

## Sequences (Intermediate UKMT)

These questions must be attempted **without a calculator**

*Topics covered in the questions below may not necessarily be from the topic of the title.*

1. If  $p$  is a positive integer and  $q$  is a negative integer, which of the following is greatest?

A  $p - q$     B  $q - p$     C  $p + q$     D  $-p - q$     E More information needed

2. In the calculation  $1003 \div 4995 = 0.2\dot{0}08$ , the number  $0.2\dot{0}08$  represents the recurring decimal fraction  $0.2008008008008\dots$

When the answers to the following calculations are arranged in numerical order, which one is in the middle?

A  $226 \div 1125 = 0.200\dot{8}$     B  $251 \div 1250 = 0.2008$     C  $497 \div 2475 = 0.20\dot{0}8$   
D  $1003 \div 4995 = 0.2\dot{0}08$     E  $2008 \div 9999 = 0.2\dot{0}08$

3. The sum of 9 consecutive positive whole numbers is 2007.

What is the difference between the largest and smallest of these numbers?

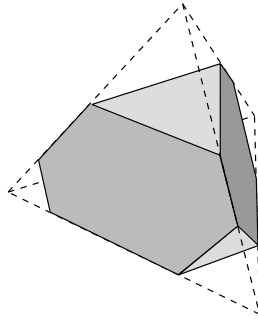
A 8                    B 9                    C 10                    D 18                    E 223

4. The first two terms of a sequence are  $\frac{2}{3}$  and  $\frac{4}{5}$ . Each term after the second term is the average (mean) of the two previous terms. What is the fifth term in the sequence?

A  $\frac{5}{34}$                     B  $\frac{1}{2}$                     C  $\frac{10}{13}$                     D  $\frac{3}{4}$                     E  $\frac{10}{11}$

5. A regular tetrahedron with edges of length 6 cm has each corner cut off to produce the solid shown. The triangular faces are all equilateral triangles, but not necessarily all the same size.

What is the total length of the edges of the resulting solid?



- A 28 cm    B 30 cm    C 36 cm    D 48 cm    E more information needed

6. One of the following is the largest of nine consecutive positive integers whose sum is a perfect square.

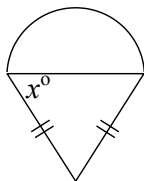
Which one is it?

- A 118    B 128    C 138    D 148    E 158

7. Given that the number 2006 is the correct answer to the calculation  $1 - 2 + 3 - 4 + 5 - 6 + \dots + (n - 2) - (n - 1) + n$ , what is the sum of the digits of  $n$ ?

- A 3    B 4    C 5    D 6    E 7

8. The diagram shows a semi-circle and an isosceles triangle which have equal areas.



What is the value of  $\tan x^\circ$ ?

- A 1    B  $\frac{\sqrt{3}}{2}$     C  $\frac{\pi}{\sqrt{3}}$     D  $\frac{2}{\pi}$     E  $\frac{\pi}{2}$