a.m.

- (a) $\frac{6600}{7} \text{ cm}^2$ (b) $\frac{6600}{9} \text{ cm}^2$
(c) $\frac{6600}{18} \text{ cm}^2$ (d) $\frac{6600}{14} \text{ cm}^2$

75. R is a point outside a circle and is 18 cm away from its centre. A secant drawn from the point R intersects the circle at points A and B in such a way that $RA = 7$ cm and $AB = 5$ cm. The radius of the circle (in cm) is:

- (a) $4\sqrt{15}$ (b) $5\sqrt{15}$
(c) $7\sqrt{15}$ (d) $3\sqrt{15}$

76. In a circle of radius 7 units, PQ and QR are chords of length 7 units each. What is the length of the chord PR in units?

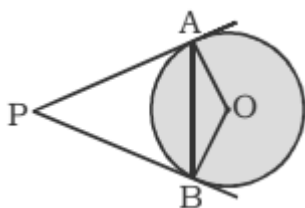
- (a) $\frac{28}{\sqrt{3}}$ (b) $\frac{14}{\sqrt{3}}$
(c) $\frac{7}{\sqrt{3}}$ (d) $\frac{21}{\sqrt{3}}$

77. Let O be the center of a circle and P be a point outside the circle. If PAB is a secant of a circle

which divides the circle. If $PA = 3$ cm and $AB = 9$ cm. PT is the tangent drawn from P , then find the length of PT .

- (a) $3\sqrt{3}$ cm (b) $4\sqrt{3}$ cm
(c) 6 cm (d) 8 cm

78. In the given figure, if PA and PB are tangents to the circle with centre O such that $\angle APB = 54^\circ$, then $\angle OBA = ?$



- (a) 27° (b) 40°
(c) 30° (d) 35°

79. In a circle centered at O , a diameter AB is extended to a point C outside the circle. CD is a tangent at point D on the circle. If $CD = 7\sqrt{3}$ cm and $\angle DBC = 120^\circ$, then the length of the diameter of the circle is equal to:

- (a) 16 cm (b) 14 cm
(c) 18 cm (d) 20 cm

80. There are two circles that touch each other externally. Radius of the first circle with centre O is 12 cm. Radius of the second circle with centre A is 8 cm. Find the length of their common tangent BC .

- (a) $6\sqrt{6}$ cm (b) $4\sqrt{6}$ cm
(c) $8\sqrt{2}$ cm (d) $8\sqrt{6}$ cm

81. Three circles of radius 6 cm are kept touching each other. The string is tightly tied around these three circles. What is the length of the string?

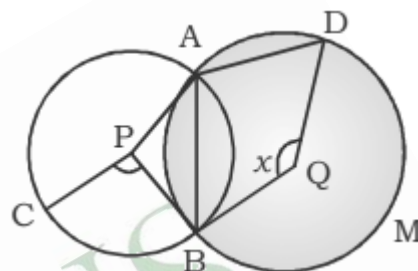
- (a) $36 + 12\pi$ cm (b) $36 + 18\pi$ cm
(c) $24 + 36\pi$ cm (d) $36 + 20\pi$ cm

82. The centres of two circles are 36 cm apart. If the radii of these two circles are 15 cm and 9 cm, respectively, then what is the sum of the lengths (in

cm) of a direct common tangent and a transverse common tangent of these two circles?

- (a) $6\sqrt{5}(\sqrt{7} + 2)$ (b) $5\sqrt{6}(\sqrt{7} + 2)$
(c) $6\sqrt{5}(\sqrt{2} + 7)$ (d) $3\sqrt{5}(\sqrt{7} + 2)$

83. In the following figure, P and Q are centres of two circles, The circles are intersecting at points A and B . PA produced on both the sides meets the circles at C and D . If $\angle CPB = 100^\circ$, then find the value of x .



- (a) 115 (b) 120
(c) 110 (d) 100

84. Two circle each of radius 36 cm are intersecting each other such that each circle is passing through the centre of the other circle. What is the length of common chord to the two circles?

- (a) $24\sqrt{3}$ cm (b) $12\sqrt{3}$ cm
(c) $18\sqrt{3}$ cm (d) $36\sqrt{3}$ cm

85. In a rhombus $ABCD$, O is any interior point such that $OA = OC$. What is five-ninths of the degree measure of $\angle DOB$?

- (a) 120° (b) 150°
(c) 100° (d) 90°

86. In a circle with centre O , an arc ABC subtends an angle of 134° at the centre of the circle. The chord AB is produced to a point P . $\angle CBP$ is equal to:

- (a) 67° (b) 113°
(c) 45° (d) 89°

87. $ABCD$ is a quadrilateral in which diagonal $BD = 70$ cm, $AL \perp BD$ and $CM \perp BD$ such that $AL = 18$ cm

- and $CM = 20$. Find the area (in cm^2) of the quadrilateral ABCD.
- (a) 1310 (b) 1300
(c) 1330 (d) 1320
- 88.** Let PQR be a right angled triangle, right-angled at R. Let $PQ = 29$ cm, $QR = 21$ cm and $\angle Q = \theta$. Find the value of $\cos\theta - \sin^2\theta$.
- (a) $\frac{40}{840}$ (b) $\frac{840}{40}$
(c) $\frac{41}{841}$ (d) $\frac{841}{41}$
- 89.** In a circle centered at O, a diameter AB is extended to a point C outside the circle. CD is a tangent at point D on the circle. If $CD = 7\sqrt{3}$ cm and $\angle DBC = 120^\circ$, then the length of the diameter of the circle is equal to:
- (a) 16 cm (b) 14 cm
(c) 18 cm (d) 20 cm
- 90.** In a triangle HJK, $HJ = HK$. G is a point on HJ such that $HG = GK = JK$. What is the degree measure of two-third of $(\angle HGK + \angle GJK)$?
- (a) 96° (b) 136°
(c) 84° (d) 90°
- 91.** A chord of the larger among two concentric circles is of length 20 cm and it is tangent to the smaller circle. What is the area (in cm^2) of the annular portion between the two circles?
- (a) 100π (b) 164π
(c) 122π (d) 175π
- 92.** Two equal circles pass through each other's centre. If the radius of each of the circle is 13 cm, then what is the length of the common chord?
- (a) $13\sqrt{5}$ cm (b) 7 cm
(c) 13 cm (d) $13\sqrt{3}$ cm
- 93.** Two circles of radii 10 cm and 5 cm touch each other externally at a point A. PQ is the direct common tangent of those two circles of centres O_1 and O_2 , respectively. The length of PQ is equal to:
- (a) $10\sqrt{2}$ cm (b) $8\sqrt{2}$ cm
(c) $9\sqrt{2}$ cm (d) $6\sqrt{2}$ cm
- 94.** $\triangle ABC$ is inscribed in a circle with Centre O. If $AB = 21$ cm, $BC = 20$ cm and $AC = 29$ cm, then what is the length of the circumradius of the triangle?
- (a) 32.5 cm (b) 13.5 cm
(c) 21.5 cm (d) 14.5 cm
- 95.** ABCD is a rhombus. In which $\angle ABC = 52^\circ$, then find $\angle ACD$?
- (a) 26° (b) 64°
(c) 54° (d) 48°
- 96.** On a PQ and RS are common tangents to two circles intersecting at A and B. A and B, when produced on both the sides, meet the tangents PQ and RS at X and Y, respectively. If $AB = 3$ cm and $XY = 5$ cm, then PQ is _____.
- (a) 5 cm (b) 3 cm
(c) 6 cm (d) 4 cm
- 97.** A person has office hours from 9 am to 5 pm in the evening. Find the median time of his office hours.
- (a) 12:30 (b) 12:00
(c) 1:00 (d) 1:30
- 98.** The age of some students is given in years as 12, 13, 16, 18, 14, 19, 13, 17, 15 and 11. The median age (in years) of the students is:
- (a) 13.5 (b) 14
(c) 15 (d) 14.5
- 99.** A set of data presented in the form of a frequency distribution table with class intervals and their respective frequencies had a mode of 48.5. The lower boundary of the modal class was 46.5; the frequency of the modal class was 34; the frequency of the class interval just preceding the modal class

was 32 and the frequency of the class interval just succeeding the modal class was 25. What was the width of the modal class?

- (a) 11 (b) 10
(c) 12 (d) 10.5

100. Find the median of the following data. (Rounded off to 2 decimal places.)

Class Interval	Frequency
0 – 5	3
5 – 10	5
10 – 15	4
15 – 20	2
20 – 25	7
25 – 30	6
30 – 35	5

- (a) 21.43 (b) 23.40
(c) 20.53 (d) 18.64



ANSWER KEY

1.	d	2.	b	3.	b	4.	c	5.	c	6.	a	7.	d	8.	a	9.	b	10.	a
11.	d	12.	b	13.	a	14.	d	15.	b	16.	d	17.	a	18.	b	19.	a	20.	a
21.	c	22.	d	23.	a	24.	b	25.	d	26.	a	27.	b	28.	a	29.	a	30.	b
31.	a	32.	c	33.	c	34.	d	35.	c	36.	b	37.	c	38.	c	39.	b	40.	b
41.	a	42.	c	43.	d	44.	b	45.	a	46.	b	47.	a	48.	c	49.	c	50.	d
51.	d	52.	c	53.	b	54.	a	55.	b	56.	b	57.	d	58.	d	59.	a	60.	a
61.	d	62.	a	63.	a	64.	b	65.	a	66.	b	67.	c	68.	c	69.	a	70.	c
71.	d	72.	c	73.	b	74.	a	75.	a	76.	d	77.	c	78.	a	79.	b	80.	d
81.	a	82.	a	83.	d	84.	d	85.	c	86.	a	87.	c	88.	c	89.	b	90.	a
91.	a	92.	d	93.	a	94.	d	95.	b	96.	d	97.	c	98.	d	99.	a	100.	a

