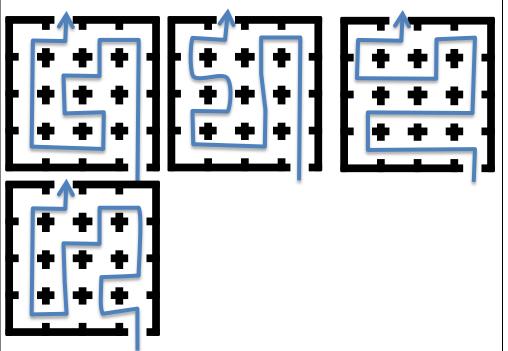
# Challenge '24 Solutions

	1. Sagitta	arius			
Edmond: 120 = 40+5*16 Nicholas: 110 = 2*23 + 4*16 James: 100 = 4*17 + 2*16					3 marks: (1 mark for each solution)
2. Auriga and Centaurus					
Auriga wins by a quarter section. The middle section they are the same. If it takes Auriga one unit of time for each section, then it takes Centaurus ½ a unit for the first and 2 units for the 3 <sup>rd</sup> .  So, Centaurus finishes ½ a unit of time behind, so when Auriga crosses the finish line, he has ¼ of a section to go.					3 marks: (1 mark a quarter section, 1 mark for both times for Centaurus to complete first and last sections, 1 mark for ½ a unit of time behind)
3. Aries					
	4	7	4		3 marks: (1 mark for 4 and 7, 1 mark for diagram, 1 mark for some reasoning)
	7		4		
	4	4	7		

### **Challenge '24 Solutions**

### 4. Taurus



5 marks:

(2 for 1st route,

1 for each additional route, penalty of 1 mark for any duplicated / or incorrect route)

# 5. Canis Minor, Lepus and Lacerta

Since there were 25 + 19 + 10 = 54 pets, and no more than 2 pets in any one house, there were pets in at least 27 houses.

Given that 5 of the 32 houses had no pets, there must be pets in exactly 27 houses.

It follows that there are no families with more than 3 children. 25 houses have lizards, thus the remaining 2 must have a hare and a small dog.

3 marks:

(1 mark for 27 houses with pets,

1 mark for no families with >3 children.

1 mark for 2 houses with a hare and a small dog)

Award all 3 marks for any correct answer with reasoning

#### 6. Gemini

 $1865 = 1024 + 841 = 32^2 + 29^2$ , so Castor's photograph of himself is **32cm long** and his photograph of Pollux is **29cm long**.

 $1865 = 16 + 1849 = 4^2 + 43^2$ , so Pollux's photograph of Castor is **4cm long** and his photograph of himself is **43cm long**.

#### 4 marks:

(1 for finding 32 and 29, 1 for finding 4 and 43.

1 for C = 32 and P = 29.

1 for C = 4 and P = 43)

## 7. Aquarius

Barrel = 0.0625pi m³ = 62500pi cm³, ¾ = 46875pi cm³ Bucket = 2430pi cm³, losing 10% leaves 2187pi cm³ 46875 / 2187 = 21.433, so 22 buckets required (note that pi cancels out)

#### 6 marks:

(1 mark for volume of barrel, 1 mark for volume of bucket,

1 mark for loss from bucket,

1 mark for net in bucket.

1 mark for correct division.

1 mark for rounding up to 22)