



ECIS Mathematics League
Archimedes League 2007
(Suggested age 12-14)

Section One

**Calculators are not
allowed**

Time: 40 minutes

1. The angles of a triangle are in the ratio **3:4:5**. What is the sum of the two biggest angles?
2. **George** has twice as much as **Barry**.
Barry has twice as much as **Monica**.
Monica has twice as much as **Ahmed**.
Altogether they have **\$120**. How much does **Barry** have?
3. An **isosceles** triangle has sides that measure 10cm and 3cm. What is the perimeter of the triangle?
4. The digits of the number **9145** are first arranged in descending order and then in ascending order. What is the difference between the resulting numbers?
5. A man who is **6 feet** tall casts a **2.5 foot** shadow. If, at the same time, a telephone pole casts a **10 foot** shadow, what is the **height of the pole**?
6. What is the next number in the sequence 1, 1, 3, 15, 105, 945 ?



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Section Two

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1. Given that $\frac{10}{x} + \frac{20}{x} + \frac{30}{x} + \frac{40}{x} = \frac{4}{3}$. Find x .
2. A brick on one side of a balance exactly balances with **three-quarters** of a brick and **three quarters of a kilogram** on the other side of the balance. What is the weight of the brick?
3. A sphere of a radius r has surface area $4\pi r^2$ and the volume $\frac{4}{3}\pi r^3$. Find the ratio of the surface area to the volume in its simplest form.
4. Two squares have sides of lengths X cm and $(2X+1)$ cm, respectively. The sum of the perimeters of these two squares equals 100cm. Find X .
5. When doing an addition on a calculator, a student made a mistake and added **36092** instead of **36.92**. To correct the mistake in a single step, what number should the student subtract?
6. The number **2007** can be written as a product of only three positive **prime factors**, $2007 = a \times b \times c$. What is the sum of $a + b + c$?



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Section Three

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1. Calculate $\frac{1}{3} \times \frac{2}{4} \times \frac{3}{5} \times \frac{4}{6} \times \frac{5}{7} \times \dots \times \frac{98}{100}$.
2. The longest side of a rectangular box is **10 cm**. The shortest side is 6 cm. Which of the following numbers written below could represent the volume of the box?
A. 60 B. 120 C. 300 D. 480 E. 720
3. If a car goes **1 mile at 30 miles per hour**, and then goes **another 2 miles at 40 miles per hour**, what is its average speed for **the 3 miles**?
4. If **x = 1**, calculate the value of 5^{x^2-x} .
5. An athlete runs **100 m in 12 seconds**. Calculate her speed in **km/h**.
6. Out of all consecutive two digit numbers **from 10 to N inclusive**, there are only 15 numbers that are divisible by the sum of their digits. **What is the smallest value of N?**



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Answers: - "accept a correct numeric answer without units"

Section 1

1. 135°
2. 32\$
3. 23cm
4. 8082
5. 24 feet
6. 10395

Section 2

1. 75
2. 3kg
3. $\frac{3}{r}$
4. $x = 8\text{cm}$
5. 36055.08
6. 229

Section 3

1. $\frac{1}{4950}$
2. D
3. 36 ml/h
4. 1
5. 30km/h
6. 54