

1. In an A.P, if the sum of first "n" terms is $S_n = n^2 p$ and the sum of first "m" terms is $S_m = m^2 p$, where m, n, p are positive integers and $m \neq n$, then S_p is

(a) p^3

(c) p^5

(b) p^4

(d) p^6

2. A radioactive sample decays and the remaining sample at infinite time is given by $b = 1 - (1/2 + 1/4 + \dots \text{to } \infty)$, then b is

(a) 2

(c) -1

(b) 1

(d) 0

3. If n, p, q are in G.P, then the expression for "p" in terms of "n" and "q" is

(a) $(1/2)nq$

(c) $2nq$

(b) $(nq)^{1/2}$

(d) nq

4. The rate of a chemical reaction is directly proportional to the concentration of its reactants. For a hypothetical chemical reaction at $t=0$, the rate is $0.1 \text{ mole L}^{-1}\text{S}^{-1}$ and the rate increases by a factor of 3 with each second. The rate of the reaction at $t=11$ seconds is

(a) $3^8/10$

(c) $3^{10}/10$

(b) $3^9/10$

(d) $3^{11}/10$

5. Water flows in to a tank. The volume of water in the tank at each minute form an A.P. If the initial volume was 5 liters and becomes 6 times after 6 minutes. The speed of water increases is

(a) 5 liters/minute

(c) 2 liters/minute

(b) 6 liters/minute

(d) 3 liters/minute

6. A solid toy is in the form of a hemisphere surmounted by a right circular cone. Height of the cone is 1 cm. and the diameter of the base is 2 cm. If a right circular cylinder circumscribes the solid the volume of the unused space inside the cylinder is

(a) $2\pi \text{ cc}$

(c) $\pi \text{ cc}$

(b) $4\pi \text{ cc}$

(d) $3\pi \text{ cc}$

7. If two cylinders have their radii in the ratio 4:5, and heights in the ratio 5:6, then the ratio of their volumes is

(a) 8:15

(c) 8:16

(b) 8:17

(d) 8:18

8. A sector of a circle of radius 21 cm and central angle 120° is made into a cone by bringing its radii together. Radius of the cone thus obtained is

(a) 7 cm

(c) 8 cm

(b) 5 cm

(d) 10 cm

9. If A, B, C are any three sets, then $B - (A \cup C) =$

(a) $(B+A) \cup (A+C)$

(c) $(B+A) \cap (A+C)$

(b) $(B-A) \cap (A-C)$

(d) $(B-A) \cup (A-C)$

10. If $P \cup Q = \{5, 11, 14, 17, 19, 20\}$, $P \cap Q = \{14\}$ and $P = \{5, 11, 14, 17\}$,
Then $Q =$

(a) $\{14, 19, 20\}$

(c) $\{5, 19, 20\}$

(b) $\{4, 19, 20\}$

(d) $\{15, 19, 20\}$

11. X - gene in a plant is responsible for red flowers and Y- gene for white flowers. If both are present, then the flowers produced are pink. If 20 plants have X-gene, 20 plants have Y-gene and there are 30 plants in all, then the total numbers of plants producing pink flowers are

(a) 7

(c) 9

(b) 8

(d) 10

12. If $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = 3x - 6$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ defined by $g(x) = 3x + k$. If $f \circ g = g \circ f$, then k is

(a) -2

(c) -6

(b) -8

(d) -1

13. A bank pays \$1800 to Patrick as the maturity value at the end of 2 years at some rate of interest. If Patrick pays a monthly deposit of \$50 for two years, then the interest paid by the bank is

(a) \$550

(c) \$650

(b) \$600

(d) \$700

14. The H.C.F of x^2-y^2 , x^3-y^3 , x^n-y^n where $n \in \mathbb{N}$ is

(a) x^2-y^2

(c) $x+y$

(b) x^2+y^2

(d) $x-y$

15. Which of the following is correct?

- I. Every polynomial has finite number of multiples.
- II. L.C.M of two polynomials of degree "2" may be a constant.
- III. HCF of two polynomials may be a constant.
- IV. Degree of H.C.F of two polynomials is always less than degree of L.C.M.

(a) I & II only

(c) II only

(b) III only

(d) I & III only

16. The L.C.M of $2^k, 2^{k+1}, 2^{k+5}$, where $k \in \mathbb{N}$ is

- (a) 2^{k+5} (c) 2
(b) 2^k (d) 2^5

17. If p and q are the roots of $ax^2+3x+2=0$, $a < 0$.
If $m = (p^2/q)+(q^2/p)$, then the correct statement is

- (a) $m > 0$ (c) $m < 0$
(b) $m = 0$ (d) None of these

18. The nature of the roots of $x^2+ax+bx+ab = 0$ is

- (a) real, distinct and rational (c) real, distinct and irrational
(b) not real (d) real and equal

19. Two chords AB and CD of a circle intersect externally at P ; If $AP = 10$ cm, $CP = 6$ cm, and $PD = 5$ cm, find PB .

- (a) 0.5 cm (c) 2 cm
(b) 1 cm (d) 3 cm

20. AB is a line segment of 6 cm, M is its midpoint. Semicircles are drawn with AM, MB and AB as diameter, all on the same side of AB. A circle is drawn to touch all the semicircles. The radius of the circle is

(a) 1

(c) 3

(b) 2

(d) 4

21. If the lengths of the corresponding sides BC and QR of two similar triangles ABC and PQR respectively 6 cm and 10 cm, then the ratio of the areas of ABC and PQR is

(a) 9:15

(c) 9:25

(b) 9:17

(d) 9:26

22. The area of the quadrilateral formed by the points (-1,1), (1,1), (1,-1) and (-1,-1) is

(a) 3 sq. units

(c) 5 sq. units

(b) 4 sq. units

(d) 6 sq. units

23. A man walks near a wall, such that distance between him and the wall is 5 units. Considering the wall to be X-axis, what is the equation of the path traveled by the man?

(a) $y = 4$

(c) $y = 5$

(b) $y = 6$

(d) $y = 7$

24. A straight road AB (A is in IV quadrant) is such that it bends at B(1,0) by an angle of 30° towards the right. Considering the line perpendicular to AB through B to be X-axis, equations of the two parts of the road are

(a) $X = 1, \sqrt{3}X - Y - \sqrt{3} = 0$

(c) $X = -1, \sqrt{3}X - Y - \sqrt{3} = 0$

(b) $X = 1, \sqrt{3}X - Y - \sqrt{3} = 1$

(d) $X = 1, \sqrt{3}X - Y - \sqrt{3} = -1$

25. A circle is divided into "n" equal sectors. The tangent of each angle at the centre is

(a) $\tan(180^\circ/n)$

(c) $\tan(90^\circ/n)$

(b) $\tan(270^\circ/n)$

(d) $\tan(360^\circ/n)$

26. A trekker, before climbing a mountain finds the height of the mountain from a point 20 km from it. He finds the angle of elevation to be 30° . The height of the mountain is

(a) $20/\sqrt{3}$ km

(c) $3\sqrt{3}/20$ km

(b) $20\sqrt{3}/3$ km

(d) $\sqrt{3}/20$ km

27. If $(1-\cos^2x) = 3/4$, then $\sin x =$

(a) $3/2$

(c) $\sqrt{3}/2$

(b) $2/\sqrt{3}$

(d) $2/3$

28. The standard deviation of 5 values is $5\sqrt{2}$. If each value is increased by 4, then the new standard deviation is

(a) $3\sqrt{2}$

(c) $5\sqrt{2}$

(b) $2\sqrt{5}$

(d) $3\sqrt{5}$

29. The variance of 5 values is 16. If each value is doubled, then the standard deviation of new value is

(a) 8

(c) 12

(b) 10

(d) 13

30. A scientist experimented with pea plants. After crossing two plants that are tall and dwarf, the ratio of number of plants obtained in the first generation is 3:1 (tall: dwarf). If the scientist experimented and got 576 plants in first generation, what is the probability that he chooses for the next generation is tall?

(a) $\frac{5}{3}$

(c) $\frac{3}{2}$

(b) $\frac{2}{3}$

(d) $\frac{3}{4}$

31. For what value of a will the system given below have no solutions?

$$2x+6y= -2$$

$$-3x+ay=4$$

(a) 12

(c) -13

(b) -9

(d) 7

32. Which equation best describes the relationship between x and y in this table?

x	y
0	-4
4	-20
-4	12
8	-36

(a) $y = -4x - 4$

(c) $y = -4x + 4$

(b) $y = 4x - 4$

(d) $y = 4x + 4$

33. Find the length and width of a rectangle whose perimeter is equal to 160 cm and its length is equal to triple its width.

(a) 62 cm, 22 cm

(c) 61 cm, 21 cm

(b) 63 cm, 23 cm

(d) 60 cm, 20 cm

34. A real estate agent received a 6% commission on the selling price of a house. If his commission was \$8,880, what was the selling price of the house?

(a) \$136000

(c) \$148000

(b) \$184000

(d) \$163000

35. An electric motor makes 3,000 revolutions per minutes. How many degrees does it rotate in one second?

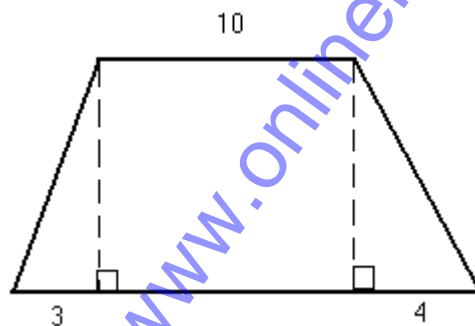
(a) 18000 degrees / second

(c) 18002 degrees / second

(b) 18001 degrees / second

(d) 18003 degrees / second

36. The area of the trapezoid shown below is equal to 270 square units. Find its perimeter.



(a) $27 + \sqrt{408} + \sqrt{415}$

(c) $27 + \sqrt{410} + \sqrt{417}$

(b) $27 + \sqrt{407} + \sqrt{414}$

(d) $27 + \sqrt{409} + \sqrt{416}$

37. If a tire rotates at 400 revolutions per minute when the car is traveling 72km/h, what is the circumference of the tire?

(a) 3 m

(c) 2 m

(b) 4 m

(d) 7 m

38. In a shop, the cost of 4 shirts, 4 pairs of trousers and 2 hats is \$560. The cost of 9 shirts, 9 pairs of trousers and 6 hats is \$1,290. What is the total cost of 1 shirt, 1 pair of trousers and 1 hat?

(a) \$148

(c) \$150

(b) \$149

(d) \$151

39. A class average mark in an exam is 70. The average of students who scored below 60 is 50. The average of students who scored 60 or more is 75. If the total number of students in this class is 20, how many students scored below 60?

(a) 2

(c) 3

(b) 4

(d) 5

40. For what value of x will the function $f(x) = -3(x - 10)(x - 4)$ have a maximum value? Find the maximum value.

(a) 4, 24

(c) 6, 26

(b) 5, 25

(d) 7, 27

41. It takes a boat 3 hours to travel down a river from point A to point B, and 5 hours to travel up the river from B to A. How long would it take the same boat to go from A to B in still water?

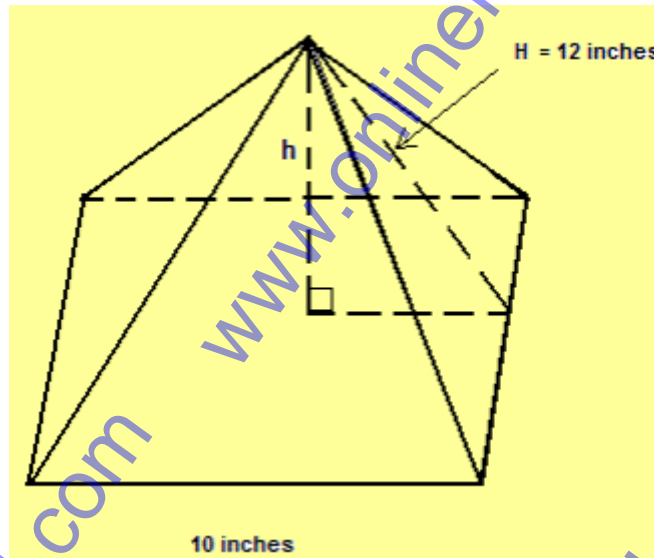
(a) 3 hours 45 minutes

(c) 3 hours 47 minutes

(b) 3 hours 46 minutes

(d) 3 hours 48 minutes

42. Each side of the square pyramid shown below measures 10 inches. The slant height, H , of this pyramid measures 12 inches.



What is the area, in square inches, of the base of the pyramid?

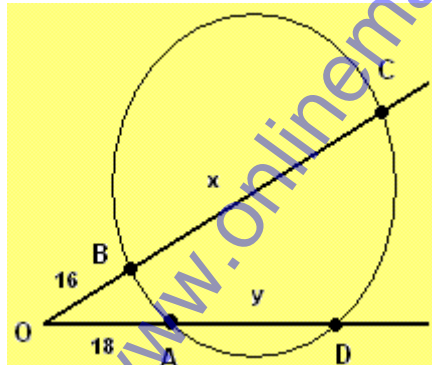
(a) 101 sq. inches

(c) 103 sq. inches

(b) 100 sq. inches

(d) 102 sq. inches

43. In the figure below triangle OAB has an area of 72 and triangle ODC has an area of 288. Find x and y .



(a) $x=20, y=13$

(c) $x=20, y=15$

(b) $x=20, y=14$

(d) $x=20, y=16$

44. The semicircle of area 1250π centimeters is inscribed inside a rectangle. The diameter of the semicircle coincides with the length of the rectangle. Find the area of the rectangle.

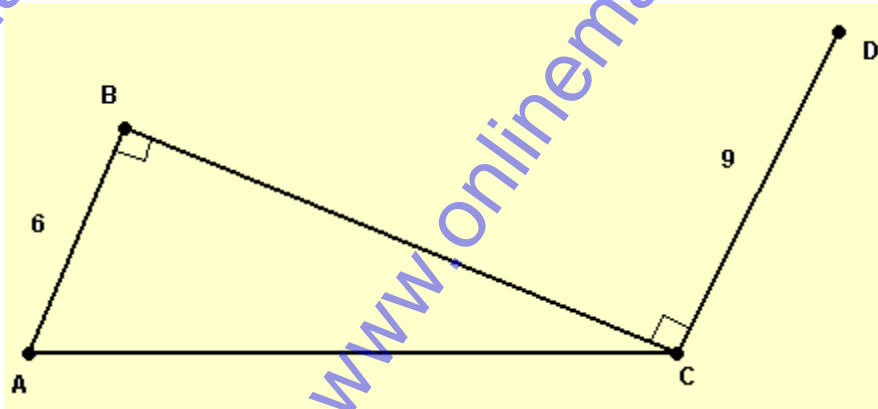
(a) 3000 sq. cms

(c) 5000 sq. cms

(b) 4000 sq. cms

(d) 6000 sq. cms

45. In the figure below AB and CD are perpendicular to BC and the size of angle ACB is 31° . Find the length of segment BD .



(a) 6.98 units

(c) 12.5 units

(b) 13.4 units

(d) 5.55 units

46. A two digit number is ab is added to the number formed by the original digits. If their sum is divisible by 11, 9, and 2, find the original number.

(a) 22

(c) 66

(b) 44

(d) 99

47. The numbers 1 to 29 are written side by side as follows:

1234567891011.....2829

If the number is divided by 8, what is the remainder?

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

48. If $x+y>5$, $x-y>3$, then which of the following gives all possible values of "x"?

- (a) $x = 3$ (c) $x < 3$
(b) $x = 4$ (d) $x > 4$

49. How many paving stones, each measuring 2.5 meters by 2 meters, are required to pave a rectangular courtyard 30 meters long 16.5 meters broad?

- (a) 22 (c) 66
(b) 44 (d) 99

50. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

(a) 18204

(c) 25200

(b) 19333

(d) 10100

Answers:

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 1. a | 2. d | 3. b | 4. c | 5. a | 6. c |
| 7. a | 8. a | 9. b | 10. a | 11. d | 12. c |
| 13. b | 14. d | 15. b | 16. a | 17. c | 18. a |
| 19. d | 20. a | 21. c | 22. b | 23. c | 24. a |
| 25. d | 26. b | 27. c | 28. c | 29. a | 30. d |
| 31. b | 32. a | 33. d | 34. c | 35. a | 36. d |
| 37. a | 38. c | 39. b | 40. d | 41. a | 42. b |
| 43. b | 44. c | 45. b | 46. d | 47. a | 48. d |
| 49. d | 50. c | | | | |