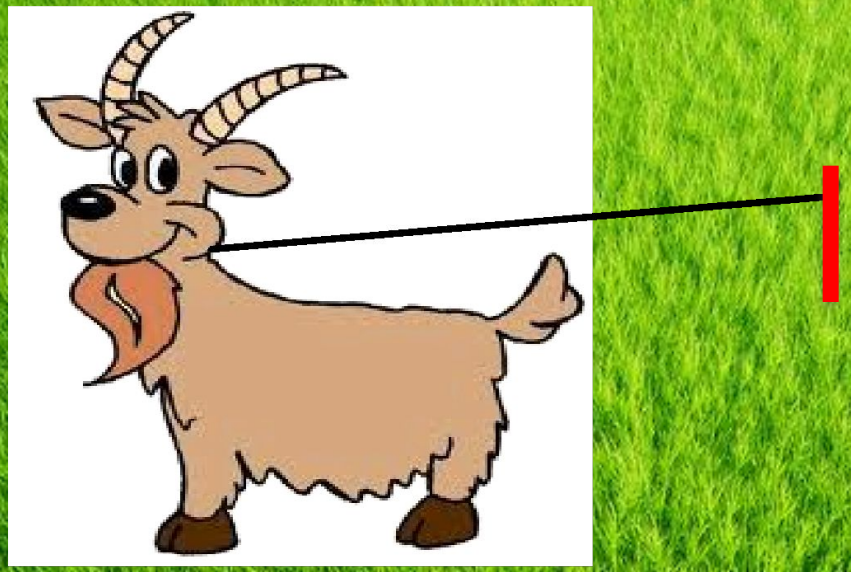
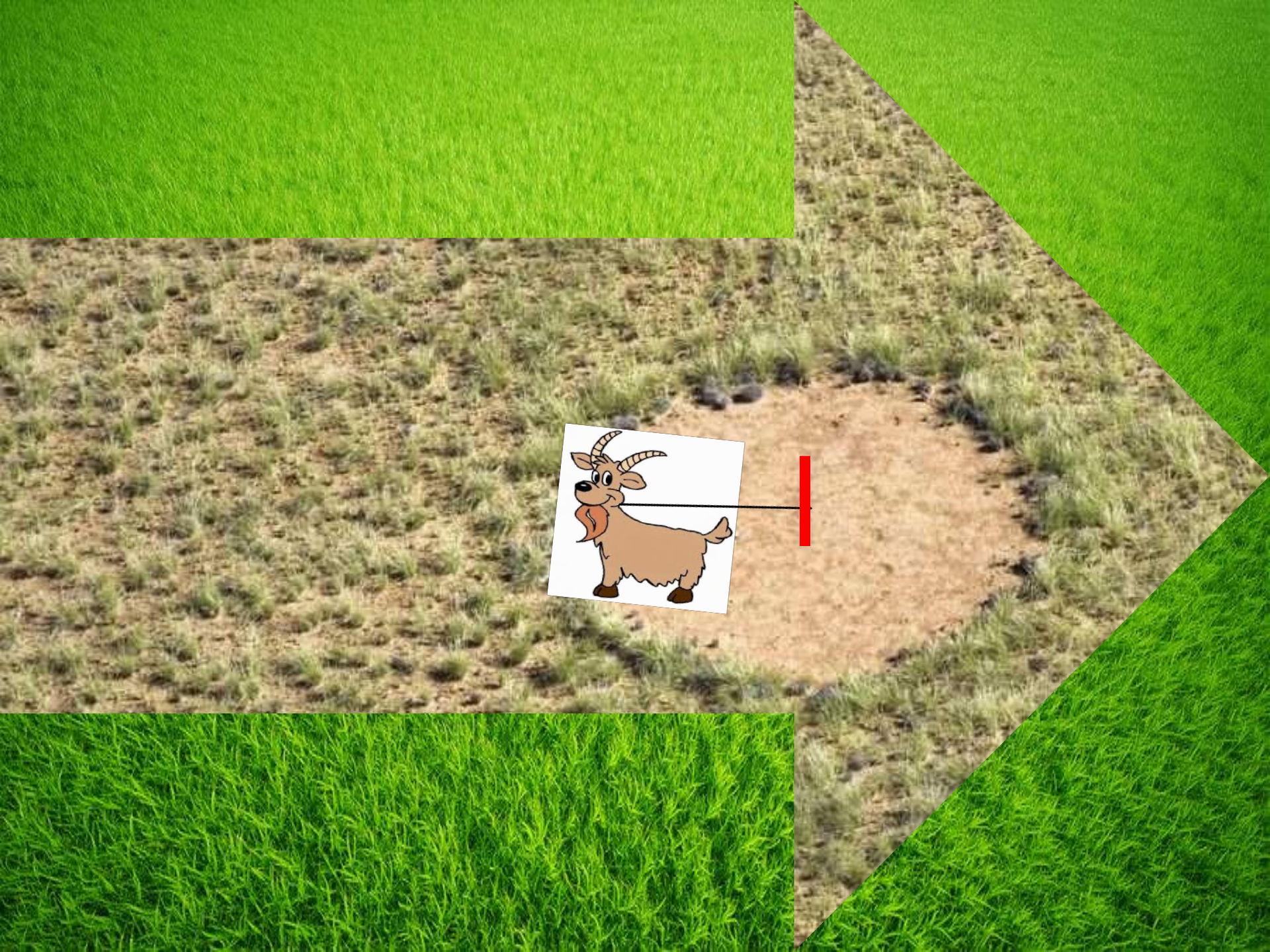
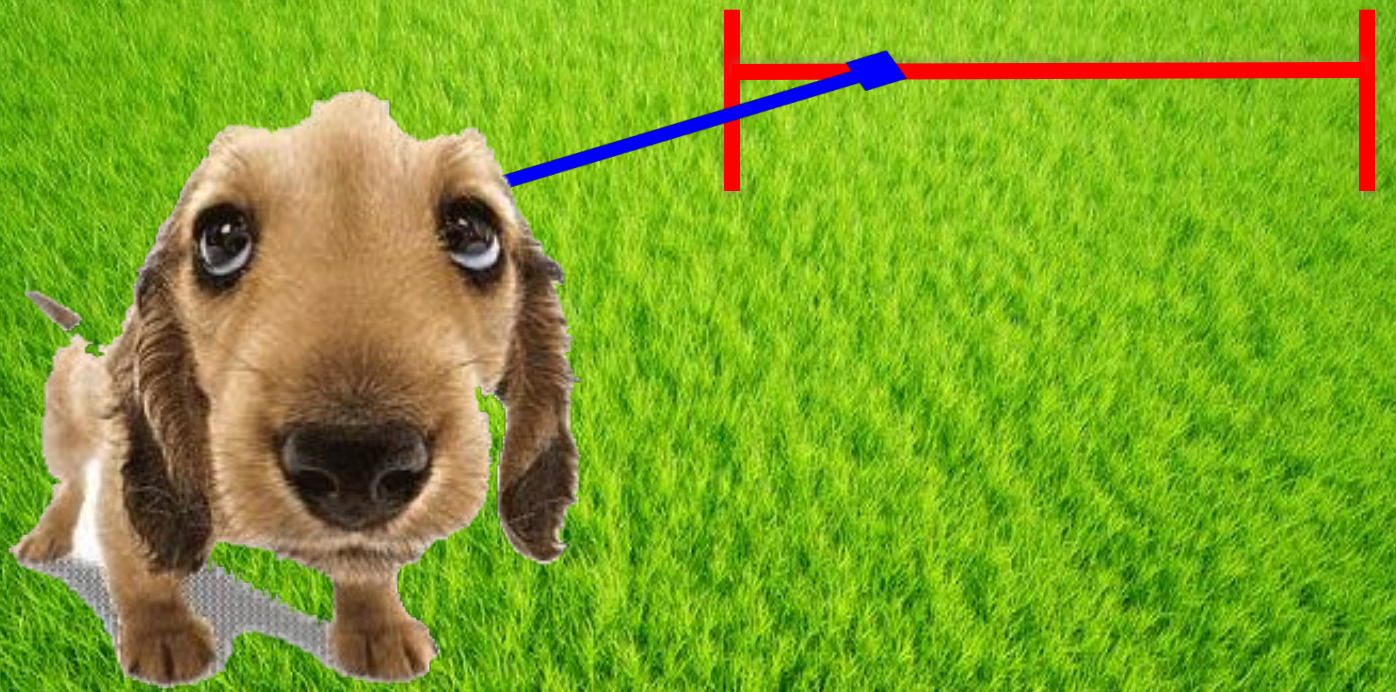
This goat is tethered
in the middle of a field.



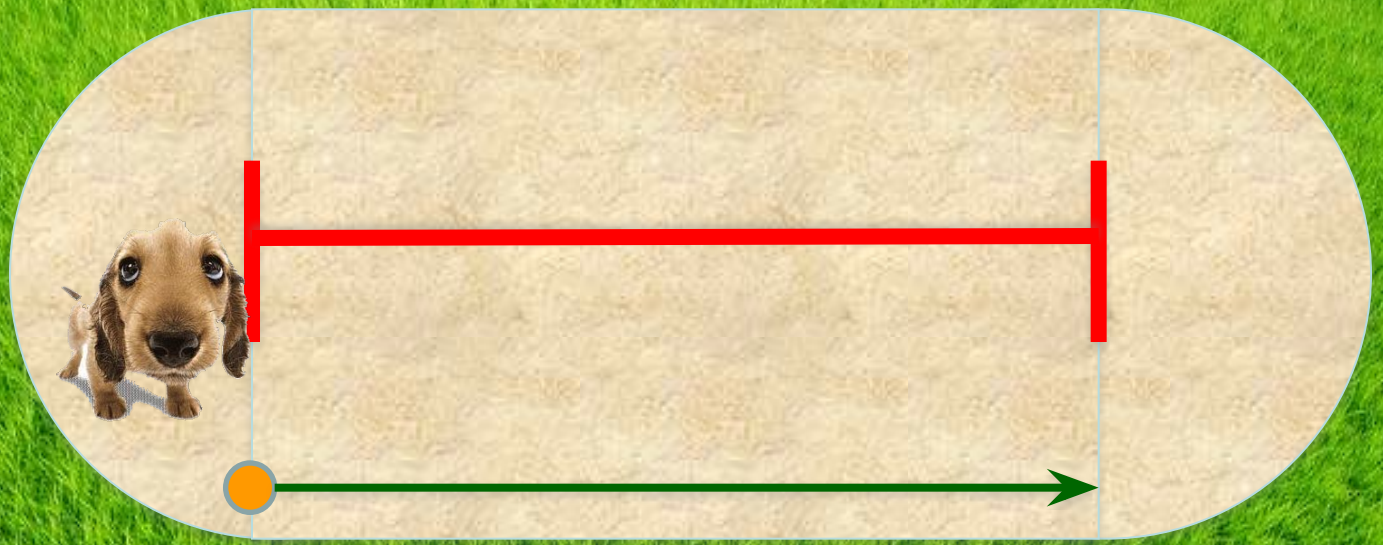
What will the area of grass
he eats look like?

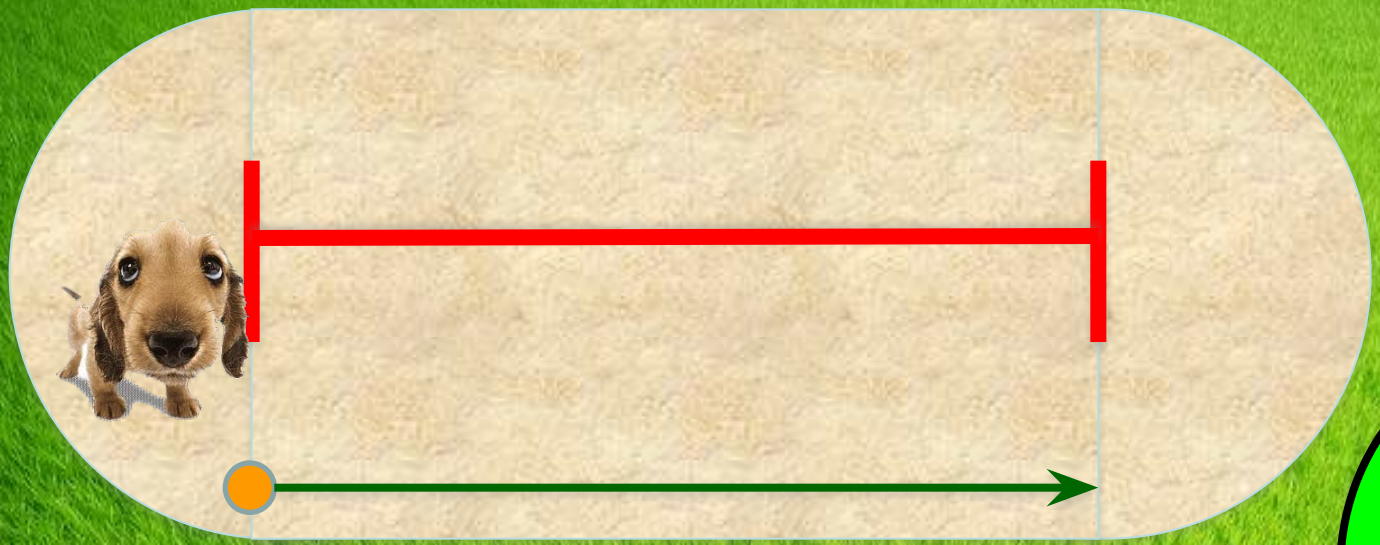


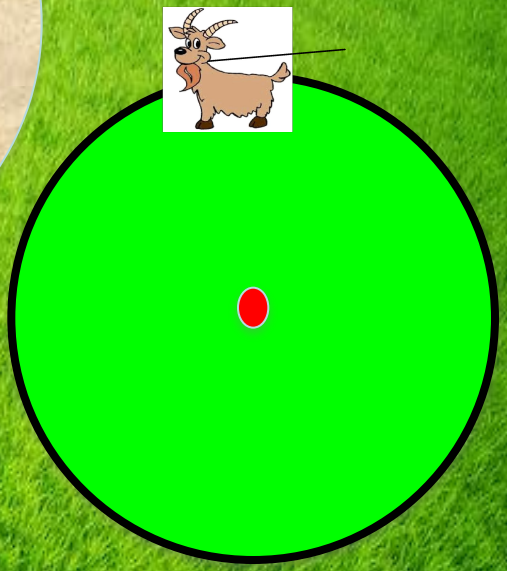
This puppy is chained to a rail, his chain can move along the rail.



What shape area can he roam in?





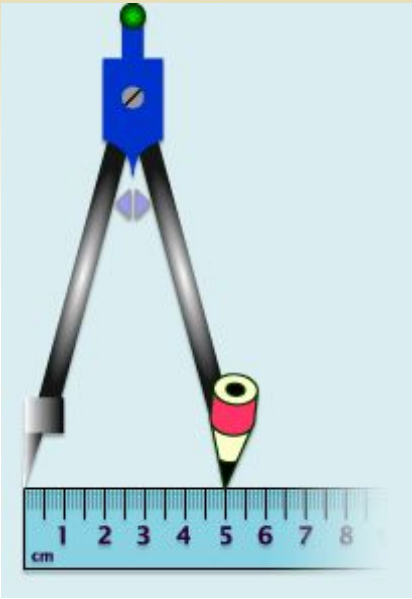


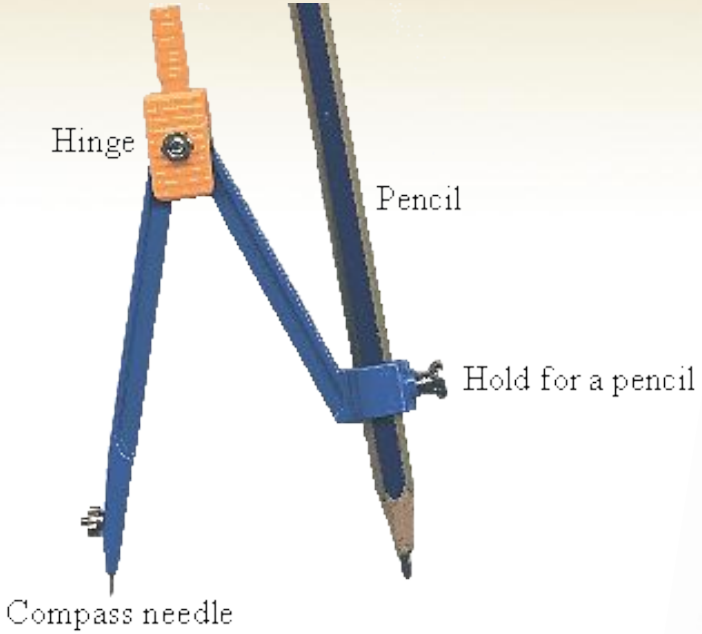
A LOCUS is a path.

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

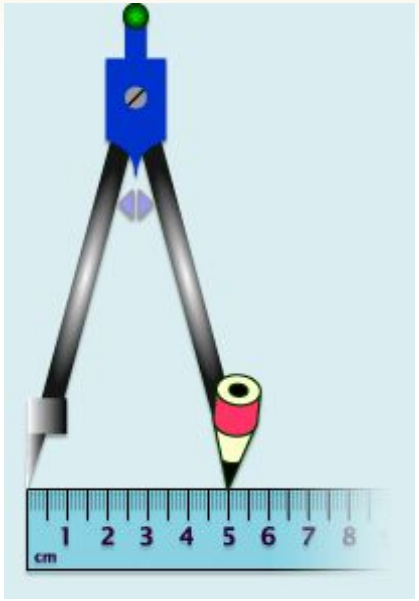
<u>The plural of locus is loci.</u>

Maths compass





For this task you may need:



Consider/think…

If 1 grid unit = 10 m

?m → 20m

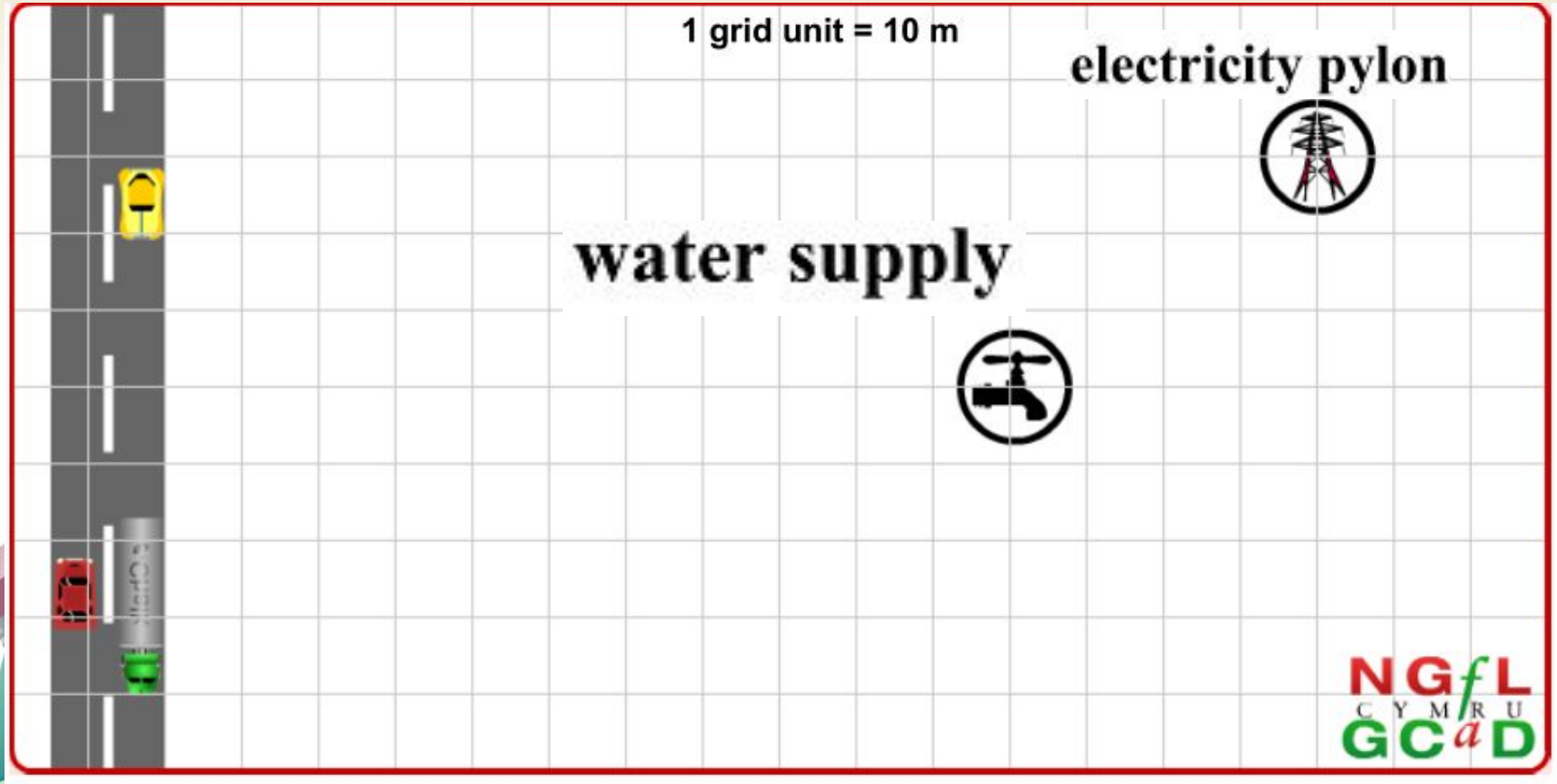
?m → 30m

Online

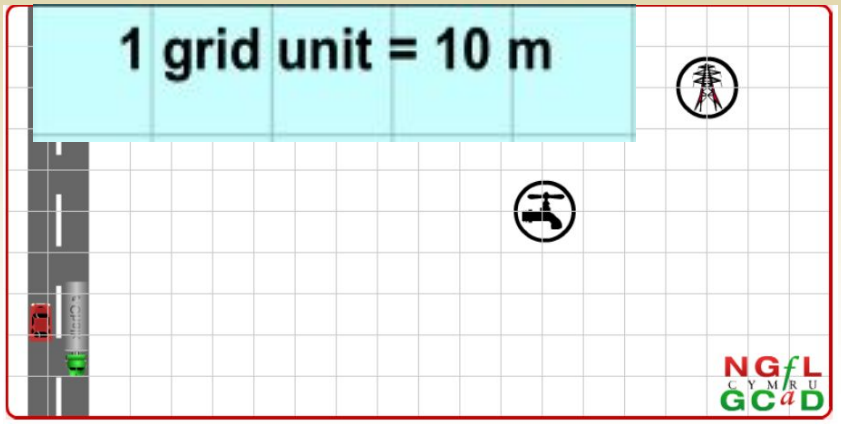
http://www.echalk.co.uk/NGfL-Cymru/eng/Maths/loci/ism/lociISM.html

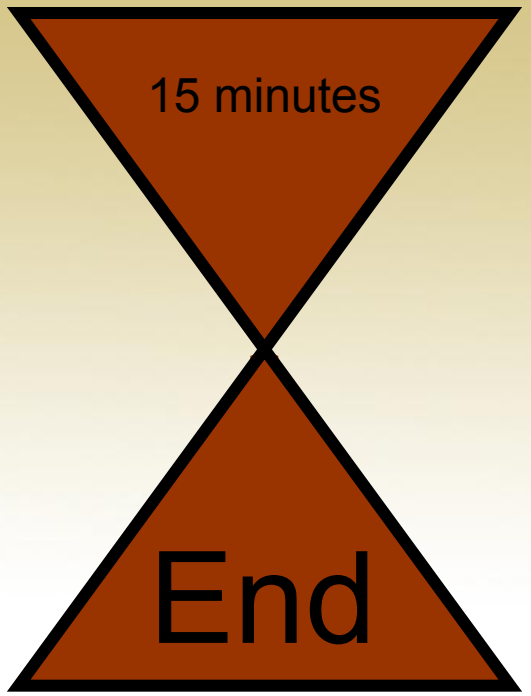
Symbols are marked

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.

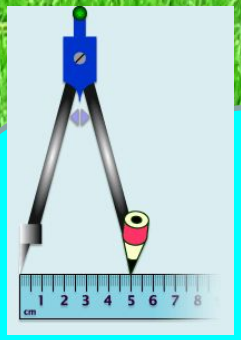
Extra time

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…

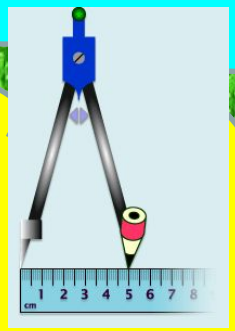
1cm represents 1m

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.

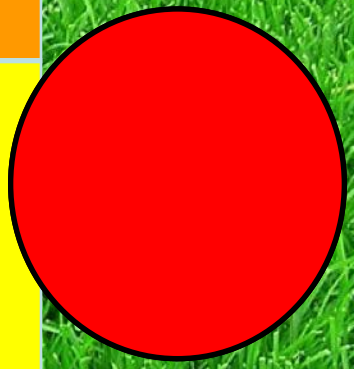
5) The farmer mistakenly tethers Gilbert to the outside corner of the field using a 4.5 metre long rope.

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

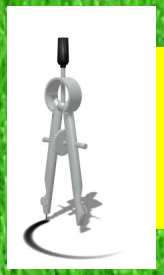
1) Gilbert is tethered to the corner of the field by a 6 metre long rope.

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.**

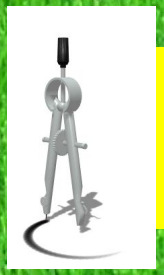
1cm represents 1m



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

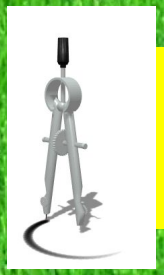
4)Gilbert is tethered to the **centre** of the field by a **3 metre long rope.**

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

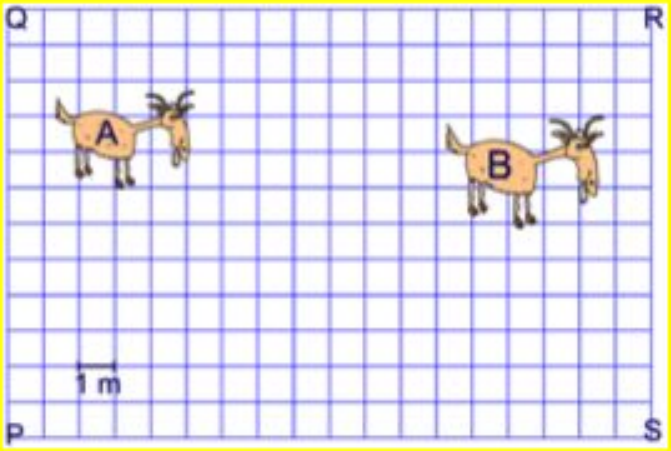
8)For some reason known only to him, the farmer fixes a **2 metre long pole** along the **centre** of the field. Gilbert is tethered to this **horizontal pole** so that his (2 metre long) rope can slide along.

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?