

Fractions (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. Which of the following fractions is in the middle when they are written in numerical order?

A $\frac{4}{7}$ B $\frac{5}{8}$ C $\frac{3}{4}$ D $\frac{7}{11}$ E $\frac{8}{13}$

2. Between them, Ginger and Victoria eat two thirds of a cake.

If Ginger eats one quarter of the cake, what fraction of the cake does Victoria eat?

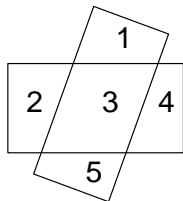
A $\frac{1}{2}$ B $\frac{2}{5}$ C $\frac{3}{8}$ D $\frac{4}{9}$ E $\frac{5}{12}$

3. Which of the following is *not* equal to a whole number?

A $\frac{594}{5+9+4}$ B $\frac{684}{6+8+4}$ C $\frac{756}{7+5+6}$ D $\frac{873}{8+7+3}$ E $\frac{972}{9+7+2}$

4. The diagram shows two rectangles which enclose five regions.

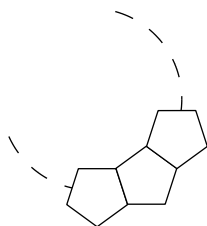
What is the largest number of regions which can be enclosed by any two rectangles drawn on a sheet of paper?



A 10 B 9 C 8 D 7 E 6

5. Equal regular pentagons are placed together to form a ring in the manner shown. The diagram shows the first three pentagons.

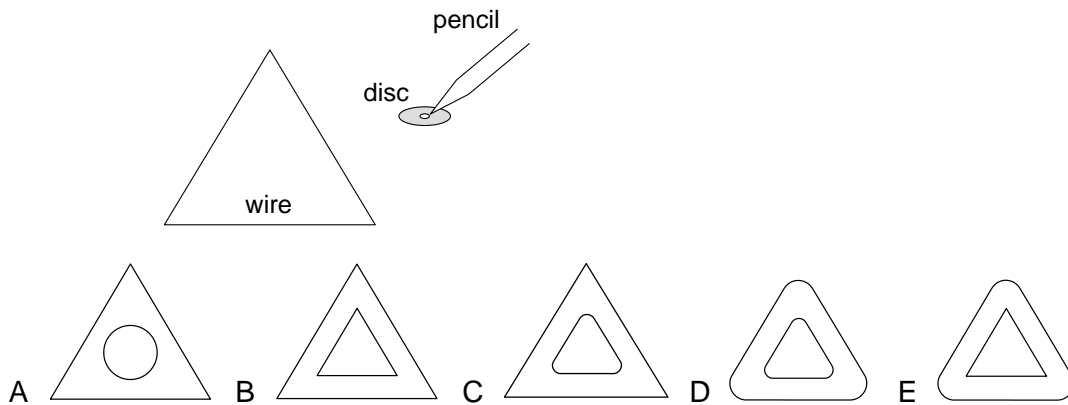
How many *more* are needed to complete the ring?



A 6 B 7 C 8 D 9 E 10

6. A wire in the shape of an equilateral triangle with sides of length 9 cm is placed flat on a piece of paper. A pencil is held in the hole at the centre of a disc of radius 1 cm, and the disc is rolled all the way around the outside of the wire, and then all the way around the inside of the wire.

What shape is drawn by the pencil?



7. If $a = b - c$, $b = c - d$ and $c = d - a$, then $\frac{a}{b} + \frac{b}{c} + \frac{c}{d} + \frac{d}{a}$ equals

- A 1 B $\frac{1}{2}$ C 0 D $-\frac{1}{2}$ E -1

8. For how many values of n are both n and $\frac{n+3}{n-1}$ integers?

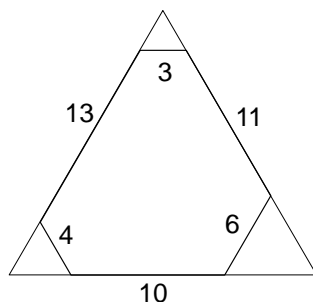
- A 7 B 6 C 4 D 3 E 0

9. Given that it takes a men b hours to paint c square metres of the Forth Bridge, how long would it take d men to paint e square metres of the bridge?

- A $\frac{abe}{cd}$ B $\frac{abd}{ce}$ C $\frac{abc}{de}$ D $\frac{acd}{be}$ E $\frac{ace}{bd}$

10. The diagram shows an irregular hexagon with interior angles all equal to 120° made by cutting the corners off a piece of card in the shape of an equilateral triangle with sides of length 20 units.

An identical hexagon could also be made by cutting the corners off a different equilateral triangle: what is the side length of this triangle?



- A 23 B 25 C 27 D 29 E 31