



ECIS Mathematics League 2005

Archimedes League (suggested age 12-14) No Calculators

Section 1 – 40 minutes (6 questions)

1. Find the value of $4 + \frac{2}{10} + \frac{4}{1000}$.

2. If $x - y > x$ and $y - x < y$, then

- (A) $x < 0$ (B) $x < y$ (C) $x = y$ (D) $y > 0$ (E) $x > y$

3. A Garden, **10m x 10m**, is enclosed by a sidewalk of width 1m. Find the area of the sidewalk, in square metres.

4. When $2^7 - 2$ is divided by 7 and $2^5 - 2$ is divided by 5. What is the sum of the quotients (results of the division)

5. Some students decide to split equally the cost of a **\$3.00** pizza. When it arrives, two of the students find they have no money and the remaining students have to pay an extra 40 cents each. Find the number of students originally involved.

6. A **3cm by 3 cm by 4 cm** block is built from 1 cm cubes, each of which is coloured red or white. If the colours of the individual cubes alternate, find the number of red faces, which are hidden from sight in the interior of the block.

End of section 1

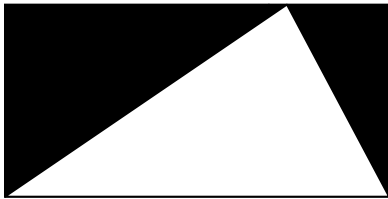


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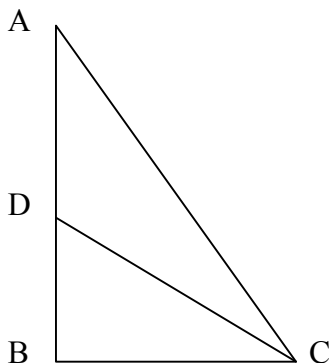
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Section 2 – 40 minutes (6 questions)

1. It takes $4\frac{1}{2}$ minutes to play Billy's favourite song on a disc recorded at **45** revolutions per minute. Billy accidentally played this disc at $33\frac{1}{2}$ revolutions per minute. How many revolutions of the disc were required to play the song?
2. Whenever Sandy enters a two – digit number into his calculator, he always enters the digits in reverse order. He is asked to add up the numbers **89, 98, 47, 77, and 85**. By how much will his answer differ from the correct answer?
3. In the diagram, the rectangle has **length 11 and width 7**. What is the area of the shaded part?



4. Suppose the value of one Singapore dollar is **30%** more than the value of one American dollar. An American tourist in Singapore purchases a **\$ 35.00** souvenir with thirty US dollars. What should his change, in Singapore dollars, be from this purchase?
5. Martin's age, when divided by **2, 3, 4, 5, or 6** gives remainder of **1**. Find the least age that Martin could be, given that he is older than 1.
6. In the diagram, **AB = 15 cm, DB = 6 cm, BC = 8cm, and $\angle B = 90^\circ$** . Find the perimeter of triangle ADC.



End of section 2

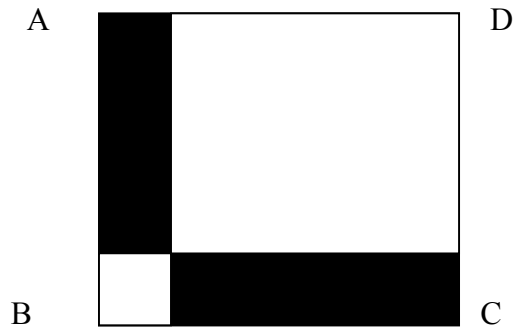


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Section 3 – 40 minutes (6 questions)

1. You are given one hour to complete a contest. After **35** minutes have passed what is a **fraction of the hour** that remains (give your answer as a **fraction** in simplest form)
2. The area of the two unshaded squares inside the ABCD square are **4cm^2** and **9cm^2** . What is the area of the shaded part, **in cm^2** ?



3. A six – digits number is formed by repeating a three – digit number: for example **265265** or **345345**. What is the largest integer, which will divide all such numbers?
4. The numbers **1, 2, 3, and 4** are placed in the empty squares so that each row, each column, and each diagonal contains each of the four numbers. Find the sum of the two numbers, which should be placed in the two squares marked with an asterisk (*)

1	2	3	4
4			1
*	*		

5. On opposite sides of a street, there are **45** streetlights in total, each one at a distance of **30** metres from the other. The streetlights on one side are arranged so that each lamp fills a gap between two other streetlights on the opposite side (so no two lights are opposite each other).



How long is the street?

6. A car is driven up a ten –mile long hill at **30 km/h**, and continues down the other side, which is also ten mile in length. What speed the car must be driven on the down slope, in km/h, in order to average **50 km/h** for the whole trip?

End of section 3



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Answers. **Award 1 point for each correct answer.**

Section 1

1. 4.204
2. E
3. 44 m²
4. 24
5. 5 students
6. 75

Section 2

1. 202 $\frac{1}{2}$
2. No difference or 0
3. $77/2$ or 38 $\frac{1}{2}$ or 38.5
4. \$4.00
5. 61
6. 36

Section 3

1. 5/12
2. **12**
3. 1001
4. **7**
5. **660**
6. 150km/h (accept 150)