Part A

1. Evaluate the expression

$$\frac{\dfrac{4}{3} - \dfrac{3}{4}}{\dfrac{3}{2} - \dfrac{2}{3}}$$

(A) $\dfrac{7}{10}$ (B) $\dfrac{5}{7}$ (C) 1 (D) $\dfrac{7}{5}$ (E) $\dfrac{10}{7}$

2. The sum of my age and my sister's age is 11. The product of our ages is 24. What is the difference of our ages?

(A) 1 (B) 3 (C) 5 (D) 7 (E) 9

3. What is the surface area of a solid rectangular box whose sides are of lengths, 8 cm, 12 cm and 20 cm?

(A) 248 cm^2 (B) 496 cm^2 (C) 992 cm^2 (D) 1920 cm^2 (E) None of these

4. The first three terms of a sequence are 3, 2, and 1. Each succeeding term is the sum of the last three terms. What is the 8th term of the sequence?

(A) 31 (B) 47 (C) 50 (D) 56 (E) 103

5. Three stones are weighed on a scale, two at a time. The scale shows weights of 49 kg, 63 kg, and 80 kg. How much does the heaviest stone weigh?

(A) 30 kg (B) 36 kg (C) 40 kg (D) 47 kg (E) Not enough information

6. A palindrome is an integer that reads the same forward and backwards. For example, 31213 is a 5 digit palindrome. How many 3 digit palindromes are even?

(A) 30 (B) 36 (C) 40 (D) 45 (E) 50

7. The sum of the integers from 1 to 25 is 325. What is the sum of the integers from 26 to 50?

(A) 625 (B) 650 (C) 925 (D) 950 (E) None of these

8. A farmer has 252 kg of apples. The apples are put into 2 kg and 5 kg bags. If the farmer uses twice the number of 5 kg bags as 2 kg bags, how many bags are used altogether?

    (A) 21   (B) 42   (C) 56   (D) 63   (E) 70

9. Each day Bob walks back and forth to his work from his home following the same path. He always walks at 2 km/h going up hills, at 3 km/h on level ground, and at 6 km/h going down hills. If the duration of a daily round trip is 2 hours, what distance does Bob walk from his home on his way to his work?

    (A) 1 km   (B) 2 km   (C) 3 km   (D) 4 km   (E) Not enough
                                                                            information

10. Two identical pieces of paper with dimensions of seven by six are placed in the corners of a square of side length equal 10 as shown in the diagram. What is the area of the shaded region? The longer side of each sheet of paper is parallel to the vertical sides of the square.
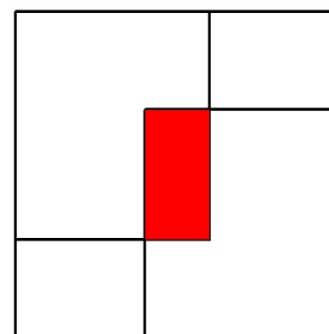
    (A) 4   (B) 8   (C) 12   (D) 16   (E) None of these

Part B

11. You have a bag filled with a large amount of 5 cent, 10 cent, and 25 cent coins. In how many distinct ways can you make the sum of $1 out of these coins? There are enough of each kind to make all needed combinations.

    (A) 25   (B) 26   (C) 27   (D) 28   (E) 29

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12. Which of the following numbers is closest to the number of seconds in one week?

    (A) 20 000   (B) 60 000   (C) 200 000   (D) 400 000   (E) 600 000

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13. Ahcène, Nabil and Paul play each other in a tournament. Each game has a winner and a loser. The winner of the tournament is the first to win 10 games and the tournament ends when a winner is found. They play each other in the order: Ahcène vs. Nabil, Ahcène vs. Paul, and Nabil vs. Paul, repeating this order until the tournament ends. What is the smallest possible number of games in the tournament?

    (A) 10   (B) 13   (C) 14   (D) 15   (E) 20

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14. Three men can cut 72 trees in three hours. Because of a shortage of space, each time one man is added, each of the workers can cut one less tree per hour. How many trees can 5 men cut in 5 hours?

    (A) 30   (B) 50   (C) 90   (D) 150   (E) 200

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15. A number is said to be prime if it is evenly divisible only by itself and by one. Among the numbers given below, which one is not a prime number?

    (A) 107   (B) 109   (C) 111   (D) 113   (E) All are prime

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16. How many ways can the numbers 1, 2, 3, 4 and 5 be placed in a line so that neither 1 nor 5 occupy either the first or the last place in the sequence?

    (A) 6   (B) 24   (C) 36   (D) 54   (E) 72

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17. Which of the following has the largest value?

    (A) $1 + 2 + 3 + ... + 2008$ (B) 2 008 000 000   (C) 2008 trillion

    (D) $1 \times 2 \times 3 \times ... \times 2008$ (E) 2008^{2008}

18. How many ways can we select four squares from the figure shown to create a connected region? A region is connected if each square shares at least one edge with some other square. For example, the region formed by the squares labelled 1,2,3 and 4 is connected.

1	4
2	5
3	6

   (A) 8　　　　(B) 9　　　　(C) 10　　　　(D) 12　　　　(E) 13

19. To enter a very private garden you need to go through four doors. At each door you must pay an entry fee. If you pay $x at a given door, then you must pay $(2x + 1) at the next door. If it costs a total of $86 to get through the four doors, how much did you pay to get through the first door?

   (A) $3　　　　(B) $4　　　　(C) $6　　　　(D) $7　　　　(E) None of these

20. A chocolate bar with lines printed on it is shown in the figure at right. How many ways can the chocolate bar be cut into exactly two pieces? Cuts can only be made along the dashed lines.
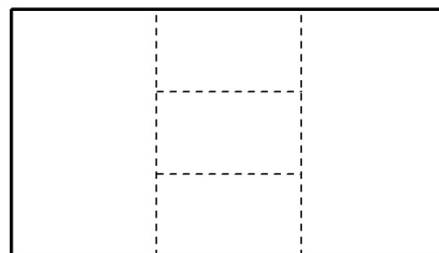
   (A) 9　　　　(B) 10　　　　(C) 11　　　　(D) 13　　　　(E) 15

Part C

21. Three squares have sides of different integer lengths, a, b, and c. The total area of the three squares cannot be

    (A) 14 (B) 29 (C) 50 (D) 88 (E) 101

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22. Maureen likes to play a game in which she reduces a number to a single digit. She adds the digits of the number together. When the total is still greater than nine, she adds the digits of the total together and continues in this way until she ends up with a single digit number. If Maureen does this for each of the integers from one to 100, how many times will she end up with a final result equal to one?
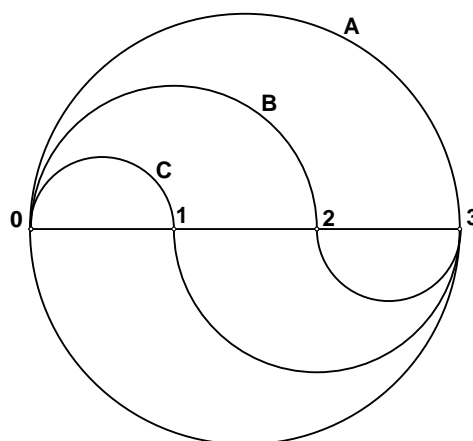
    (A) 3 (B) 10 (C) 11 (D) 12 (E) 21

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23. How many 4-sided figures can be found in the drawing at right?
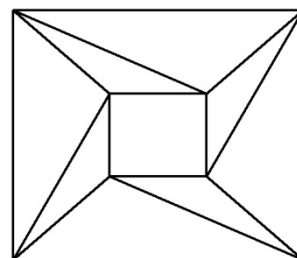
    (A) 10 (B) 12 (C) 13 (D) 14 (E) 18

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24. A is a circle whose diameter is equal to 3 units. Curves B and C are both made from one half circle of diameter equal to 1 unit and one half circle whose diameter is equal to 2 units. What is the area of the region located between curves B and C?

    (A) $\frac{3}{4}$ (B) $\frac{3\pi}{4}$ (C) 3 (D) 3π (E) None of these

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25. How many ways can seven different single digit positive integers be chosen so that the sum of those integers equals 37?

    (A) 2 (B) 3 (C) 6 (D) 7 (E) 36

26. How many zeros appear at the end of the product $1 \times 2 \times 3 \times 4 \times \ldots \times 50$?

    (A) 5   (B) 10   (C) 12   (D) 13   (E) None of these