

## Set I

- 1 If a number is first multiplied by  $\frac{4}{7}$  and then divided by  $\frac{12}{7}$  then it is equivalent to which of the following operations on the number

- a) Multiplying by  $\frac{1}{3}$
- b) Dividing by  $\frac{1}{3}$
- c) Multiplying by 3
- d) Dividing by  $\frac{2}{3}$

- 2 If

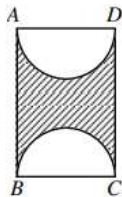
$$\begin{array}{r} A B C \\ + C B A \\ \hline D E D D \end{array}$$

Where A,B,C,D,E are distinct digits satisfying this addition, then E is

- a) 3
  - b) 5
  - c) 2
  - d) 4
- 3 Sum of the odd numbers from 1 to 2019 both inclusive, is divisible by
- a) Only 100
  - b) Only 101
  - c) Both 100 and 101
  - d) Neither by 100 nor by 101
- 4 A box of dimensions 40 x 35 x 28 units is used to keep smaller cuboidal boxes so that no space is left between the boxes. If the box is packed with 100 such smaller boxes of the same size, the dimension of the smaller box is
- a) 8x8x7 units
  - b) 8x7x7 units
  - c) 7x8x9 units
  - d) 20x7x7 units
- 5 X is a 5 digit number. Let Y be the sum of the digits of X. Let Z be the sum of the digits of Y. Then the maximum possible value that Z can have is
- a) 9
  - b) 8
  - c) 10
  - d) 12

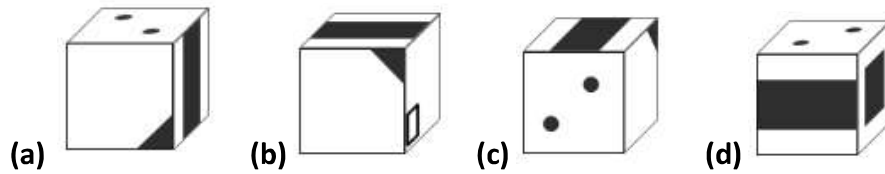
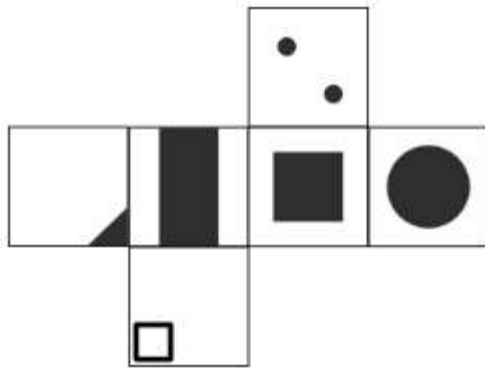
- 6 Look at the set of numbers  $\{2,3,5,7,8,10,12\}$ . Four numbers are selected from this and made into two pairs. The pairs are added and the resulting two numbers are multiplied. The smallest such product is
- 72
  - 60
  - 54
  - 64
- 7 On Thursday night, 120 college students are drinking coffee at a local café. Each student drinks either cold coffee or black coffee. One third of the students are females and one fifth of the students drink black coffee. If 10 of the students are male and drink black coffee, how many female students drink cold coffee?
- 14
  - 26
  - 40
  - 70
- 8 The product of two integers is 36 and their sum is 13. What is the positive difference between the two numbers?
- 1
  - 4
  - 5
  - 7
- 9 The highest common factor and the lowest common multiple of 264, 1980 and A are 12 and 59400 respectively. Find the largest possible value of A.
- (a) 4200    (b) 2800    (c) 3600    (d) 5400
- 10 Professor Mathias has uncovered a perplexing challenge. He presents his students with a mind-boggling problem: there are  $(-63p^4q^5r)$  captivating objects hidden in a mystical chest, waiting to be shared equally among  $(-7p^3q^2r)$  enthusiastic explorers. The precise number of treasures that will be distributed to each eager explorer is
- (a)  $-9pqr$                       (b)  $9pq^3r$                       (c)  $9pq^3$                       (d)  $441p^7q^7r^2$
- 11 In a company, the total experience of two employees is 'a' years. The manager's experience is four times 'a'. Six years hence, the manager's experience will be equal to the sum of the experiences of both employees. Find the manager's present experience.
- (a) 1 year                      (b) 2 years                      (c) 3 years                      (d) 8 years

- 12 Given that  $2 \times 5^x = \frac{10}{\sqrt[3]{25}}$ , find the value of x.
- (a)  $\frac{1}{3}$       (b)  $\frac{2}{3}$       (c)  $\frac{5}{12}$       (d)  $\frac{7}{3}$
- 13 For any positive integer m,  $3^{3m+2} - 9^{\frac{3}{2}} + \left(\frac{1}{27}\right)^{-m-1}$  is divisible by
- (a) 2      (b) 13      (c) 7      (d) 11
- 14 The sequences 3, 20, 37, 54, 71, ... and 16, 27, 38, 49, 60, 71, ... each have 71 as a common term. The next term that these sequences have in common is
- (a) 115      (b) 187      (c) 258      (d) 445
- 15 Find the remainder and the last digit of the quotient of  $\underbrace{1111 \dots 1111}_{24 \text{ digits}} \div 7$ .
- (a) 0,3      (b) 3, 3      (c) 4,3      (d) 0,4
- 16 The radii of the circular ends of a bucket of height 40 cm are of lengths 35 cm & 14 cm. What is the volume of the bucket.
- a) 60060 cubic cm  
b) 70040 cubic cm  
c) 80080 cubic cm  
d) 80160 cubic cm
- 17 For each positive integer n let  $f(n) = n^4 - 3n^2 + 9$ . Then the sum of all f (n) which are prime is
- a) 5  
b) 17  
c) 10  
d) 20
- 18 ABCD is a rectangle with AD = 10 cm. If the shaded area is 100 sq.cm, then the shortest distance between the semicircles is

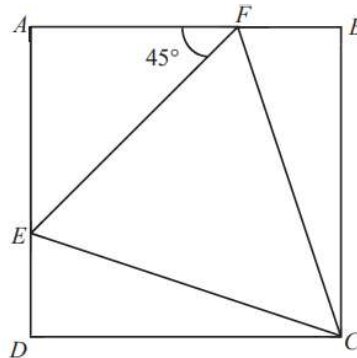


- a)  $2.5 \pi$  cm    (b)  $5\pi$  cm    (c)  $(2.5\pi - 10)$  cm    (d)  $(2.5\pi + 10)$  cm

- 19 Which of the following cubes cannot be made from the unfolded cube?



- 20 In the given figure, ABCD is a square, angle AFE =  $45^\circ$  and the ratio of AF : FB is 2:1



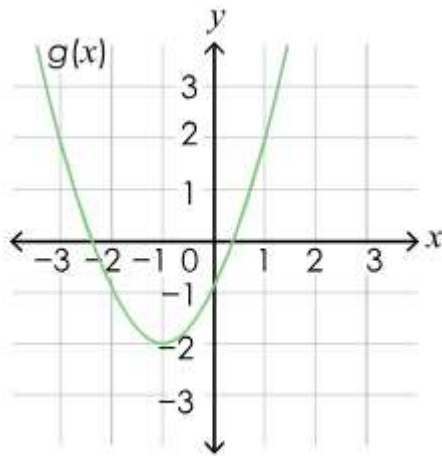
Find the ratio of the area of triangle CEF and the area of square ABCD.

- (a) 4:9      (b) 9:4      (c) 3:4      (d) 4:3
- 21 A circle and a square have the same perimeter, then
- (a) their areas are equal
  - (b) the area of the circle is greater
  - (c) the area of the square is  $\pi$  times the area of the circle
  - (d) the area of the square is  $\pi^2$  times the area of the circle

- 22 A calendar for 2019 is made using 4 sheets, each sheet having 3 months. The total number of days shown in each of the four sheets ( 1st, 2nd, 3rd, 4th) respectively is

a) (90,91,92,92)  
b) (90,92,91,92)  
c) (90,92,91,92)  
d) (90,92,92,91)

- 23 Identify the vertex and the axis of symmetry of the quadratic function shown in the graph



- (a) The vertex is at  $(-1, -2)$  and axis of symmetry is  $x = -1$   
(b) The vertex is at  $(-1, -2)$  and axis of symmetry is  $y = -2$   
(c) The vertex is at  $(-2, -1)$  and axis of symmetry is  $y = -1$   
(d) The vertex is at  $(-2, -1)$  and axis of symmetry is  $x = -2$
- 24 If 50 numbers are subtracted from 53 individually and the mean of the resulting numbers is found to be 3.5, what is the mean of the original set of numbers?
- (a) 49.5                      (b) 50.5                      (c) 56.5                      (d) 59.5
- 25 Sumedh begins his journey by walking 20 meters north from his original position. He then takes a right turn and walks 30 meters. After another right turn, he covers a distance of 35 meters. Upon taking a left turn, he walks 15 meters. Finally, he takes another left turn and walks 15 meters. What is Sumedh's final position with respect to his original position, and how far away is he in meters?
- (a) 15 meters to the west                      (b) 30 meters to the east  
(c) 30 meters to the west                      (d) 45 meters to the east

- 26 Team A and B are competing in a best of 3 games badminton finals. Each game will only result in a win or a loss. The competition ends when either one wins 2 games out of 3. The probability of team A winning in any one game is  $\frac{5}{8}$ . What is the probability that team A wins the competition?
- (a)  $\frac{75}{512}$                       (b)  $\frac{25}{32}$                       (c)  $\frac{275}{512}$                       (d)  $\frac{175}{256}$
- 27 In a class of 25 students, 80% are passing the class with a grade of C or better. If two students are randomly selected from the class, what is the probability that neither student is passing with a grade of C or better?
- (a)  $\frac{1}{30}$                       (b)  $\frac{1}{50}$                       (c)  $\frac{1}{3}$                       (d)  $\frac{2}{25}$
- 28 If a certain concrete mixture contains gravel, water and sand in a 1 to 3 to 5 ratio by weight, how many kgs of water would be needed to produce 72 kg of the mixture?
- a) 72  
b) 40  
c) 24  
d) 9
- 29 The square root of  $0.\overline{4}$  is
- (a)  $0.\overline{6}$                       (b)  $0.\overline{7}$                       (c)  $0.\overline{8}$                       (d)  $0.\overline{9}$
- 30 In a confectionery a cake originally priced at ₹ 800 is being offered with a 10% discount. However, the shopkeeper also applies a 10% tax on all bakery items. What will be the final selling price of this cake?
- (a) ₹ 700                      (b) ₹ 800                      (c) ₹ 792                      (d) ₹ 788
- 31 A group of friends decided to go on a picnic and budgeted Rs. 96 for food expenses. Unfortunately, four friends couldn't make it to the picnic. As a result, the remaining friends had to chip in an additional Rs. 4 each to cover the costs. How many friends attended the picnic in total?
- (a) 8                      (b) 12                      (c) 16                      (d) 24

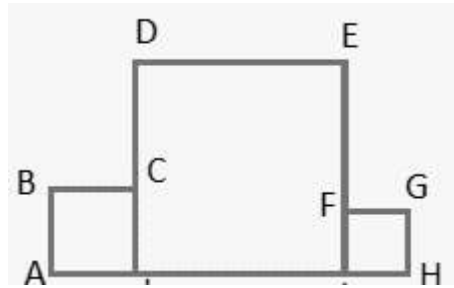
- 32 In a mixture of 40 litres, the ratio of milk to water is 9 : 1. Another 2 litres of water is added to the mixture. Find the ratio of milk to water in the new mixture.

(a) 11 : 2                      (b) 1 : 3                      (c) 1:6                      (d) 6:1

- 33 Evaluate  $\left(1 + \frac{1}{45} + \frac{1}{55} + \frac{1}{65}\right) \times \left(\frac{1}{45} + \frac{1}{55} + \frac{1}{65} + \frac{1}{75}\right) - \left(1 + \frac{1}{45} + \frac{1}{55} + \frac{1}{65} + \frac{1}{75}\right) \times \left(\frac{1}{45} + \frac{1}{55} + \frac{1}{65}\right)$

(a)  $\frac{1}{75}$                       (b)  $\frac{4}{75}$                       (c)  $\frac{3}{89}$                       (d)  $\frac{1}{65}$

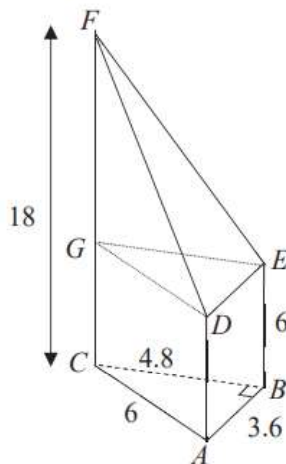
- 34 The area of the figure formed by three squares having integral sides is 142 cm<sup>2</sup>. Find the length AH.



(a) 110 cm                      (b) 20 cm                      (c) 35 cm                      (d) 80 cm

- 35 In the given figure, a solid is made up of a pyramid and prism. The base of the prism is a right angled triangle. FC, AD and EB are vertically above the base. FC = 18 cm, AD = EB = 6 cm, AB = DE = 3.6 cm, BC = GE = 4.8 cm and AC = 6cm. The ratio of volume of the prism : volume of the pyramid.

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



- 36 How many three digit integers between 310 and 400, exclusive are divisible by 3 when the tens digit and the hundreds digit are switched?
- 19
  - 22
  - 30
  - 90
- 37 S is sequence,  $s_1, s_2, s_3 \dots s_n$ , in which every term after the first is one less than three times the previous term. If  $s_5 - s_3 = 28$ , which of the following is the first term in the sequence?
- $\frac{2}{3}$
  - $\frac{8}{9}$
  - 1
  - $\frac{5}{3}$
- 38 Suppose x represents the number of adults attending a workshop and y represents the number of children attending the same workshop ( $x > y$ ). It is known that the total number of attendees is 20, and the product of the number of adults and children is 64. If the workshop organizer charges ₹ 250 per adult and ₹ 200 per child, the total revenue generated from the workshop will be
- ₹ 4800
  - ₹ 5400
  - ₹ 6000
  - ₹ 7800
- 39 Adi is 6 years older than Jon. Jon is 3 years younger than Tushar. If Adi is 19 years old, how old is Tushar?
- 17
  - 16
  - 10
  - 18
- 40 If  $(x + 9)(x + a) = x^2 + (b + 6)x + 45$  is true for all values of x, what is the value of b?
- 9
  - 8
  - 5
  - 4