1. Which of the following are finite sets?

   I.   The set of all positive even integers
   II. The set of all high schools in Singapore
   III. The set of all positive and negative integers including zero.

(a) I only

(b) II only

(c) III only

(d) II and III only

2. $(A \cup B)' =$

(a) $A' \cap B'$

(b) $A \cup B$

(c) $(A \cap B)'$

(d) $A' \cup B'$

3. In a group of students, 65 play foot ball, 45 play hockey, 42 play cricket, 20 play foot ball and hockey, 25 play foot ball and cricket, 15 play hockey and cricket and 8 play all the three games. Find the number of students in the group.

(a) 551

(b) 444

(c) 100

(d) 441

4. In a survey of university students, 64 had taken mathematics course, 94 had taken computer science course, 58 had taken physics course, 28 had taken mathematics and physics, 26 had taken mathematics and computer science, 22 had taken computer science and physics course, and 14 had taken all the three courses. Find the number of students who were surveyed. Find how many had taken physics only.

(a) 60

(c) 22

(b) 33

(d) 50

5. A radio station surveyed 190 students to determine the types of music they liked. The survey revealed that 114 liked rock music, 50 liked folk music, and 41 liked classical music, 14 liked rock music and folk music, 15 liked rock music and classical music, 11 liked classical music and folk music. 5 liked all the three types of music. How many liked folk music but not rock music?

(a) 36

(c) 32

(b) 38

(d) 44

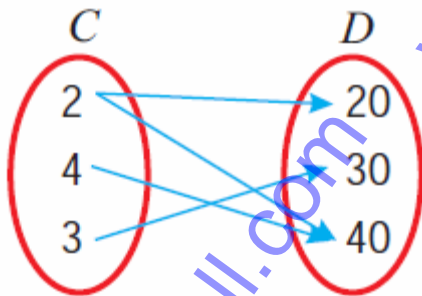6. Let R = {(1, 3), (2, 6), (3, 10), (4, 9)}. What is the range of R?

(a) {3,6,10,8}   (c) {1,2,3,4}

(b) {3,6,10,9}   (d) {3,6,8,9}

7. Does the below diagram represent a function

(a) No   (c) Can not be concluded

(b) Yes   (d) None of these

8. Let A= {0, 1} and B = {1, 3} be two sets. Let $f: A \rightarrow B$ be a function given by $f(x)$ = $2x$ + 1. Represent this function as (i) a set of ordered pairs
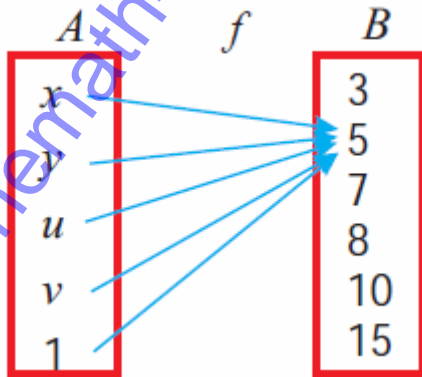
(a) {(0,1),(0,3)}   (c) {(0,1),(1,3)}

(b) {(1,1),(1,3)}   (d) {(3,6),(1,9)}

9. The below diagram represents

(a) One to one function   (c) Onto function

(b) Constant function   (d) None of these

10. Find the first three terms of the following sequence.

$$a_1 = -1, \qquad a_n = \frac{a_{n-1}}{n+2}, \quad n > 1 \text{ and } \forall\, n \in \mathbb{N}$$

(a) -1, -1/4, -1/4   (c) -1, -1/2, -1/20

(b) -1, -1/4, -1/20   (d) -1, -1/4, -1/10

11. $3m - 1$, $3m - 3$, $3m - 5$,………………………….is a/an

(a) Geometric Progression

(c) Arithmetic progression

(b) Harmonic progression

(d) None of these

12. Find the smallest positive integer n such that t_n of the arithmetic sequence 20, 77/4, 37/4…. is negative?

(a) 28

(c) 29

(b) 30

(d) 20

13. In a flower garden, there are 23 rose plants in the first row, 21 in the second row, 19 in the third row and so on. There are 5 rose plants in the last row. How many rows are there in the flower garden?

(a) 8

(c) 11

(b) 9

(d) 10

14. If a person joins his work in 2010 with an annual salary of $30,000 and receives an annual increment of $600 every year, in which year, will his annual salary be $39,000?

(a) 2024

(c) 2026

(b) 2025

(d) 2027

15. The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture initially, how many bacteria will be present at the end of 14th hour?

(a) $28(2^{14})$

(c) $30(2^{14})$

(b) $29(2^{14})$

(d) $31(2^{14})$

16. An amount $500 is deposited in a bank which pays annual interest at the rate of 10% compounded annually. What will be the value of this deposit at the end of 10th year?

(a) $500(11/10)^{10}$

(c) $500(11/12)^{10}$

(b) $501(11/10)^{10}$

(d) $500(10/11)^{10}$

17. The sum of first three terms of a geometric sequence is 12/13 and their product is -1. Find the common ratio.

(a) -4/3 or 3/4　　　　　　　(c) 4/3 or 3/4

(b) -4/3 or -3/4　　　　　　(d) 4/3 or -3/4

18. Find the sum of the below series.

$$1^2 - 2^2 + 3^2 - 4^2 + \ldots$$

(a) n(2n-1)　　　　　　　　(c) n(2n+1)

(b) -n(-2n+1)　　　　　　　(d) -n(2n+1)

19. Find the sum of all 3 digit natural numbers, which are divisible by 8.

(a) 91388　　　　　　　　　(c) 47189

(b) 51326　　　　　　　　　(d) 61376

20. The measures of the interior angles taken in order of a polygon form an arithmetic sequence. The least measurement in the sequence is 85c. The greatest measurement is 215c. Find the number of sides in the given polygon.

(a) 15

(c) 13

(b) 12

(d) 24

21. An organization plans to plant saplings in 25 streets in a town in such a way that one sapling for the first street, two for the second, four for the third, eight for the fourth street and so on. How many saplings are needed to complete the work?

(a) $2^{25}-1$

(c) $2^{25}-2$

(b) $2^{25}-3$

(d) $2^{25}-25$

22. Find the total area of 14 squares whose sides are 11 cm, 12 cm,………………………….,24 cm, respectively.

(a) 4515 sq.cm

(c) 4517 sq.cm

(b) 4516 sq.cm

(d) 4518 sq.cm

23. Solve $3x - 5y = -16$, $2x + 5y = 31$

(a) x=-3, y=5   (c) x=3, y=-5

(b) x=3, y=5   (d) x=-3, y=-5

24. The cost of 11 pencils and 3 erasers is $50 and the cost of 8 pencils and 3 erasers is $38. Find the cost of each pencil and each eraser.

(a) 4,2   (c) 2,4

(b) 2,3   (d) 1,6

25. In a two digit number, the digit in the unit place is twice of the digit in the tenth place. If the digits are reversed, the new number is 27 more than the given number. Find the number.

(a) 38   (c) 26

(b) 36   (d) 28

26. Eight men and twelve boys can finish a piece of work in 10 days while six men and eight boys can finish the same work in 14 days. Find the number of days taken by one man alone to complete the work and also one boy alone to complete the work.

(a) 140,380

(c) 140,380

(b) 140,280

(d) 160,280

27. Find the zeros of the quadratic polynomial $x^2+9x+20$

(a) -4,5

(c) 4,5

(b) 4,-5

(d) -4,-5

28. Find a quadratic polynomial if the sum and product of zeros of it are –4 and 3 respectively.

(a) x^2-4x-3

(c) x^2+4x+3

(b) x^2-4x+3

(d) x^2+4x-3

29. The G.C.D of $15x^4y^3z^5$ and $12x^2y^7z^2$

(a) $5xy^3z^5$ (c) $2x^2yz^2$

(b) $2x^2y^7z^2$ (d) $3x^2y^3z^2$

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30. The L.C.M of x^3+y^3, x^3-y^3, $x^4+x^2y^2+y^4$

(a) x^6-y^6 (c) x^6+y^6

(b) x^6-y^6+xy (d) x^6+y^6-xy

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31. The GCD and LCM of two polynomials are $x + 1$ and x^6-1 respectively. If one of the polynomials is x^3+1, find the other.

(a) $(x^3-1)(x+1)$ (c) $(x^3-1)(x-1)$

(b) $(x^3+1)(x-1)$ (d) $(x^3+1)(x+1)$

32. When we simplify the following expression,

$$\frac{(x-8)(x^2+5x-50)}{(x+10)(x^2-13x+40)}$$

We get

(a) 0

(c) 1

(b) -1

(d) None

33. The base of a triangle is 4 cm longer than its altitude. If the area of the triangle is 48 sq. cm, then find its base and altitude.

(a) (14,3)

(c) (10,4)

(b) (11,2)

(d) (12,8)

34. A car left 30 minutes later than the scheduled time. In order to reach its destination 150 km away in time, it has to increase its speed by 25 km/hr from its usual speed. Find its usual speed.

(a) 75 km/hr

(c) 95 km/hr

(b) 85 km/hr

(d) 105 km/hr

35. Find the values of k so that the equation
$x^2-2x(1+3k)+7(3+2k)$ has real and equal roots.

(a) 3   (c) 8

(b) 2   (d) 1

36. If one of the roots of the equation $3x^2-10x+k=0$ is 1/3, then find the other root and also the value of "k"?

(a) 2, k=3   (c) 3, k=2

(b) 4, k=3   (d) 3, k=3

37. If the sum and product of the roots of the quadratic equation $ax^2+bx+c=0$ are both equal to 10, then find the values of a and c.

(a) 3/2, 5   (c) 1/2, 5

(b) 5/2, 5   (d) 7/2, 5

38. Find the point which divides the line segment joining the points (3 , 5) and (8 , 10) internally in the ratio 2 : 3.

(a) (5,7)   (c) (3,7)

(b) (7,7)   (d) (2,7)

39. Find the centroid of the triangle whose vertices are A(4, -6), B(3,-2) and C(5, 2).

(a) (4,2)   (c) (-4,2)

(b) (4,-2)   (d) (-4,-2)

40. If (7,3),(6,1), (8,2) and (p, 4) are the vertices of a parallelogram taken in order, then find the value of p.

(a) p=8   (c) p=10

(b) p=9   (d) p=11

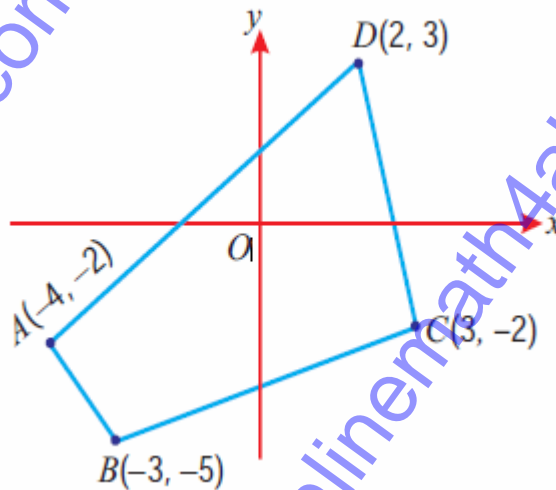41. Find the area of the triangle whose vertices are (1, 2), (-3, 4) and (-5 ,-6).

(a) 21 sq.units

(c) 22 sq.units

(b) 19 sq.units

(d) 23 sq.units

42. Find the area of the quadrilateral given below

(a) 25 sq.units

(c) 27 sq.units

(b) 26 sq.units

(d) 28 sq.units

43. Find the slope of the straight line whose angle of inclination is 45 degree.

(a) -1

(c) 1

(b) 2

(d) -2

44. Find the equation of straight line whose angle of inclination is 45 degree and the y- intercept is 2/3

(a) y=x-(2/3)

(c) y=x+(2/3)

(b) y=-x-(2/3)

(d) y=-x+(2/3)

45. Chord AB and CD cut at P inside the circle. AB = 11, AP = 3, CP = 6. Find CD.

(a) 10

(c) 8

(b) 6

(d) 9

46. Find the area of a right angled triangle with hypotenuse 10 cm and one of the acute angle is $66^0 48'$

(a) 38.10

(c) 18.10

(b) 30.10

(d) 28.10

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47. Find the radius of the incircle of a regular hexagon each side of length 6 cm.

(a) 5.196 m

(c) 5.845 cm

(b) 5.196 cm

(d) 5.845 m

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48. The top of a tower was observed from the top and the bottom of a building of height 20 m at angles of elevation 45° and 60°. Find the height of the tower.

(a) 66.152 m

(c) 48 m

(b) 52.12 m

(d) 47.32 m

49. Calculate the standard deviation for the data 14, 22, 9, 15, 20, 17, 12, 11

(a) 5.18   (c) 3.18

(b) 4.18   (d) 2.18

50. One card is drawn at random from a shuffled pack of 52 cards. What is the probability that it will be any card except queen?

(a) 3/10   (c) 1/2

(b) 12/13   (d) 0

Answers

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