

Part A

1. The next number in the sequence 4, 5, 8, 13, 20, 29, ... is :

(A) 38 (B) 39 (C) 40 (D) 42 (E) 49

2. What is the value of $2 + \frac{2}{2 + \frac{2}{2 + \frac{2}{3}}}$?

(A) 1 (B) $\frac{2}{3}$ (C) $\frac{30}{11}$ (D) 2 (E) None of these

3. What is the last digit in the product $9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$?

(A) 0 (B) 2 (C) 4 (D) 6 (E) 8

4. What is the value of $\frac{1+\sqrt{2}}{1-\sqrt{2}} + \frac{1-\sqrt{2}}{1+\sqrt{2}}$?

(A) -6 (B) $\frac{\sqrt{2}}{2}$ (C) $\sqrt{2}$ (D) +6 (E) None of these

5. The “floor” of a fraction is defined to be the largest integer which is not greater than that fraction. For example, floor ($10 / 3$) = 3. Evaluate floor (floor ($1000 / 7$) / floor ($71 / 2$)).

(A) 4 (B) 5 (C) 7 (D) 10 (E) 500

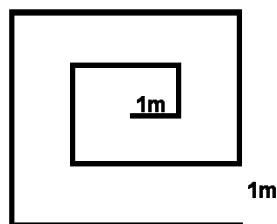
6. How many ways can the number 10 be written as the sum of exactly three positive and not necessarily different integers if the order in which the sum is written does not matter? For example, $10 = 1 + 4 + 5$ is one such sum. This sum is the same as $10 = 4 + 1 + 5$.

(A) 5 (B) 6 (C) 7 (D) 8 (E) 10

7. A rectangular floor is completely covered with tiles whose size is 1×2 . If the tiles are not cut and do not overlap, the size of the floor cannot be

(A) 4×9 (B) 8×8 (C) 11×7 (D) 16×5 (E) None of these

8. A path which is 1 m wide is partly surrounded by a fence shown in the diagram at the right. What is the length of the fence ?



(A) 20 m (B) 21 m (C) 22 m (D) 23 m (E) 24 m

9. A year is palindromic if it reads the same backwards and forward. How many such years are there in this millennium?

(A) 1 (B) 5 (C) 9 (D) 10 (E) 12

10. A student using a calculator to calculate a sum accidentally added 79012 instead of 7912. In order to correct the sum in one operation, the student should subtract:

(A) 7012 (B) 71100 (C) 71112 (D) 86924 (E) None of these

Part B

11. A $4 \times 4 \times 4$ cube consisting of smaller cubes is painted and then broken apart. How many of the smaller cubes will have exactly 2 painted sides?
- (A) 8 (B) 16 (C) 20 (D) 24 (E) 32
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12. A box contains 80 blocks, some of which are wood and some made of plastic. Each block is coloured with one of the colours red or green. If 48 of the blocks are made of wood and if 32 of the blocks are red, what is the largest possible number of green plastic blocks?
- (A) 16 (B) 24 (C) 32 (D) 48 (E) None of these
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13. One day in math class, Shelley asks the teacher “Mr. Nelson, how old are you?” Mr. Nelson responds : “This year, I am three times as old as my sister. However, six years ago, I was five times as old as she was.” “This does not help me,” replies Shelley. Help Shelley figure out how old her mathematics teacher is.
- (A) 36 (B) 40 (C) 49 (D) 55 (E) None of these
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14. What is the value of $2 - 4 + 6 - 8 + 10 - 12 + 14 - \dots - 100$?
- (A) -50 (B) 0 (C) 50 (D) 100 (E) None of these
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15. Four children find a bag of marbles and divide them among themselves. Each child takes a different number of marbles and no child has more than twice as many marbles as anyone else. The smallest possible number of marbles in the bag was
- (A) 10 (B) 15 (C) 18 (D) 21 (E) None of these
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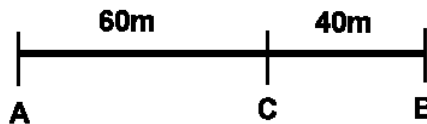
16. Exactly 100 people live in a village. The oldest person in the village was born in 1900 and everybody in the village was born in a different year but all on January 1st. In 1999, the sum of the digits in Julie's birth year was equal to her age. How old was she?

(A) 4 (B) 12 (C) 16 (D) 23 (E) None of these

17. We define the operation “o” as follows : $a \circ b = a \times b + a - b$. What is the value of the expression $(2 \circ 5) \circ (5 \circ 2)$?

(A) 81 (B) 113 (C) 117 (D) 169 (E) None of these

18. Alphonse starts at point A and runs at a constant rate toward point C. At the same time, Brigitte starts at point B and runs toward point C also at a constant rate. They arrive at C at exactly the same moment. If they continue running in the same directions, Alphonse arrives at B exactly 10 seconds before Brigitte arrives at A. How fast was Brigitte running?



(A) 3 m/sec (B) $\frac{10}{3}$ m/sec (C) $\frac{13}{3}$ m/sec (D) 5 m/sec (E) Not enough information

19. A box contains some apples. Andrée takes $\frac{1}{2}$ of them along with one extra apple. Beatrice takes $\frac{1}{3}$ of the remaining apples along but puts two apples back into the box and finally Corrine takes $\frac{5}{6}$ of the remaining apples along with one more apple. There are now 7 apples left in the box. How many apples were in the box before Andrée took her share?

(A) 16 (B) 44 (C) 110 (D) 140 (E) None of these

20. During a mathematics test, 18 students answered question 1 correctly, 23 students answered question 2 correctly, 8 students got them both correct and 11 students answered incorrectly on both questions. How many students took the test?

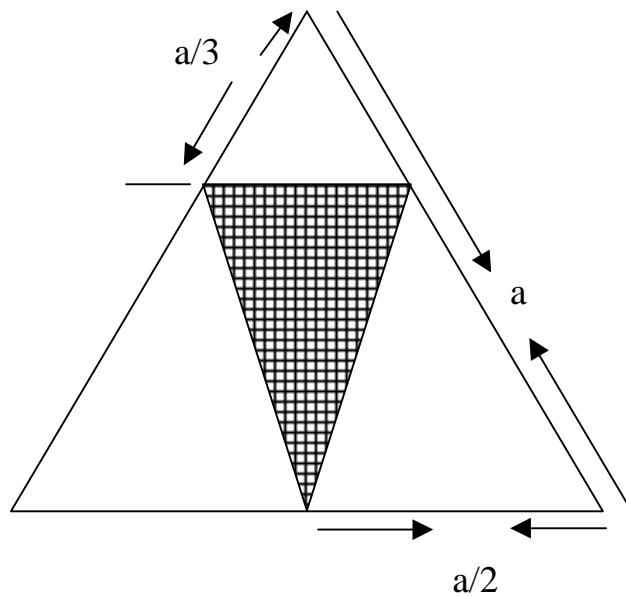
(A) 41 (B) 44 (C) 49 (D) 52 (E) 60

Part C

21. How many three digit numbers can be constructed using the digits 1, 2, 3, 4, 5 if the same digit cannot appear twice in a row in any of the numbers?

(A) 60 (B) 65 (C) 80 (D) 120 (E) None of these

22. In the figure below, the area of the shaded triangle is $2\sqrt{3}$. If the large triangle and the small upper triangle are equilateral, what is the value of a ?

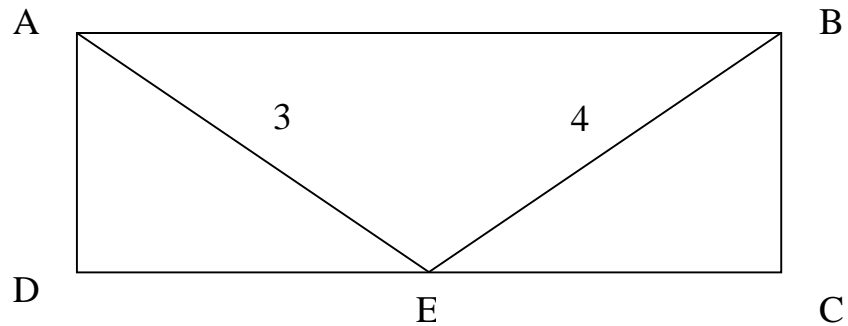


(A) 2 (B) 2.5 (C) 3 (D) 6 (E) None of these

23. A set of $1 \times 1 \times 1$ cubes is used to construct a hollow $10 \times 10 \times 10$ cube whose shell is two layers of cubes in thickness. How many cubes are needed?

(A) 750 (B) 784 (C) 792 (D) 800 (E) None of these

24. Consider the rectangle ABCD below. E is a point on CD such that $AE = 3$, $BE = 4$ and $AE \perp BE$.



The area of rectangle ABCD is :

- (A) 8 (B) 10 (C) 12 (D) 14 (E) None of these
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25. The next number in the sequence $1, \frac{4}{3}, 2, \frac{16}{5}, \frac{16}{3}, \frac{64}{7}, \dots$ is

- (A) $\frac{128}{9}$ (B) $\frac{92}{5}$ (C) 16 (D) $\frac{108}{7}$ (E) None of these
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26. What is the value of the sum :

$$1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + 9 + \dots - 99 - 100?$$

- (A) -100 (B) 0 (C) 1 (D) 100 (E) None of these
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