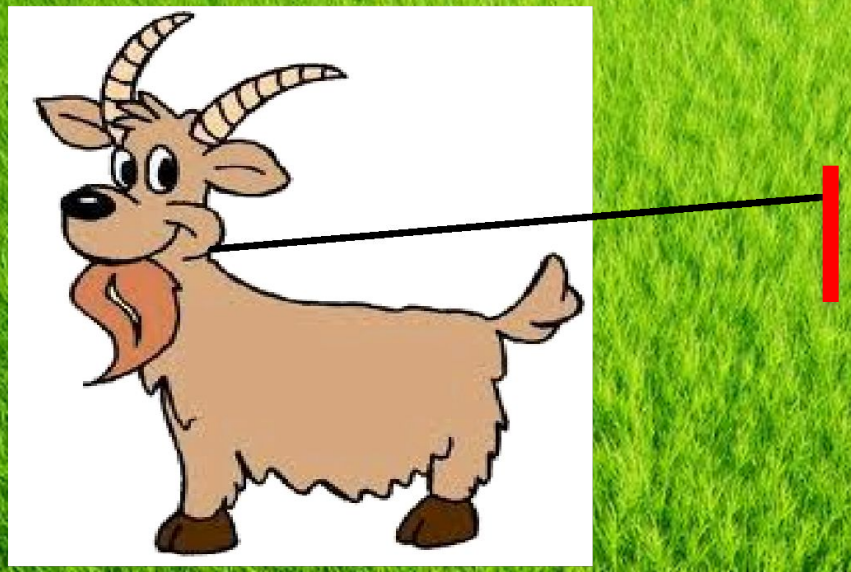
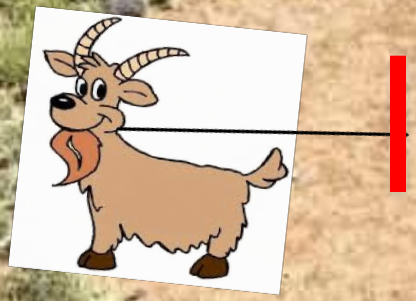
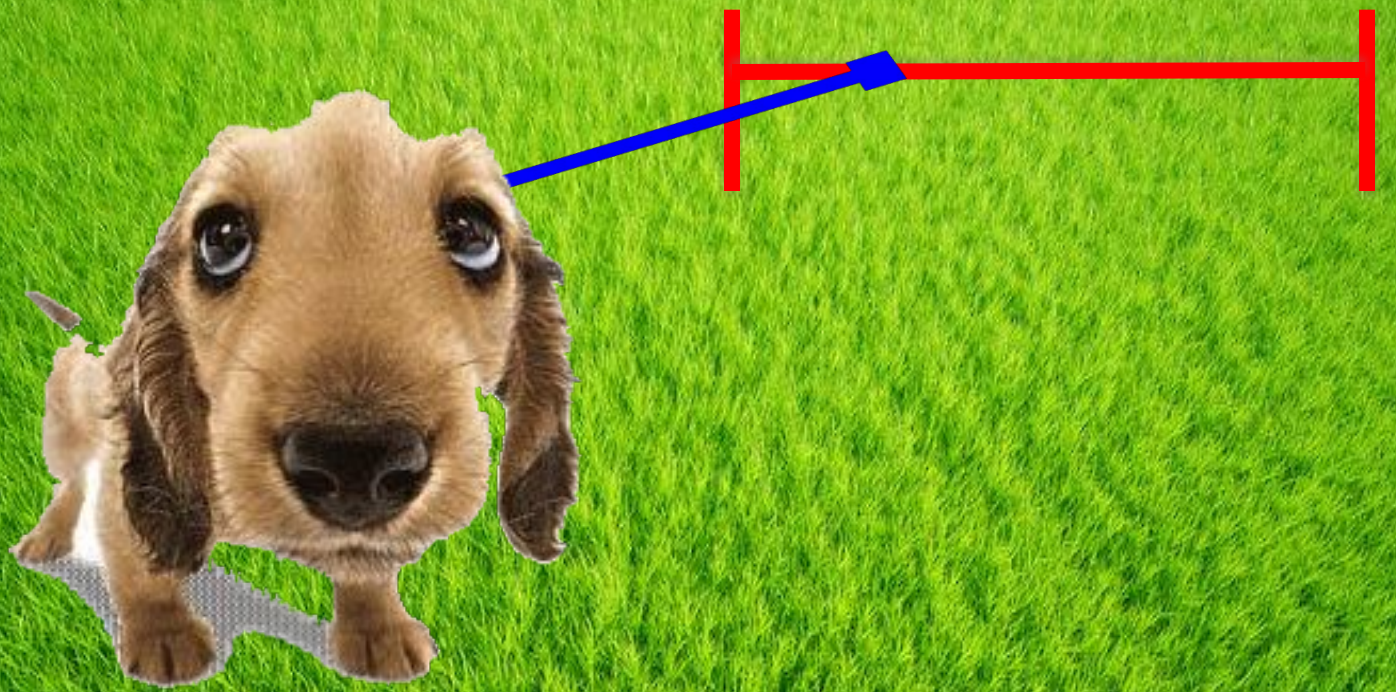
This goat is tethered in the middle of a field.



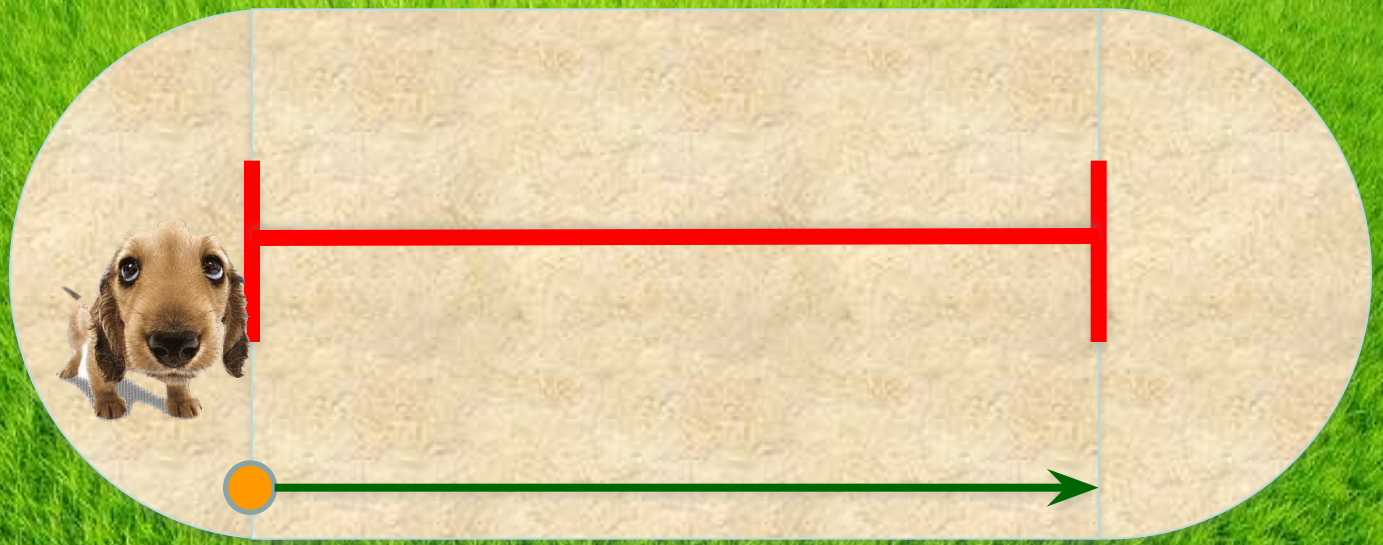
What will the area of grass he eats look like?

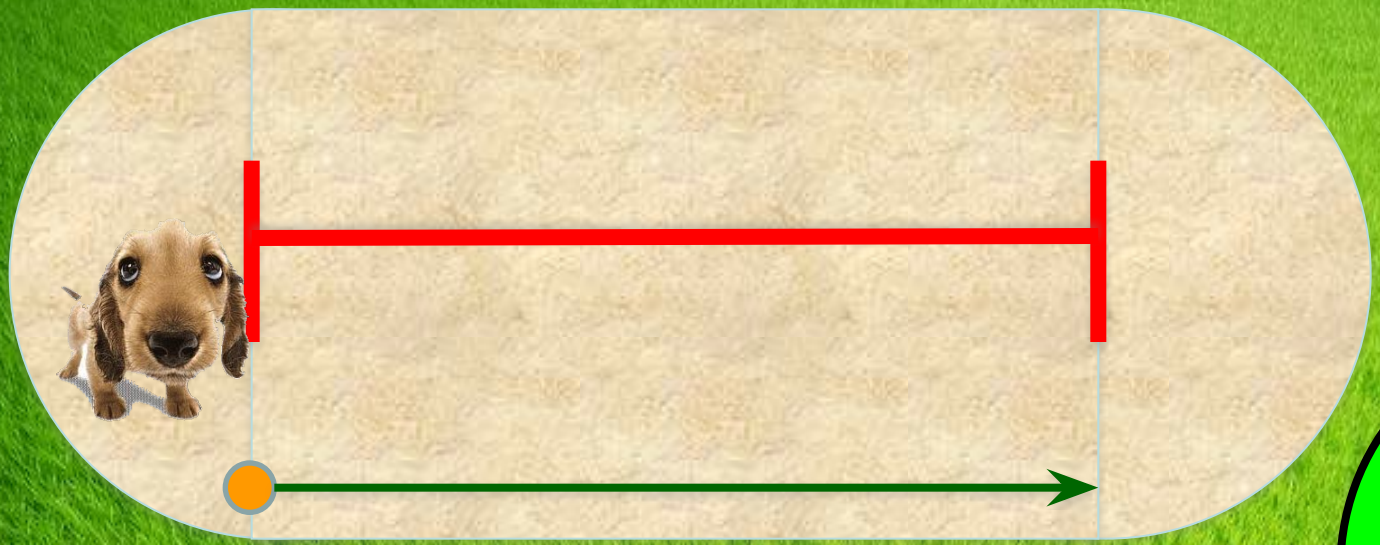


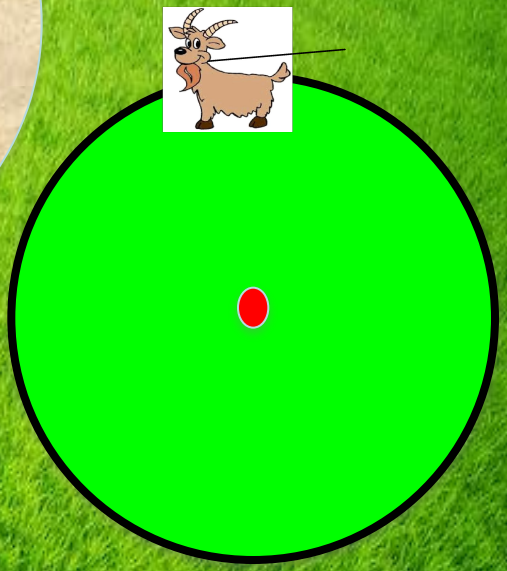
This puppy is chained to a rail, his chain can move along the rail.



What shape area can he roam in?





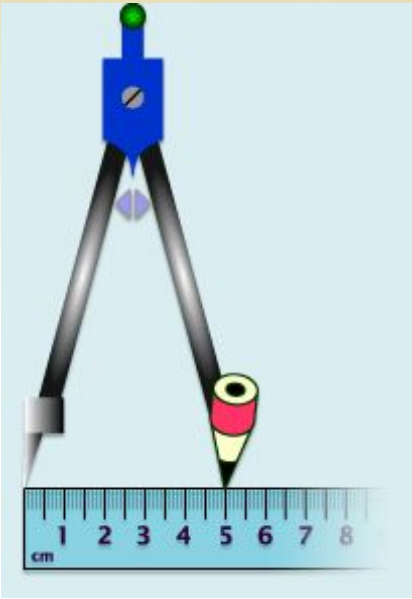


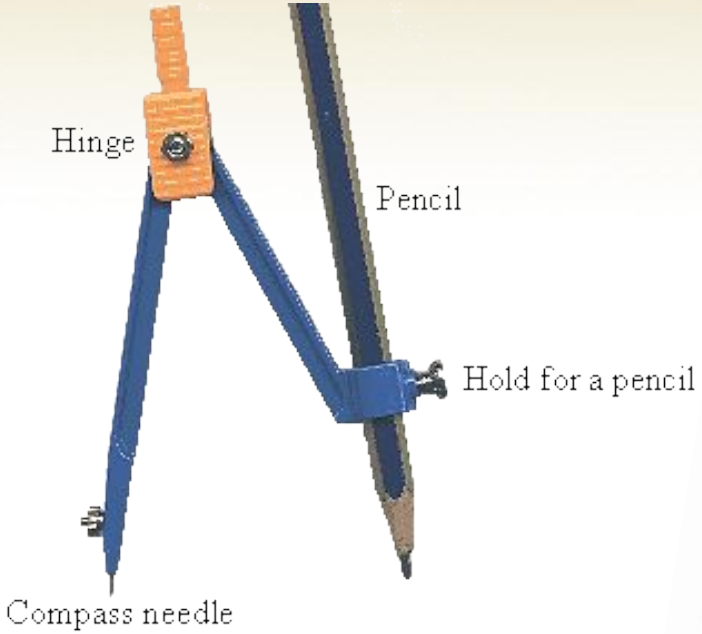
A LOCUS is a path.

The path is formed by a point which moves according to some rule.

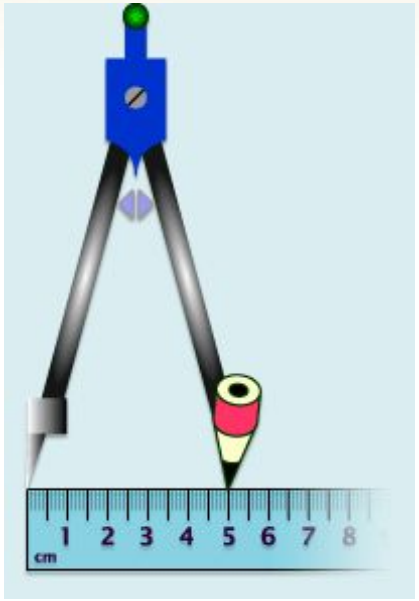
The plural of locus is loci.

# Maths compass




# For this task you may need:

# Consider/think…

If 1 grid unit = 10 m

?m → 20m

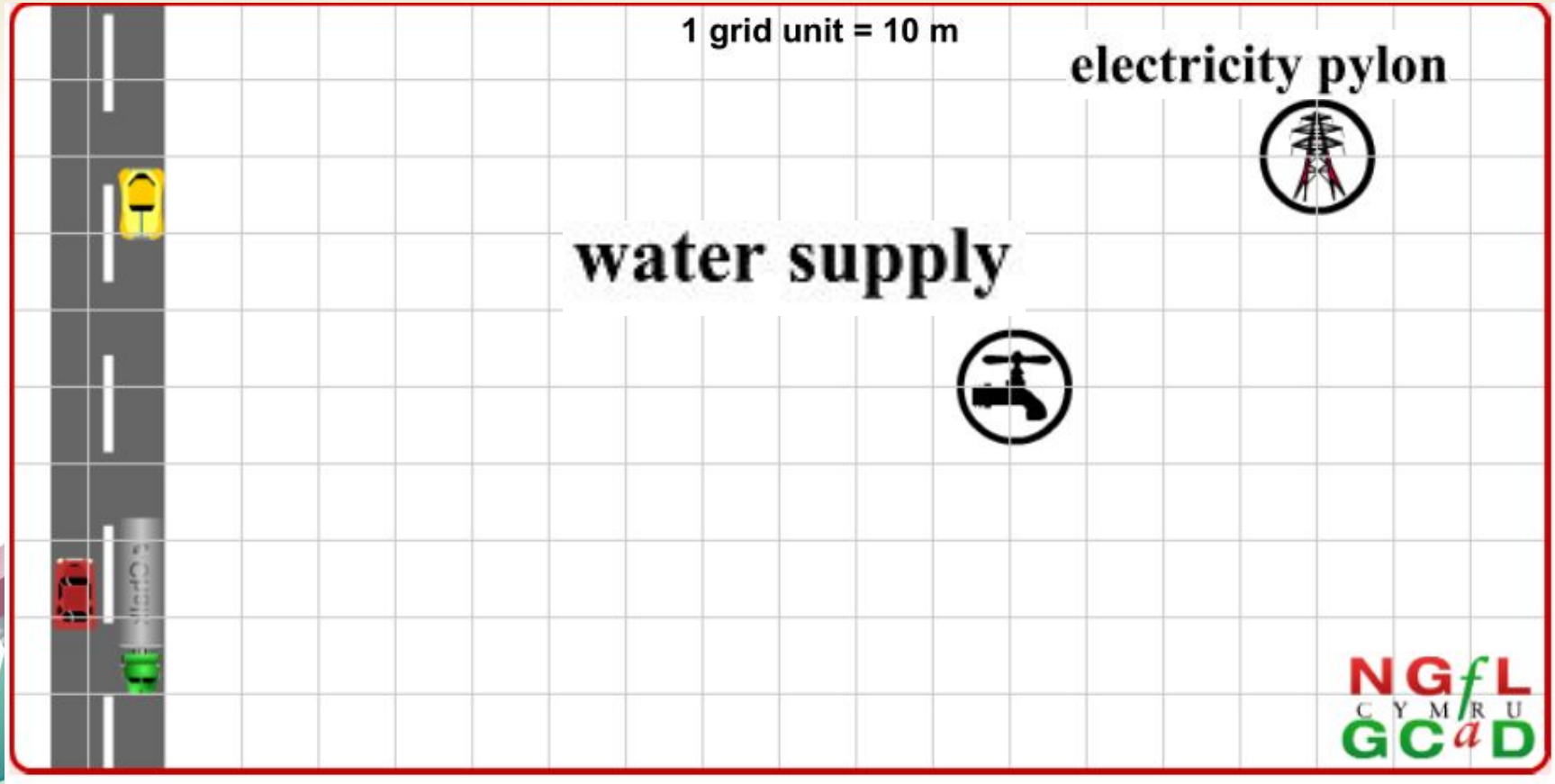
?m → 30m

# Online

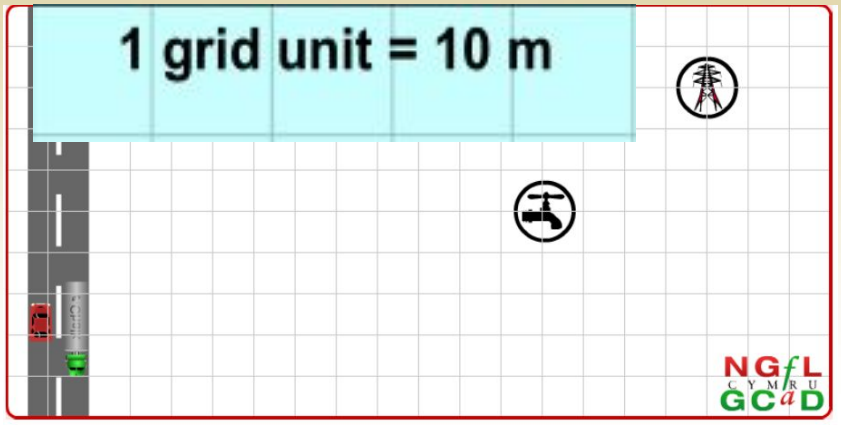
http://www.echalk.co.uk/NGfL-Cymru/eng/Maths/loci/ism/lociISM.html

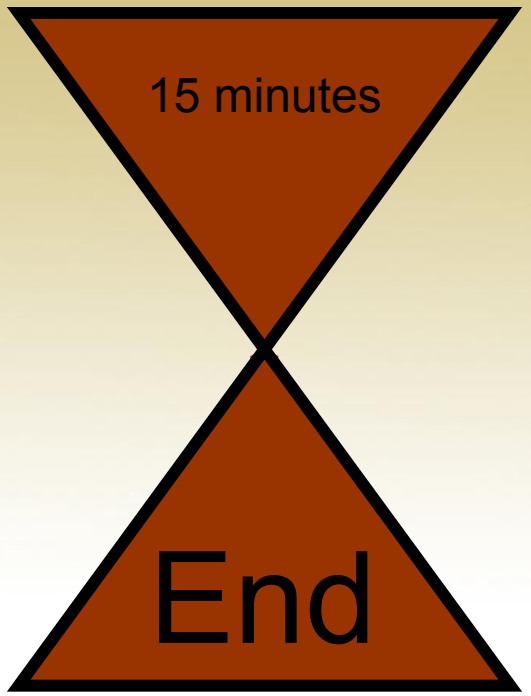
# Symbols are marked

The road



# The property developer's dilemma




**However, the council have declared that all new houses must comply with the following rules:**

1. **All new builds must be at least 100 m away from busy roads.**
2. **New houses must be within 40 m of a main water supply.**
3. **No new houses should be sited within 30 m of an electricity pylon.**

**Your task is to work out the exact area of land you are allowed to build on.**

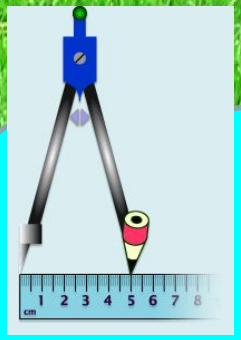
# Extra time

5 minutes

Gilbert is a goat and he likes eating grass.

The farmer keeps him in a rectangular field measuring 10 metres by 8 metres.

In each of the following cases construct an accurate diagram to show the area of grass that Gilbert can munch on.



If…

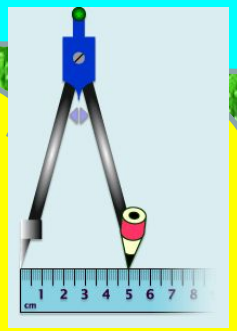
1cm represents 1m

2cm represents - ?m

6cm represents - ?m

If…

1cm represents 1m



2cm represents - 2m

6cm represents - 6m

# Construct an accurate diagram

1) Gilbert is tethered to the corner of the field by a 6 metre long rope.

2) Gilbert is tethered to the midpoint of the longer side of the field by a 7 metre long rope.

3) Gilbert is tethered to the shorter side of the field, 2 metres from the corner, by a 5 metre long.

4) Gilbert is tethered to the centre of the field by a 3 metre long rope.

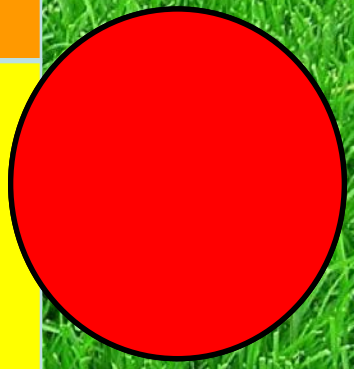
5) The farmer mistakenly tethers Gilbert to the outside corner of the field using a 4.5 metre long rope.

6) The farmer mistakenly tethers Gilbert to the outside corner of the field using a 5 metre long rope.

7) The farmer tethers Gilbert outside the field, to a point 3 metres along from the corner on the longer side. The farmer uses a 5 metre long rope.

8) For some reason known only to him, the farmer fixes a 2 metre long pole along the centre of the field. Gilbert is tethered to this horizontal pole so that his

(2 metre long) rope can slide along.



# Construct an accurate diagram

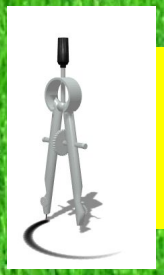
1) Gilbert is tethered to the corner of the field by a 6 metre long rope.

1cm represents 1m

# Construct an accurate diagram

2) Gilbert is tethered to the **midpoint of the longer side** of the field by a **7 metre long rope.**

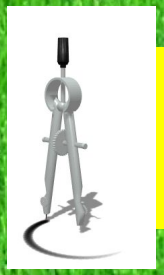
1cm represents 1m



# Construct an accurate diagram

3) Gilbert is tethered **to the shorter side** of the field, **2 metres from the corner**, by a 5 metre long rope.

**1cm represents 1m**



# Construct an accurate diagram

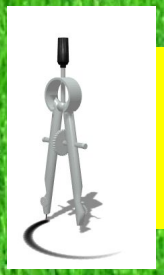
4)Gilbert is tethered to the **centre** of the field by a **3 metre long rope.**

**1cm represents 1m**

# Construct an accurate diagram

5)The farmer mistakenly tethers Gilbert to the **outside corner** of the field using a **4.5 metre long rope.**

**1cm represents 1m**



# Construct an accurate diagram

6)The farmer mistakenly tethers Gilbert to the **outside corner** of the field using a **5 metre long rope**.

1cm represents 1m

Try this one out – it's an interesting solution!

7)The farmer tethers Gilbert **outside the field**, to **a point 3 metres along** from the **corner** on the **longer side**. The farmer uses a **5 metre long rope**.

1cm represents 1m

# Construct an accurate diagram

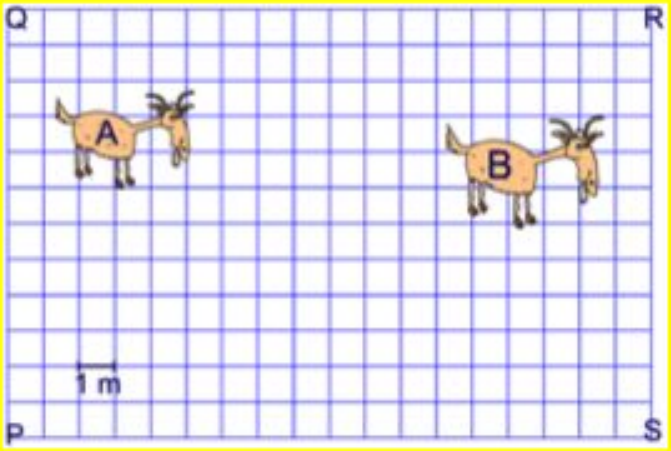
8)For some reason known only to him, the farmer fixes a **2 metre long pole** along the **centre** of the field. Gilbert is tethered to this **horizontal pole** so that his (2 metre long) rope can slide along.

**1cm represents 1m**

# Combining loci

**Challenge**

Suppose two goats, Archimedes and Babbage, occupy a fenced rectangular area of grass of length 18 m and width 12 m.




Archimedes is tethered so that he can only eat grass that is within 12 m from the fence PQ and Babbage is tethered so that he can only eat grass that is within 14 m of post R. (On your diagram 1 square = 1m)

How we could find where the area is that both goats can graze?