

1. Find the value of  $\sqrt{27} + \sqrt{75} + \sqrt{108} - \sqrt{48}$ .

(a) 17.32

(c) 19.32

(b) 18.32

(d) 20.32

2. The conjugate of  $3 - 5\sqrt{2}$  is

(a)  $2 - 5\sqrt{3}$

(c)  $2 + 5\sqrt{3}$

(b)  $3 + 5\sqrt{2}$

(d)  $3 - 5\sqrt{2}$

3. Simplify the following:

$$\log_{10}\left(\frac{9}{8}\right) - \log_{10}\left(\frac{27}{32}\right) + \log_{10}\left(\frac{3}{4}\right)$$

(a) -1

(c) 1

(b) 2

(d) 0

4. In a class 50 boys, 27 are on foot ball team and 18 are on the basket ball team. 12 boys are not in any team. Use Venn diagram to find how many are on both teams. How many play only foot ball?

(a) 7, 19

(c) 7, 21

(b) 7, 20

(d) 7, 22

5.  $(A \cap B)' =$

(a)  $A \cap B$

(c)  $A \cup B$

(b)  $A' \cap B'$

(d)  $A' \cup B'$

6. Find the angle and area of a sector whose radius is 21 cm and length of arc is 66 cm.

(a)  $180^\circ, 691 \text{ cm}^2$

(c)  $180^\circ, 693 \text{ cm}^2$

(b)  $180^\circ, 692 \text{ cm}^2$

(d)  $180^\circ, 694 \text{ cm}^2$

7. The cost of 4 tables and 9 chairs is \$3125. If the cost of a table is the same as the cost of 4 chairs, find the total cost of 2 tables and 3 chairs.

(a) \$1375

(c) \$1377

(b) \$1376

(d) \$1378

8. Find the compound interest on \$64000 for one year at the rate of 10% per annum compounded quarterly.

(a) \$4918

(c) \$4920

(b) \$4919

(d) \$4921

9. The given points  $(-2,3)$ ,  $(0,0)$ ,  $(-3,-2)$  are the vertices of a/an

(a) isosceles triangle

(c) scalene triangle

(b) right triangle

(d) equilateral triangle

10. Two vertices of a triangle are  $(8,1)$  and  $(0,2)$  and its centroid is  $(4,3)$ . Find the third vertex of the triangle.

(a)  $(-4,-6)$

(c)  $(4,-6)$

(b)  $(4,6)$

(d)  $(-4,6)$

11. A balloon is flying on the top of a building 10 m high from a building is seen at an angle of  $30^\circ$  by a boy standing at a point A. Find the distance between the boy and the balloon.

(a) 20 m

(c) 10 m

(b) 40 m

(d) 30 m

12. What least value must be assigned to "a" so that the number 197a5462 is divisible by 9.

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

13. In dividing a number by 585, a student employed the method of short division. He divided the number successively by 5, 9 and 13 (factors of 585) and got the remainders 4, 8 and 12. If he had divided the number by 585, the remainder would have been

- (a) 583 (c) 585  
(b) 584 (d) 586

14. Three different containers contain 496 liters, 403 liters and 713 liters of mixtures of milk and water respectively. What biggest measure can measure all the different quantities exactly?

- (a) 28 liters (c) 30 liters  
(b) 29 liters (d) 31 liters

15. Jill and Jack are friends. Each has some money. If Jill gives \$30 to Jack, then Jack will have twice the money left with Jill. But if Jack gives \$10 to Jill, then Jill will have thrice as much as is left with Jack. How much money does each have?

(a) \$62,\$34

(c) \$60,\$32

(b) \$61,\$33

(d) \$59,\$31

16. At an international dinner,  $\frac{1}{5}$  of the people attending were French men. If the number of French women at the dinner was  $\frac{2}{3}$  greater than the number of French men, and there were no other French people at the dinner, then, what fractions of people at the dinner were not French?

(a)  $\frac{10}{15}$

(c)  $\frac{8}{15}$

(b)  $\frac{9}{15}$

(d)  $\frac{7}{15}$

17. A group of students decided to collect as many cents from each member of the group as is the number of members. If the total collection amounts to \$59.25, the number of members in the group is

(a) 88

(c) 66

(b) 77

(d) 55

18. 16 children are to be divided into two groups A and B of 10 and 6 children. The average percent marks obtained by the children of group A is 75 and the average percent marks of all the 16 children is 76. What is the average percent mark of children group B?

(a) 233/3

(c) 433/3

(b) 333/3

(d) 533/3

19. A fraction becomes  $\frac{2}{3}$  when 1 is added to both, its numerator and denominator. And, it becomes  $\frac{1}{2}$  when 1 is subtracted from both the numerator and denominator. Find the fraction.

(a)  $\frac{9}{5}$

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

(b)  $\frac{4}{5}$

(d)  $\frac{7}{5}$

20. In a two digit number, the digit in the unit's place is more than twice the digit in ten's place by 1. If the digits in the unit's place and the ten's place are interchanged, difference between the newly formed number and the original number is less than the original number by 1. What is the original number?

(a) 37

(c) 39

(b) 38

(d) 40

21. One year ago, the ratio of Kevin's and David's age was 6:7 respectively. Four years hence, this ratio would become 7:8. How old is David?

- (a) 35 years                      (c) 37 years  
(b) 36 years                      (d) 38 years

22. A person was asked to state his age in years. His reply was, "take my age 3 years hence, multiply it by 3 and then subtract 3 times my age 3 years ago and you will know how old I am". What was the age of the person?

- (a) 15 years                      (c) 17 years  
(b) 16 years                      (d) 18 years

23. If  $x=y^a$ ,  $y=z^b$ ,  $z=x^c$ , then find the value of  $abc$ .

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

24. Mr. Jones gave 40% of the money he had, to his wife. He also gave 20% of the remaining amount to each of his three sons. Half of the amount now left was spent on miscellaneous items and the remaining amount of \$12000 was deposited in the bank. How much money did Mr. Jones have initially?

- (a) \$120000 (c) \$100000  
(b) \$110000 (d) \$90000

25. A manufacturer undertakes to supply 2000 pieces of a particular component at \$25 per piece. According to his estimate, even if 5% fail to pass the quality tests, then he will make profit of 25%. However, as it turned out, 50% of the components were rejected. What is the loss to the manufacturer?

- (a) \$13000 (c) \$10000  
(b) \$11000 (d) \$9000

26. A mixture contains alcohol and water in the ratio 4:3. If 5 liters of water is added to the mixture, the ratio becomes 4:5. Find the quantity of alcohol in the given mixture.

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



27. A, B and C enter in to partnership by investing in the ratio of 3:2:4. After one year, B invests another \$270000 and C, at the end of two years, also invests \$270000. At the end of three years the profits are shared in the ratio of 3:4:5. Find the initial investment of C.

(a) \$340000

(c) \$320000

(b) \$360000

(d) \$380000

28. If 9 engines consume 24 metric tones of coal, when each is working 8 hours a day, how much coal will be required for 8 engines, each running 13 hours a day it being given that 3 engines of former type consumes as much as four engines of later type?

(a) 16 metric tones

(c) 36 metric tones

(b) 46 metric tones

(d) 26 metric tones

29. A contract is to be completed in 46 days and 117 men were set to work, each working 8 hours a day. After 33 days,  $\frac{4}{7}$  of the work completed. How many additional men may be employed so that the work may be completed in time, each man now working 9 hours a day?

(a) 83

(c) 81

(b) 82

(d) 80

30. A machine P can print 100 thousand books in 8 hours, machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9.00 am. While machine P is closed at 11.00 am and the remaining two machines complete the work. Approximately at what time will the work be finished?

(a) 4:00 pm

(c) 3:00 pm

(b) 1:00 pm

(d) 2:00 pm

31. Two cyclists start from the same place in opposite direction. One goes towards north at 18 km per hour and the other goes towards south at 20 km per hour. What time will they take to be 47.5 km apart?

(a)  $5/4$  hours

(c)  $7/4$  hours

(b)  $3/4$  hours

(d)  $9/4$  hours

32. A piece of 16-gauge copper wire 42 cm long is bent into the shape of a rectangle whose width is twice its length. Find the dimensions of the rectangle.

(a) 7 cm, 24 cm

(c) 9 cm, 34 cm

(b) 8 cm, 14 cm

(d) 7 cm, 14 cm

33. A circular swimming pool with a diameter of 28 feet has a deck of uniform width built around it. If the area of the deck is  $60\pi$  square feet, find its width.

(a) 1 foot

(c) 5 feet

(b) 2 feet

(d) 4 feet

34. If one side of a square is doubled in length and the adjacent side is decreased by two centimeters, the area of the resulting rectangle is 96 square centimeters larger than that of the original square. Find the dimensions of the rectangle.

(a) 24 cm by 10 cm

(c) 24 cm by 20 cm

(b) 34 cm by 10 cm

(d) 34 cm by 15 cm

35. The owner of a local jewellery store hired 3 watchmen to guard his diamonds, but a thief still got in and stole some diamonds. On the way out, the thief met each watchman, one at a time. To each he gave  $\frac{1}{2}$  of the diamonds he had then, and 2 more besides. He escaped with one diamond. How many did he steal originally?

(a) 54 diamonds

(c) 66 diamonds

(b) 44 diamonds

(d) 36 diamonds

36. A Chevette starts traveling east along a road. At the same time, from the same point a Porche starts traveling north at a speed 15 km/hr faster than that of car A. After one hour and twenty minutes, the cars are 100km apart. At what speeds are they traveling?

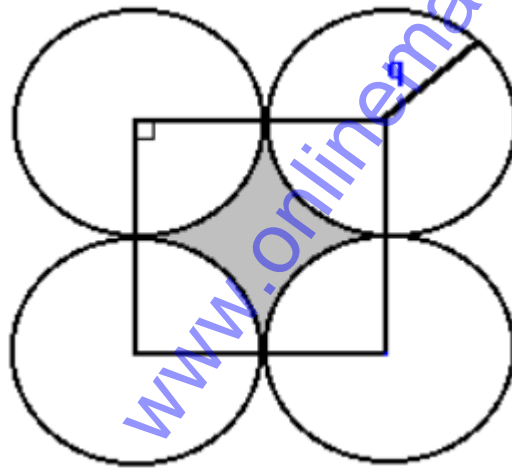
(a) 60 km/hr

(c) 66 km/hr

(b) 72 km/hr

(d) 78 km/hr

37. Three rectangles are lined up horizontally as shown. The first rectangle has a width of 1 and a length of 2. The second rectangle has a width of 2 and a length of 4. The third rectangle has a width of 4 and a length of 8. What is the area of the shaded region?



(a) 13 square units

(c) 14 square units

(b) 15 square units

(d) 16 square units



40. Mark, Mike, Lawrence and Joshua bought a motorbike for \$60.00. Mark paid one half of the sum of the amounts paid by the other boys, Mike paid one third of the sum of the amounts paid by the other boys; and Lawrence paid one fourth of the sum of the amounts paid by the other boys. How much did Joshua have to pay?

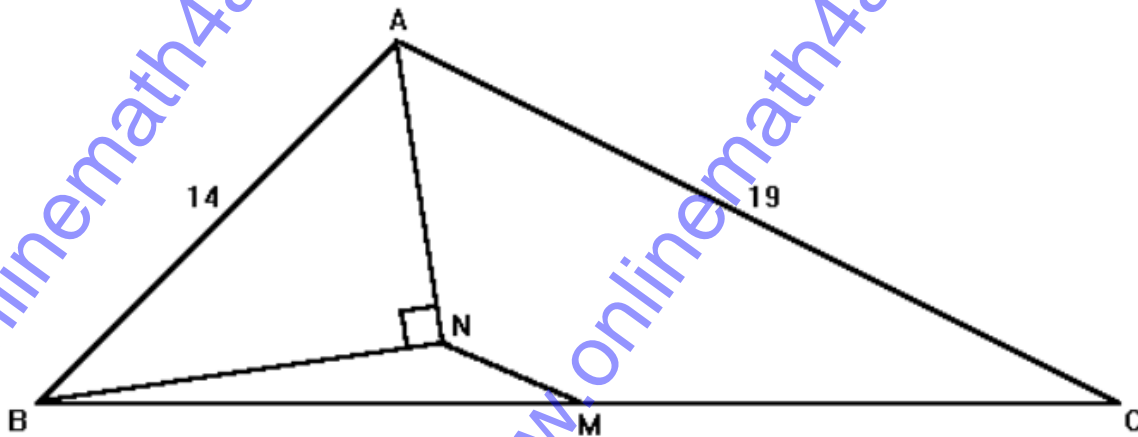
(a) \$13

(c) \$15

(b) \$14

(d) \$16

41. In a triangle  $ABC$ ,  $M$  is the midpoint of the side  $BC$ ,  $AN$  bisects angle  $BAC$ ,  $BN$  is perpendicular to  $AN$ . If sides  $AB$  and  $AC$  have lengths 14 and 19, then what is the length of  $MN$ ?



(a) 3.2

(c) 2.5

(b) 7.9

(d) 8.8

42. A set of consecutive positive integers beginning with 1 is written on the teacher's blackboard. A student came along and erased one number. The average of the remaining numbers is  $35\frac{7}{17}$ . What number was erased?

- (a) 2 (c) 6  
(b) 7 (d) 3

43. It is an odd number with three digits. All the digits are different and add up to 12. The difference between the first two digits equals the difference between the last two digits. What is the digit?

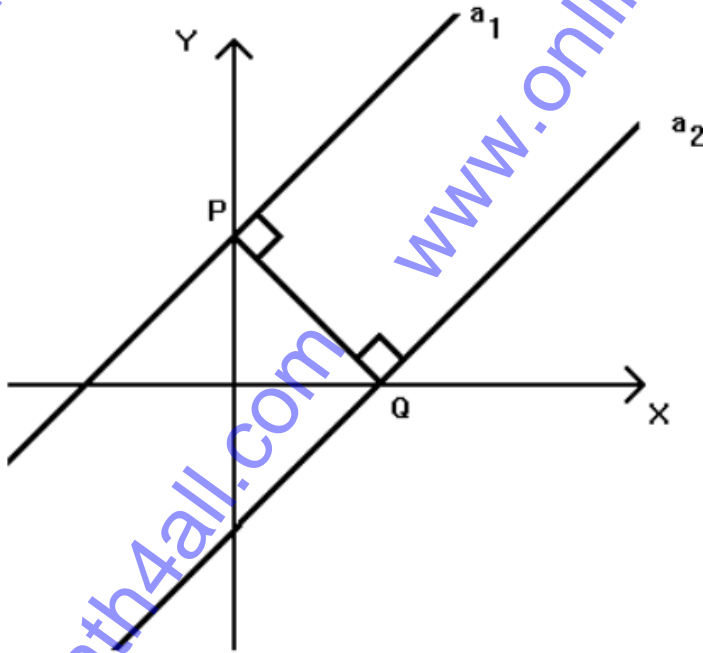
- (a) 741 (c) 147  
(b) 641 (d) 146

44. What is the real value for  $x$  such that  $x \log_2 3 = \log_{10} 3$  ?

- (a)  $\log_{10} 2$  (c)  $\log_{10} 4$   
(b)  $\log_{10} 3$  (d)  $\log_{10} 5$

45. Line  $a_1$  has equation  $y = mx + b$ . Line  $a_1$  crosses the  $y$  axis at  $p$  and line  $a_2$  crosses the  $x$  axis at  $q$ .

If  $pq$  is perpendicular to both lines, then what is the  $y$  intercept of  $a_2$ ?



(a)  $p$

(c)  $b$

(b)  $-p$

(d)  $-b$



46. If a rectangular solid has sides, front and bottom faces with areas of  $2x$ ,  $y/2$  and  $xy \text{ cm}^2$  respectively, what is the volume of the solid in centimeters cubed?

(a)  $xy \text{ cm}^3$

(c)  $3xy \text{ cm}^3$

(b)  $2xy \text{ cm}^3$

(d)  $4xy \text{ cm}^3$

47. Jean Luc, a professional painter, decided to try something a little different. He decided to create a mathematical work of art. He divides a square piece of canvas into nine equal squares and paints the central square red. He then divides each of the remaining eight squares into nine equal squares, painting each of the eight central squares so formed yellow. The remaining squares are again each divided into nine, the centers this time being painted blue. This process is continued using a different color for each new set of central squares until over half of the original area of the canvas has been painted with paint. How many central squares have been painted?

(a) 37449

(c) 37451

(b) 37450

(d) 37452

48. The Chateau family has two cupboards for its wine bottles, a small cupboard and one much larger. Being very fussy, they do not like their wine exposed to the light more than 12 times, including both the time they buy it and the time they drink it and each time they open the cupboard. If they drink one bottle each day, how often does the Chateau family need to buy wine?

(a) every 76 days

(c) every 78 days

(b) every 77 days

(d) every 79 days

49. If 3 dice are thrown, in how many ways can we obtain a sum of 15?

(a) 9

(c) 11

(b) 10

(d) 12

50. In Ottawa many fields have circular irrigation systems. A single sprinkler is placed on the center of the field. If the sprinkler sprays water just to the four edges of the field, what percent of the field is not watered?

(a) 20.2%

(c) 18.5%

(b) 23.3%

(d) 21.5%

Answers:

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