

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
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2. 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
-

3. During a sale, the price of a book is reduced by 25%. The new price is then further reduced by 40%. The cost of the book as a percentage of its original price is

- (A) 35% (B) 37.5% (C) 45% (D) 55% (E) None of these
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4. 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
-

5. Which of the following expressions has the greatest value?

- (A) $(2^2)^5$ (B) $(2.5)^2$ (C) $\frac{2}{(\frac{1}{10})}$ (D) $(5^2)(2^5)$ (E) $(5^2)^2$
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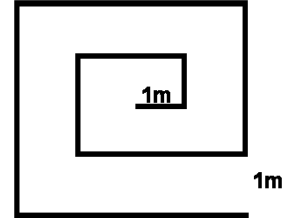
6. $\frac{a}{b}$ is a fraction. If 2 is added to the numerator, the value of the fraction is $\frac{1}{2}$. If 3 is added to the denominator, the fraction has a value of $\frac{1}{3}$. The value of the sum $a+b$ is

- (A) 18 (B) 19 (C) 20 (D) 22 (E) 25
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7. To the nearest integer, 125% of 25 is

- (A) 20 (B) 30 (C) 31 (D) 32 (E) None of these
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8. A path which is 1m wide is partly surrounded by a fence shown in the diagram at right. What is the length of the fence?



- (A) 20 m (B) 21 m (C) 22 m (D) 23 m (E) 24 m
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9. A country with 135 million persons has an area of 150000 square kilometres. The population density, expressed in the number of persons per square kilometre is

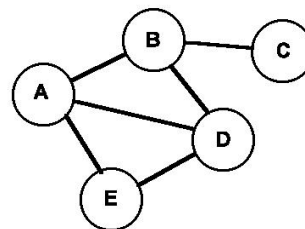
- (A) .09 (B) .9 (C) 9 (D) 90 (E) 900
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10. A year is palindromic if it reads the same backwards and forwards. How many such years are there in this millenium?

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

11. The map shows the roads connecting 5 cities. A tour consists of visiting each of the cities by road exactly once. For example, AEDBC represents a tour. How many different tours are there?



- (A) 2 (B) 4 (C) 6 (D) 8 (E) None of these
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12. 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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13. The “floor” of a fraction is defined to be the largest integer which is not greater than that fraction. For example, $\text{floor} (10 / 3) = 3$. Evaluate

$$\text{floor} (\text{floor} (1000 / 7) / \text{floor} (71 / 2)).$$

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

14. 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
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15. One day in a 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.” How old is the mathematics teacher?

- (A) 36 (B) 40 (C) 49 (D) 55 (E) None of these
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16. 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
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17. 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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18. During a mathematics test, 18 students answered question 1 correctly, 23 students answered question 2 correctly, 8 of them 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) None of these
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19. 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
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20. A box contains 80 blocks, some of which are made of wood and some of which are 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?

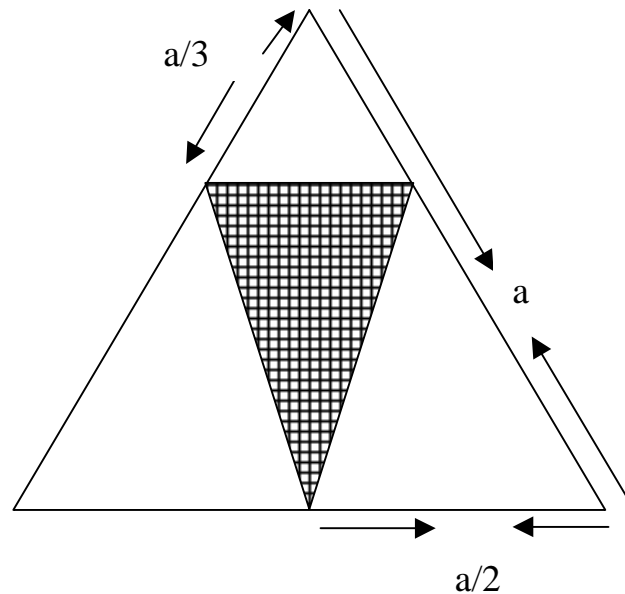
- (A) 16 (B) 24 (C) 32 (D) 48 (E) None of these
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Part C

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

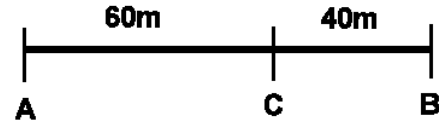


- (A) 2 (B) 2.5 (C) 3 (D) 6 (E) None of these
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23. How many ways can the number 10 be written as the sum of exactly three positive and not necessarily different integers if the order in which the sum is written does not matter? For instance, $10 = 1 + 4 + 5$ is one such sum. This sum is the same as $10 = 4 + 1 + 5$.

- (A) 5 (B) 6 (C) 7 (D) 8 (E) 10
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24. 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/s (B) $10/3$ m/s (C) $13/3$ m/s (D) 5 m/s (E) Not enough information
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25. 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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26. 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
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