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Upper Primary Division Round 2

Questions 1 to 5, 4 marks each

1. What is the value of $44 \times 49 \times 25$?

- (A) 43900 (B) 52900 (C) 53200 (D) 53825 (E) 53900

Answer : _____

2. A hotel staff distributes four room keys to four travelers randomly. It is known that exactly two of the travelers get their correct room keys. How many different ways are there of distributing the keys to the four travelers?

- (A) 3 (B) 4 (C) 6 (D) 8 (E) 10

Answer : _____

3. How many factors of $3^4 \times 5^6 \times 7^{10}$ are relatively prime to 15?

- (A) 10 (B) 11 (C) 20 (D) 21 (E) 44

Answer : _____

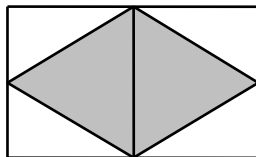
4. A total of 20 students and teachers visit a museum. The original price of each admission ticket is \$200. It is known that teachers are offered 10% discount, while students are offered 50% discount in purchasing the admission tickets. If the total admission fee is \$2640, how many teachers are there?

- (A) 6 (B) 8 (C) 10 (D) 14 (E) 16

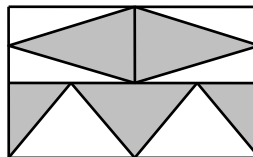
Answer : _____

5. In each of the following options, the dimensions of the rectangle are 10 cm by 6 cm. There are some shaded triangles inside each rectangle. The vertices of the shaded triangles must be either at the endpoints of a line segment or points that divide it into equal parts. From the options below, which figure has the largest shaded region?

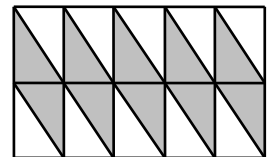
(A)



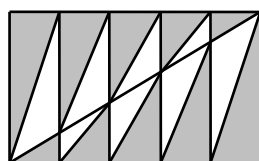
(B)



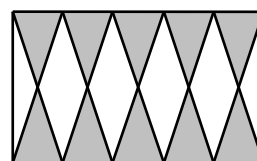
(C)



(D)



(E)



Answer : _____

Questions 6 to 13, 5 marks each

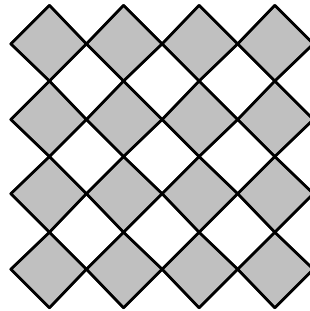
6. Use the digits 2, 0, 1 and 7 once and without repetition to create all possible 4-digit numbers. How many of these numbers leave a remainder of 4 when divided by 11?

Answer : _____

7. The lengths of two sides of a triangle are 6 cm and 13 cm respectively. It is known that the length of the third side is also an integer (in cm.). What is the minimum perimeter of this triangle?

Answer : _____ cm

8. Refer to the diagram below, where 16 black squares and 9 white squares are arranged alternately such that it will form a figure in which there are 7 bricks on its diagonals, and all the outer bricks are black.



Using the similar pattern stated above, if we want to form figures in which there are 11 bricks on its diagonals, how many black square tiles are required?

Answer : _____ black square tiles

9. Fill in the 4×4 box so that the numbers 1, 2, 3, and 4 appear exactly once in each row and column. Refer to the figure below, what is the sum of the values of A and B?

	A	4	
B		1	
1	2	3	4
3	4	2	1

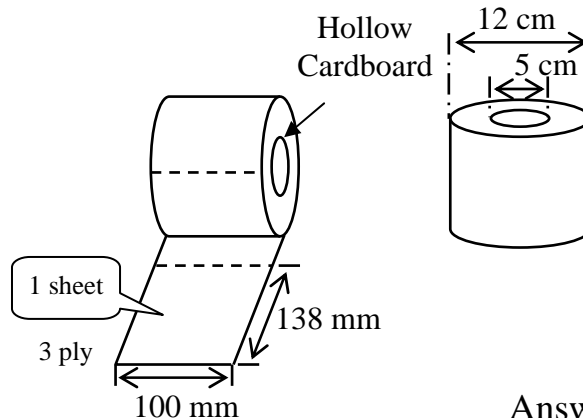
Answer : _____

UP 3

10. Alex and Charles both sent parcels of weight exceeding 10 kg. The postage rates Alex and Charles were both sending parcels. The postage rates are as follows: For the first 10 kg and below, the postage price is \$6 per kg; the postage price for each successive kilogram after 10 kg is \$2 lower than the original price. Given that Alex's parcel is 20% heavier than Charles' and his postage price is \$12 more than that of Charles, find the weight, in kg, of the parcel sent by Alex?

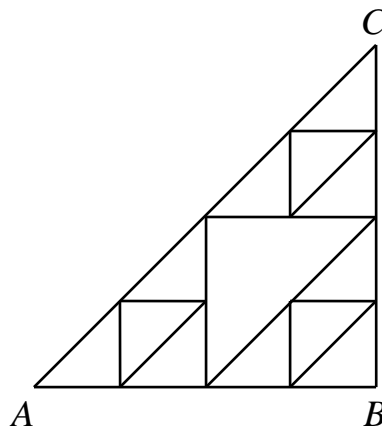
Answer : _____ kg

11. Refer to the figure below where a pack of cylindrical-shaped tissue paper roll is shown, where the middle part is made up of a hollow rolled cardboard. The tissue paper is divided into several sheets and rolled over the cardboard. The pack indicates: "138 mm × 100 mm per sheet, 3 ply", which means that each sheet is 138 mm long and 100 mm wide and it contains 3 layers. Given that each roll of tissue paper is 0.13 mm thick, the diameter of cardboard roll is 5 cm, and the diameter of the rolled tissue paper is 12 cm, how many sheets of tissue paper, rounding to integer, are there in a pack? (Take $\pi = 3.14$)



Answer : _____ sheets

12. The diagram below is composed of many right angled isosceles triangles. Suppose an ant wants to travel from point A to point C, in how many ways can this be done if we are only allowed to move up, right or diagonally?



Answer : _____ ways

UP4

13. From the set of positive integers from 1 to 174 inclusive, select 12 different positive integers such that their sum is 2017. In how many different ways can the 12 integers be selected?

Answer : _____ ways

Questions 14 to 15, 20 marks each
(Detailed solutions are needed for these two problems)

14. A bag contains 2017 balls that are numbered from 1 to 2017. At least how many balls must be taken out so that among those balls, there will always be 3 balls, in which the sum of the numbers on the first two balls is the number on the third ball?

Answer : _____ balls

UP 5

15. There are eight numbers namely 1, 2, 3, 4, 5, 6, 7 and 8. Choose at least two **different** numbers from the eight numbers such that the difference of any two of the chosen numbers neither equals to 2 nor 6 (For example, if 1 is already chosen, 3 and/or 7 cannot be chosen). What is the number of different ways to choose the numbers?

Answer : _____ ways
