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## Upper Primary Division Round 2

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### Questions 1 to 5, 4 marks each

1. What is the value of  $57.6 \times \frac{8}{5} + 28.8 \times \frac{184}{5} - 14.4 \times 80$ ?

- (A) 0            (B) 8            (C) 14.4            (D) 38.8            (E) 57.6

Answer : \_\_\_\_\_

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2. Max gives 27 apples to a group of friends. The numbers of apples they receive are consecutive positive integers. What is the maximum size of this group?

- (A) 2            (B) 3            (C) 4            (D) 5            (E) 6

Answer : \_\_\_\_\_

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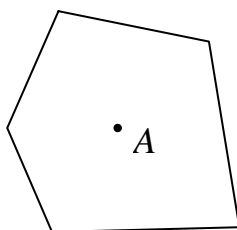
3. What is the sum of all possible two-digit perfect squares such that the sums of their digits are also perfect squares?

- (A) 100            (B) 110            (C) 117            (D) 181            (E) 271

Answer : \_\_\_\_\_

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4. The diagram shows a point A inside a pentagon with area  $20 \text{ cm}^2$ . If the distance from A to each side of the pentagon is 5 cm., what is the perimeter, in cm, of the pentagon?



- (A) 4            (B) 8            (C) 10            (D) 15            (E) 20

Answer : \_\_\_\_\_

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5. What is the sum of the digits of the number whose square is equal to  $15984 \times 48951$ ?

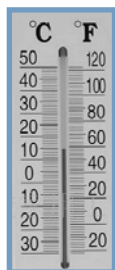
- (A) 18            (B) 21            (C) 24            (D) 27            (E) 36

Answer : \_\_\_\_\_

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**Questions 6 to 13, 5 marks each**

6. The usual thermometer has two scales, Celsius measured in  $^{\circ}\text{C}$  and Fahrenheit measured in  $^{\circ}\text{F}$ . If  $m^{\circ}\text{C}$  is the same temperature as  $n^{\circ}\text{F}$ , the conversion formula is  $m \times \frac{9}{5} + 32 = n$ . What is the value of  $m$  if  $m^{\circ}\text{C}$  is the same temperature as  $n^{\circ}\text{F}$  and  $m + n = 60$ ?



Answer : \_\_\_\_\_  $^{\circ}\text{C}$

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7. The diagram shows two intersecting circles of radius 10 cm. The four arcs inside each circle have the same shape and equal length. Taking  $\pi \approx 3.14$ , what is the area, in  $\text{cm}^2$ , of the shaded region which consists of 7 identical parts?



Answer : \_\_\_\_\_  $\text{cm}^2$

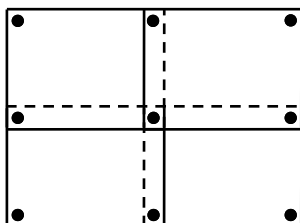
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8. The total number of players on three badminton teams is 29. No two players on the same team play against each other, while every two players on different teams play each other exactly once. What is the maximum number of games played?

Answer : \_\_\_\_\_ games

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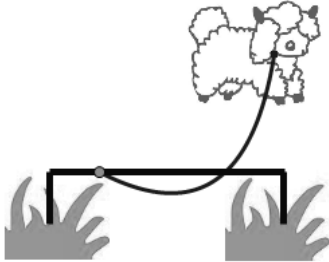
9. A class is putting up 40 rectangular posters of the same shape and size on a wall. Each poster must be held in place by one nail near each corner. Adjacent posters may overlap slightly so that the same nail can serve to hold both of them. The diagram shows how 9 nails can hold four posters adjacent diagonally. What is the minimum number of nails required to hold all 40 posters?



Answer : \_\_\_\_\_ nails

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10. The diagram shows a sheep on a lawn, tied by a string to a metal rod parallel to the ground. The length of the string is 10 m, the length of the metal rod is 3 m. The sheep is of negligible size and the height of the rod above the ground is also negligible. Taking  $\pi \approx 3.14$ , what is the area, in  $\text{m}^2$ , of the part of the lawn from which the sheep can eat the grass?



Answer : \_\_\_\_\_  $\text{m}^2$

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11. Leon uses a code to convert a letter string consisting only of As, Bs and Cs, into a number string consisting only of 0s and 1s, by replacing A with 101, B with 11 and C with 0. If the number string obtained is 111010101111100110101, what is the number of letters in the original letter string?



Answer : \_\_\_\_\_

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12. Divide the ten positive integers from 1 to 10 into two groups so that when the product of the numbers in the first group is divisible by the product of the numbers in the second group, the quotient is a positive integer. What is the minimum value of this quotient?

Answer : \_\_\_\_\_

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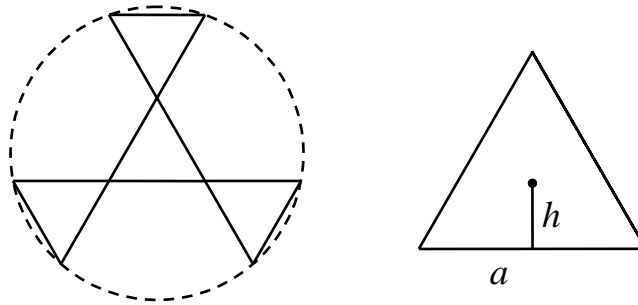
13. Wally writes down three positive integers  $a$ ,  $b$  and  $c$  in a row on the blackboard, where  $a + c = 2b$ . He then erases the commas between the three numbers to obtain a five-digit number. What is the maximum value of this number?

Answer : \_\_\_\_\_

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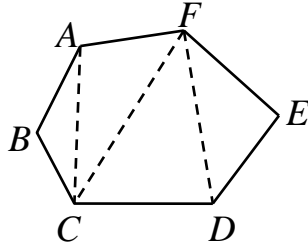
**Questions 14 to 15, 20 marks each**  
**(Detailed solutions are needed for these two problems)**

14. In an equilateral triangle of side length  $a$ , the distance  $h$  from the centre of the triangle to any side satisfies  $a^2 = 12h^2$ . Lily uses four equilateral triangles of side length 6 cm to make a cardboard windmill with three blades. Two triangles sharing a common vertex have the corresponding sides lying on the same straight line, as shown in the diagram. Taking  $\pi \approx 3.14$ , what is the area, in  $\text{cm}^2$ , of the circle swept out by the blades of the windmill?



Answer : \_\_\_\_\_  $\text{cm}^2$

15. The diagram shows a hexagon  $ABCDEF$  partitioned into four triangles by three diagonals  $AC$ ,  $CF$  and  $FD$ , no two of which intersect except at the vertices. What the total number of ways of partitioning  $ABCDEF$  into four triangles with three non-crossing diagonals?



Answer : \_\_\_\_\_ ways

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