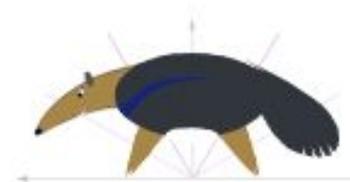


UC IRVINE MATH CEO

Community Educational Outreach



Meeting 17 Student's Booklet

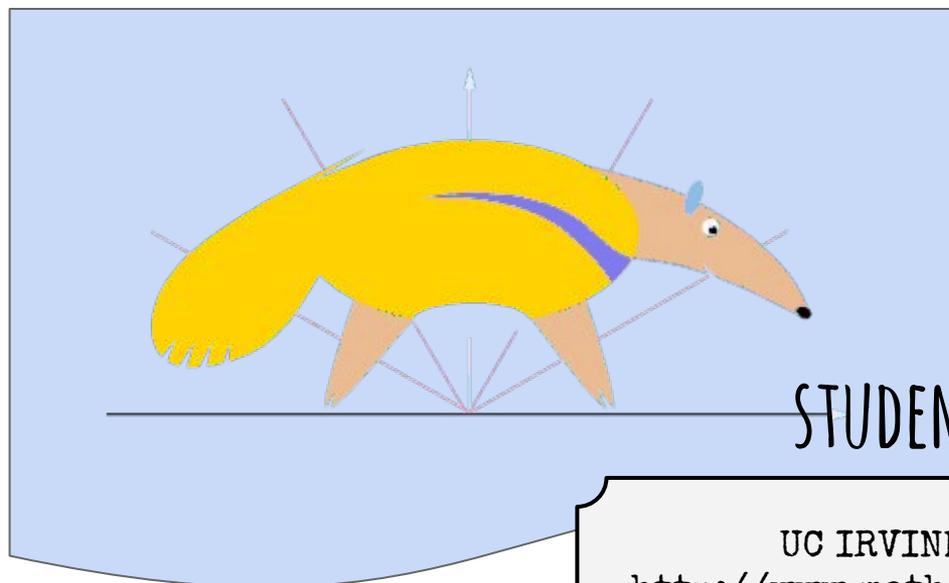
Zot! Zot! Zot!

March 30 2016 @ UCI

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STUDENT'S BOOKLET

UC IRVINE MATH CEO
<http://www.math.uci.edu/mathceo/>

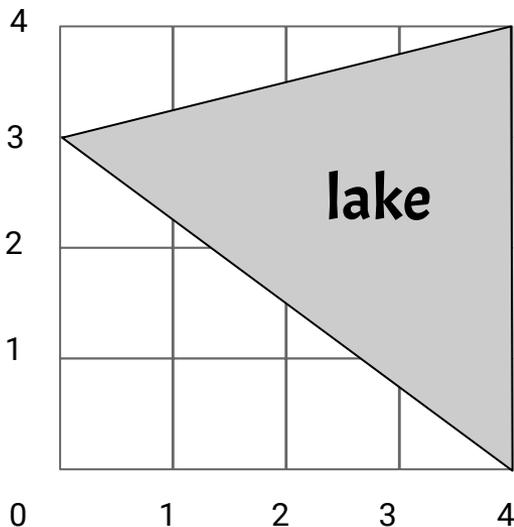
Do not write the answers in this page.

Problem 1
 Jack buys 4 kinds of fruits. Pears weight 200g each, apples 200g each, papayas 500g each and avocados 300g each. Jack buys as many papayas as avocados. Find an expression for the total weight in grams of Jack's fruits.

- (A) $200 * \#pears + \#apples + 500 * \# papayas + 300 * \# avocados$
- (B) $200 * (\#pears + \# apples) + 800 * (\# papayas + \#avocados)$
- (C) $200 * (\#pears + \#apples) + 400 * \#avocados$
- (D) $200 * (\#pears + \#apples) + 400 * (\#papayas + \# avocados)$
- (E) $100 * (2 * \# pears + \#apples + 5 * \#papayas + 3 * \#avocados)$

Problem 2

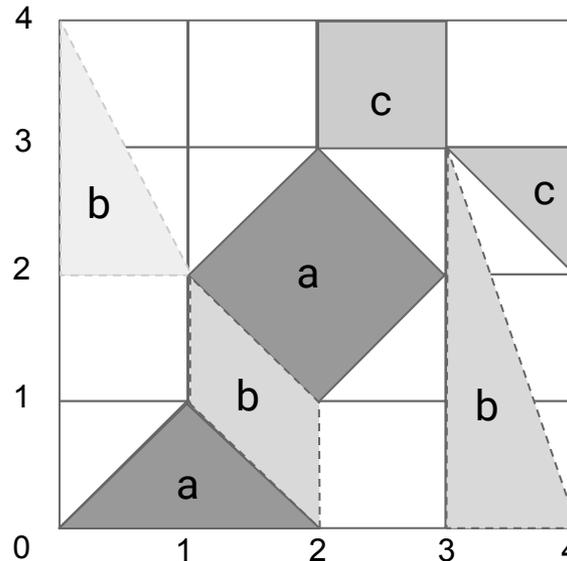
The area of the shaded lake is:



- (A) Less than 6.
- (B) Between 6 and 8.
- (C) Equal to 8
- (D) Larger than 8.
- (E) Impossible to know.

Problem 3

In a board game, three players a,b and c compete to cover the most area. The figure indicates a given stage in the game. Who is winning at the moment?



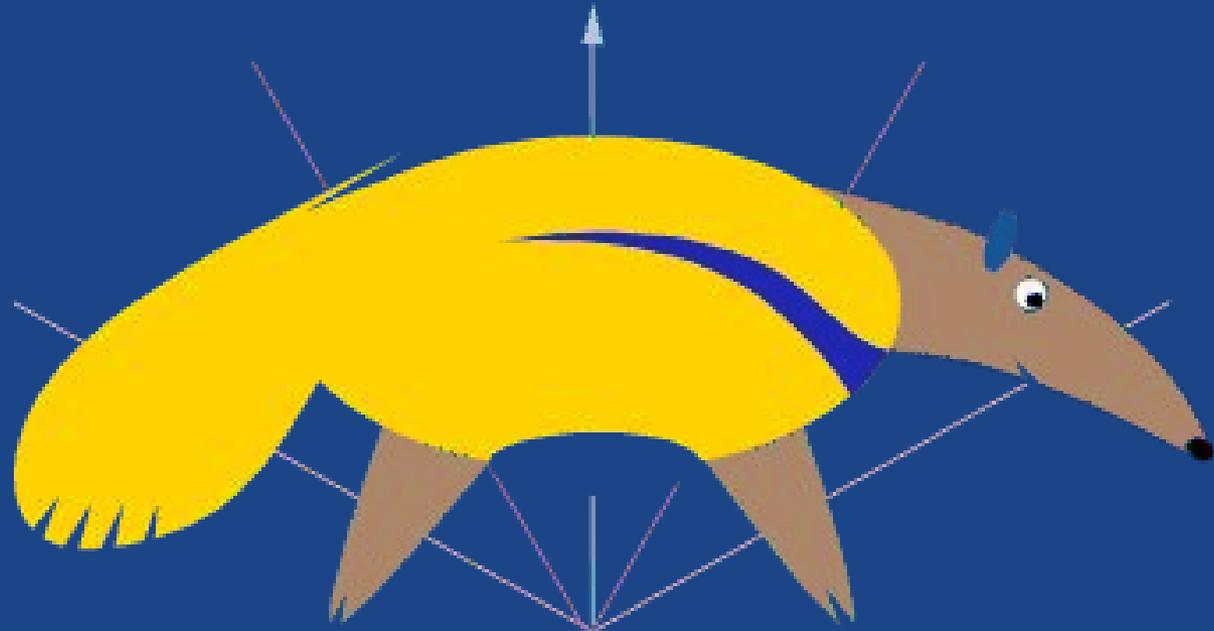
- (A) a. (B) b. (C) c. (D) Tie between 2 players.
- (E) Tie between all players.

Problem 4

If an ant takes 2.5 days to walk from the lake to Antiochia. What part of the trip does she covers in one day?



- (A) 2.5 (B) .5 (C) .4 (D) .2 (E) .1



Zot! Zot! Zot!

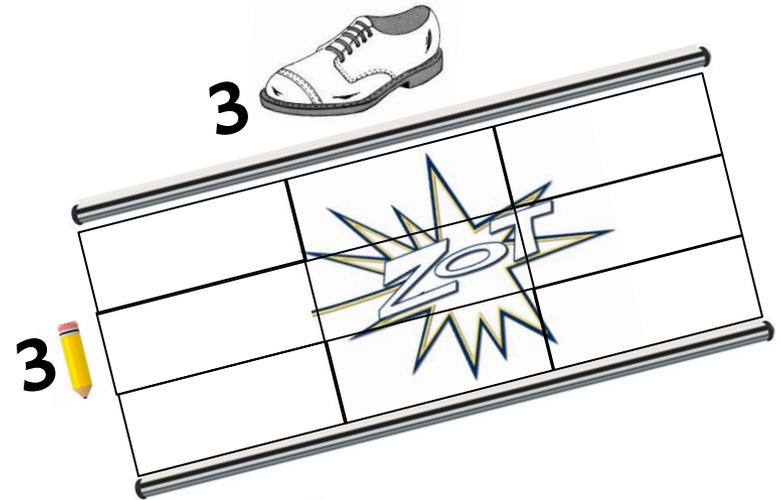
1 BANNERS

Fans are getting ready for the start of the Sports season and so they have made triangular and rectangular banners. They have measured the dimensions using pencils, shoes and canes. Let's create a banner!

Alejandro's Banners

- a** Alejandro made two rectangular banners, and used a pencil and a shoe as measuring tools. One banner is 3 shoes wide and 3 pencils tall. The other one is 4 shoes wide and 2 pencils tall.

Alejandro wants to take the largest banner (the one with most area) to the game. Which one should he select? Explain your choice.



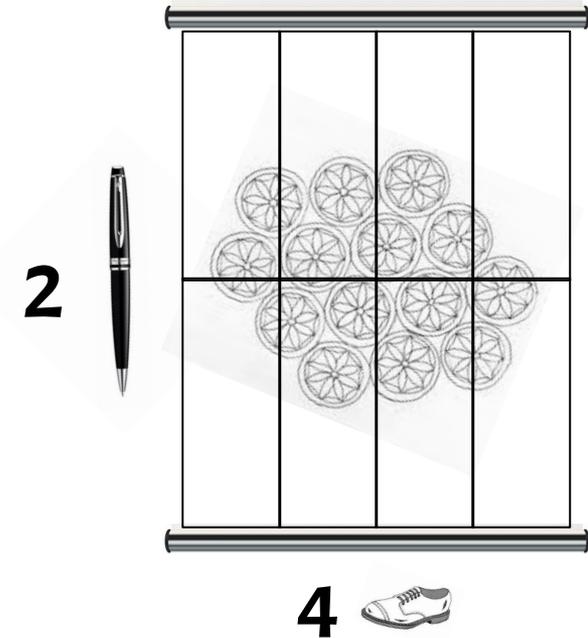
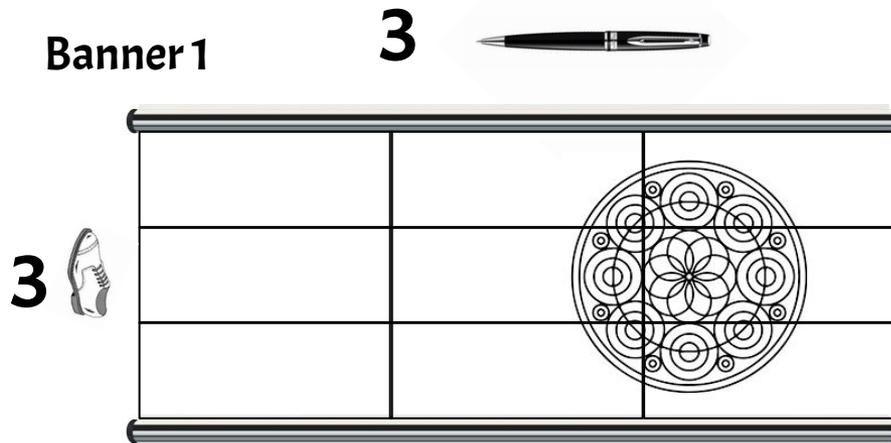
Discuss

Is the first banner squared shape? Why or why not?

What is the area of each banner? In which units can you measure the area?

b Alejandro created two more banners. This time he used a shoe and a pen to measure them, and obtained the dimensions shown in the pictures. Which banner has the largest area? Explain your choice.

Banner 2



Discuss

In which units would you measure the area of these two banners?
Are you using the same area units for both banners?

Pencils & sugar canes

- c** Rebecca also made two rectangular banners. When she measured them using a pencil and a sugar cane, she found the following dimensions:
- Banner 1 is 6 pencils wide and 4 sugar canes long.
 - Banner 2 is 4 pencils wide and 6 sugar canes long.

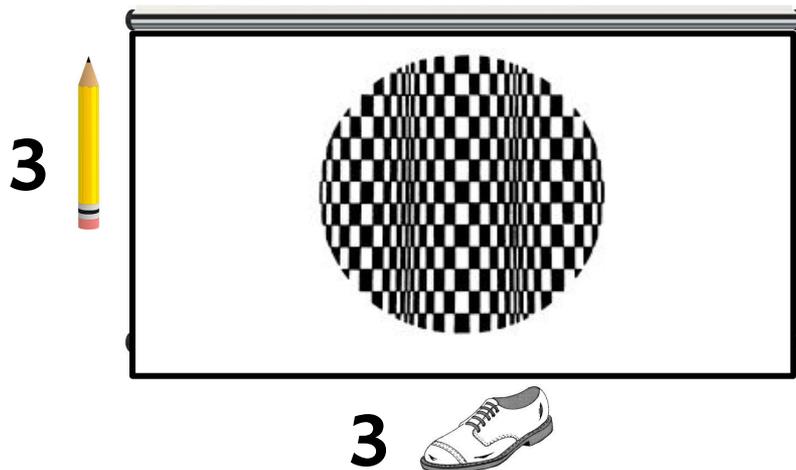
Discuss

Do the banners have the same area, or does it depend on how the pencil and the sugar cane lengths compare to each other?

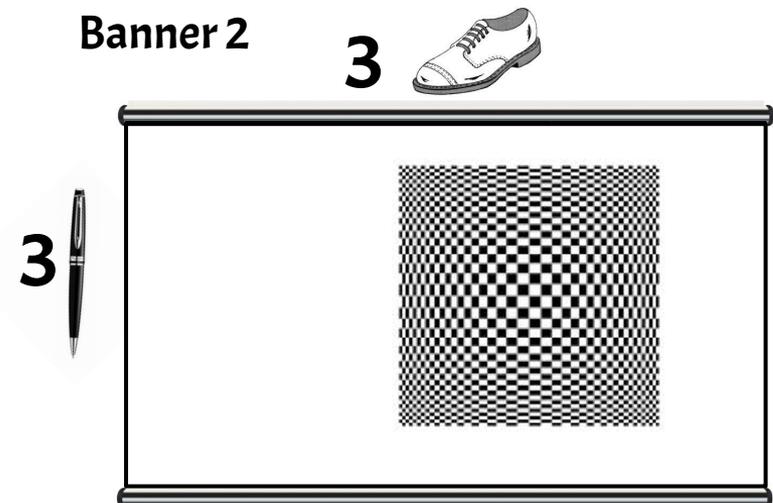
Same area?

- d** Dana also made two banners: one is 3 pencils by 3 shoes, the other is 3 pens by 3 shoes. Can you say (without knowing any other information) that both banners have the same area? Discuss in groups.

Banner 1

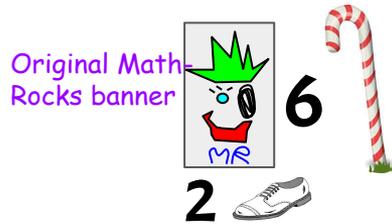


Banner 2



The wall reproductions

Paul is a big fan of the "Math rocks" (a musical group), he is planning to do a scale reproduction (**same proportion as the original**) of a banner on his wall room.



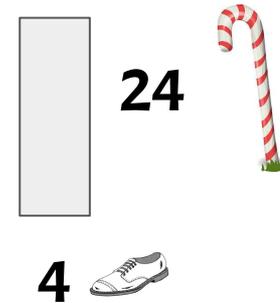
f What are the height and side length of the biggest version of the banner that you can fit in



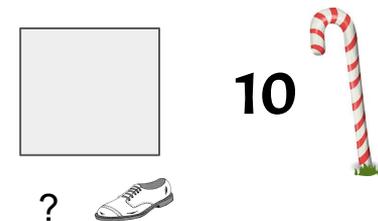
a) a wall of height 24 canes and side length 24 shoes?



b) a wall of height 24 canes and side length 4 shoes?

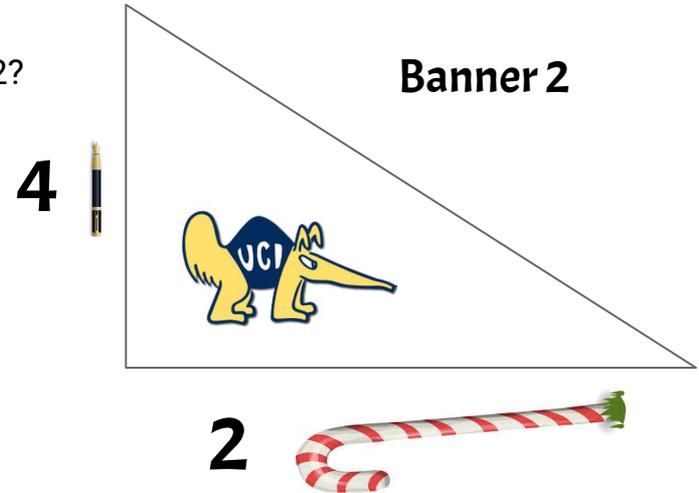
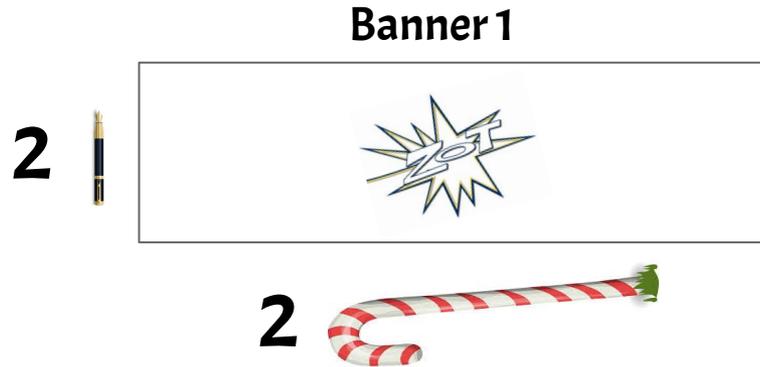


c) a square wall of 10 canes in height?

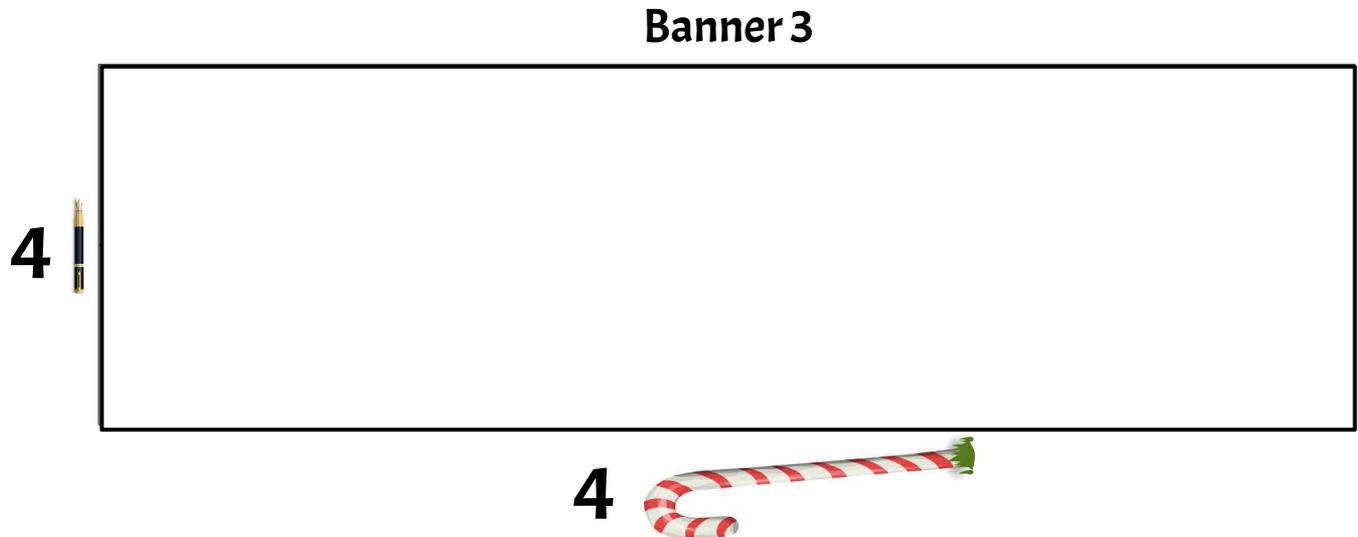


Rectangle Vs. Triangle

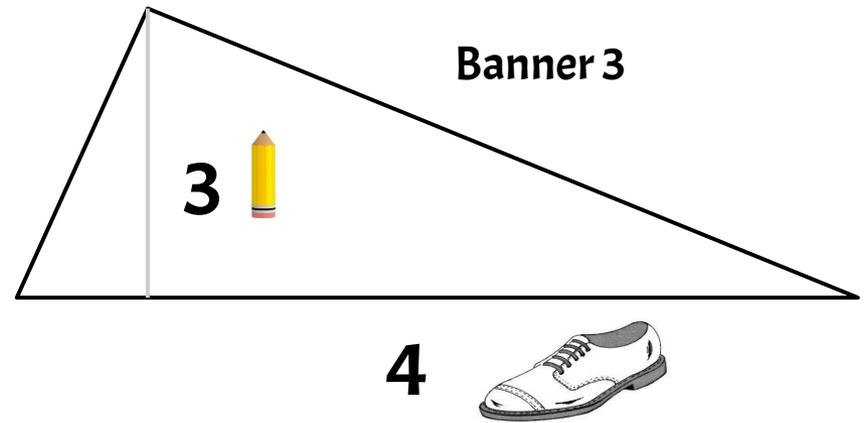
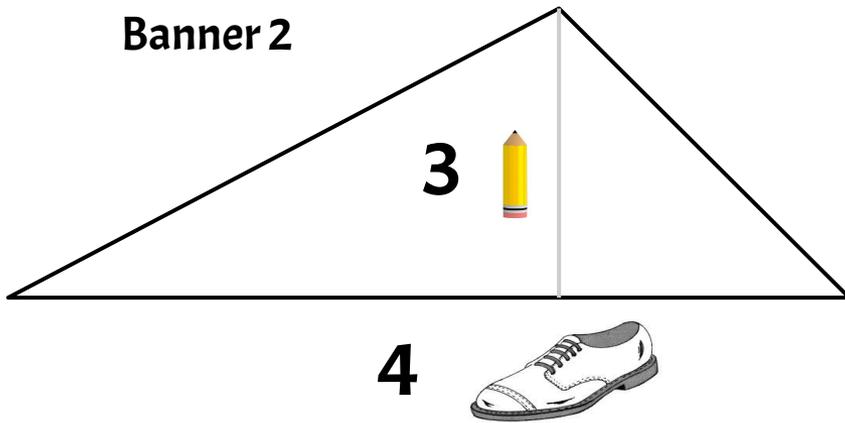
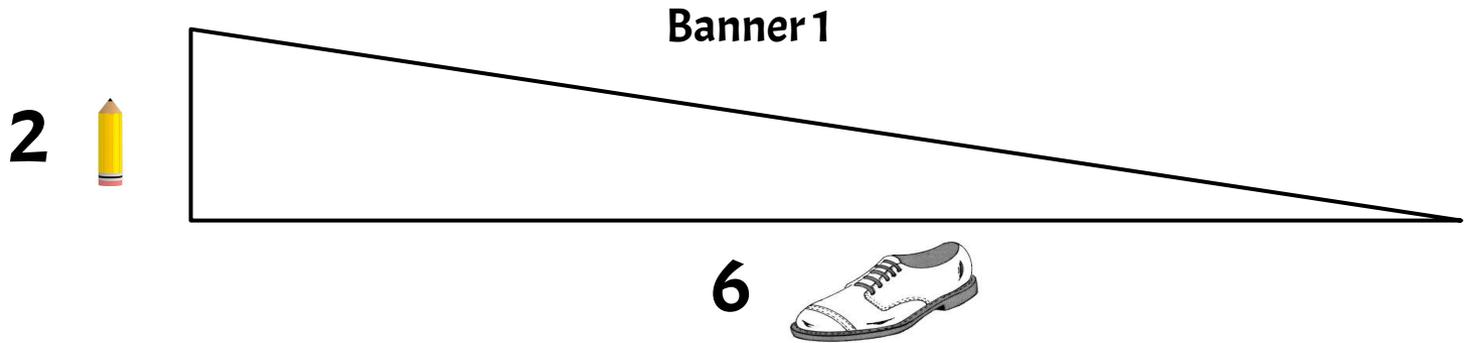
- g** Which banner has the largest area: Banner 1 or Banner 2?
Discuss your answer.



- k** How many copies of Banner 1 do you need to use to cover Banner 3? How many copies of Banner 2 do you need to use to cover Banner 3? Are your answers consistent with your answer in part f?



i Which triangular banner has the largest area? Discuss your answer.

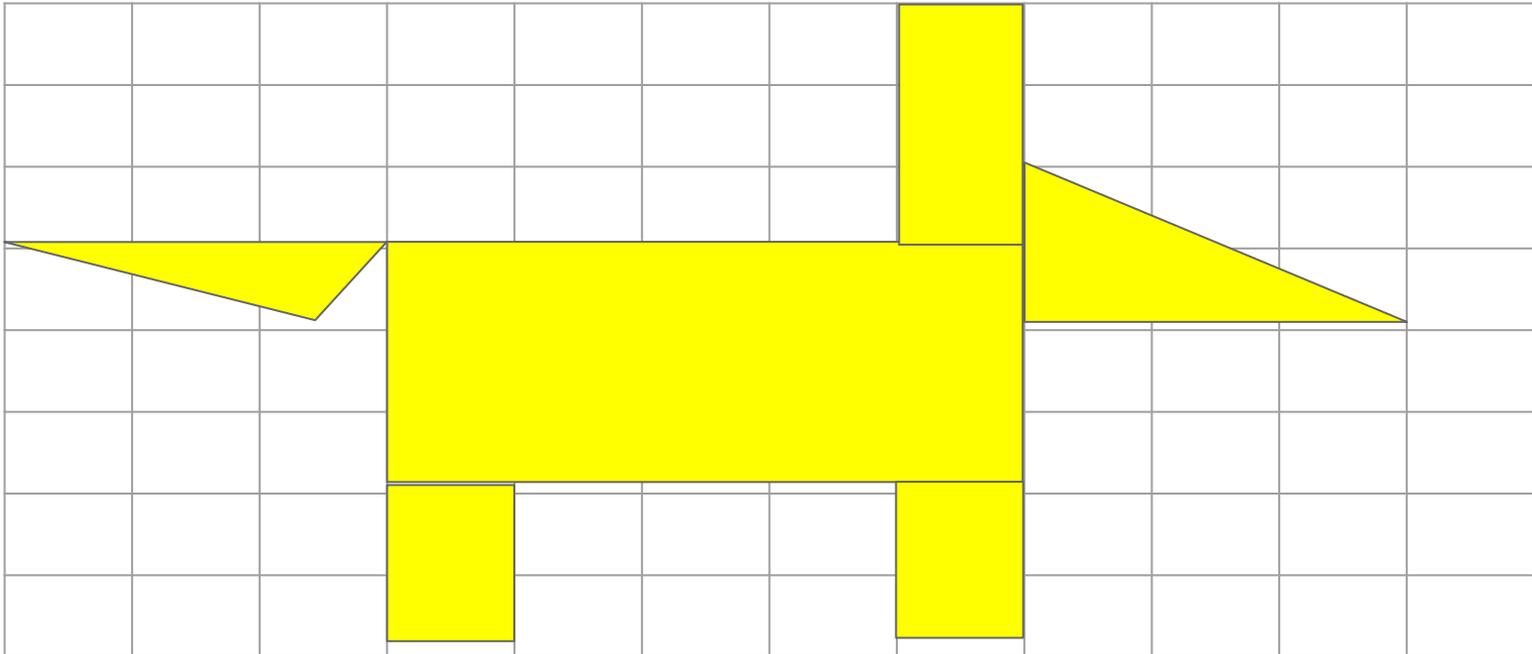


Horse or Poodle?

- i** The following banner has as units rectangles measuring 1 shoe long and 1 pencil tall:

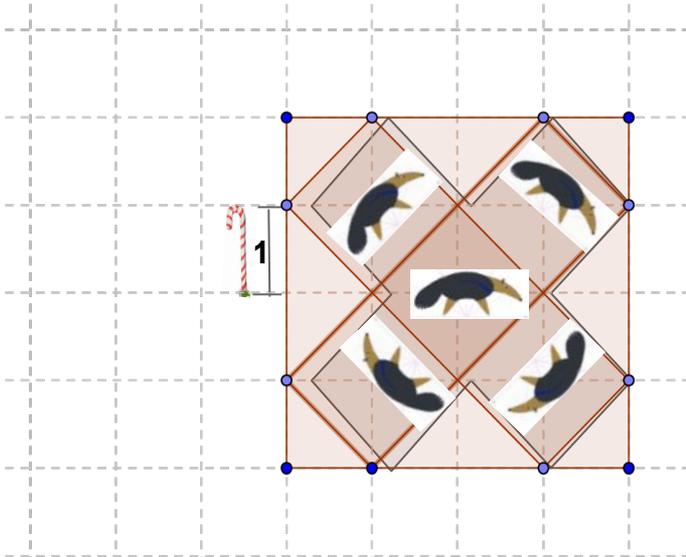


Find the total area of the animal that appears in the banner (and determine which animal it is):

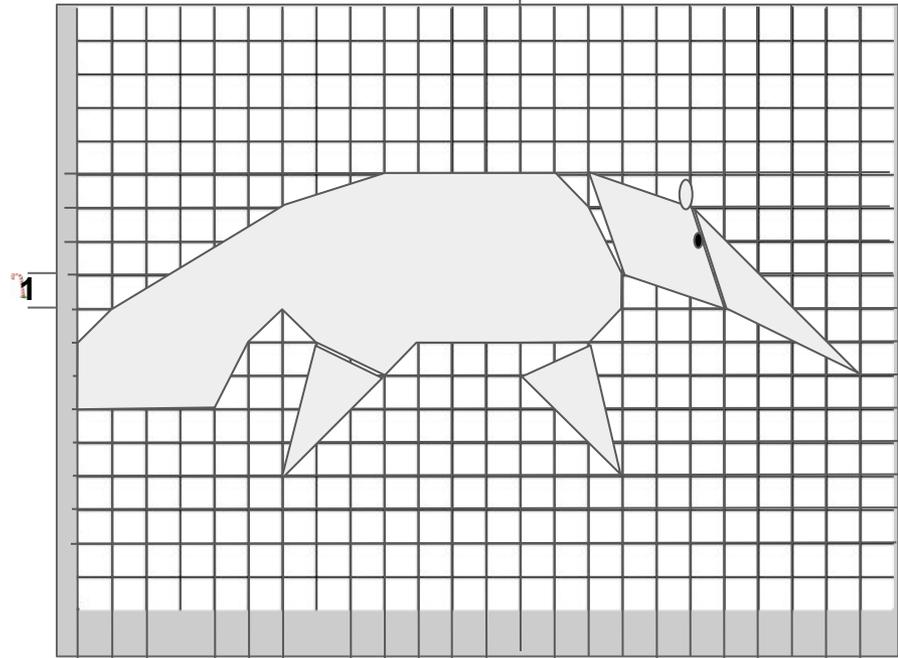


Peter the anteater

- k** Find the area of the shaded region (each square on the grid has length side one cane). Discuss your answer.



- l** Try to find the area of Peter the Anteater (the UCI's mascotte).



- m** In which units would you measure the area of these two banners?

From pencils to toothpicks



- n** Select a toothpick and a pencil. We will use these objects as measuring tools. Draw a rectangular banner of width **3** pencils and height **3** toothpicks.

draw it here...

Complete the following tables, measuring your banner. You can estimate to tenths:

width	height
<u>3</u> pencils	<u>3</u> toothpicks

Area: _____

width	height
___ toothpicks	___ toothpicks

Area: _____

width	height
___ pencils	___ pencils

Area: _____

Discuss

Is the banner squared shaped? Why or why not?

What is the area of your banner? In which area unit can you measure it?

Discuss

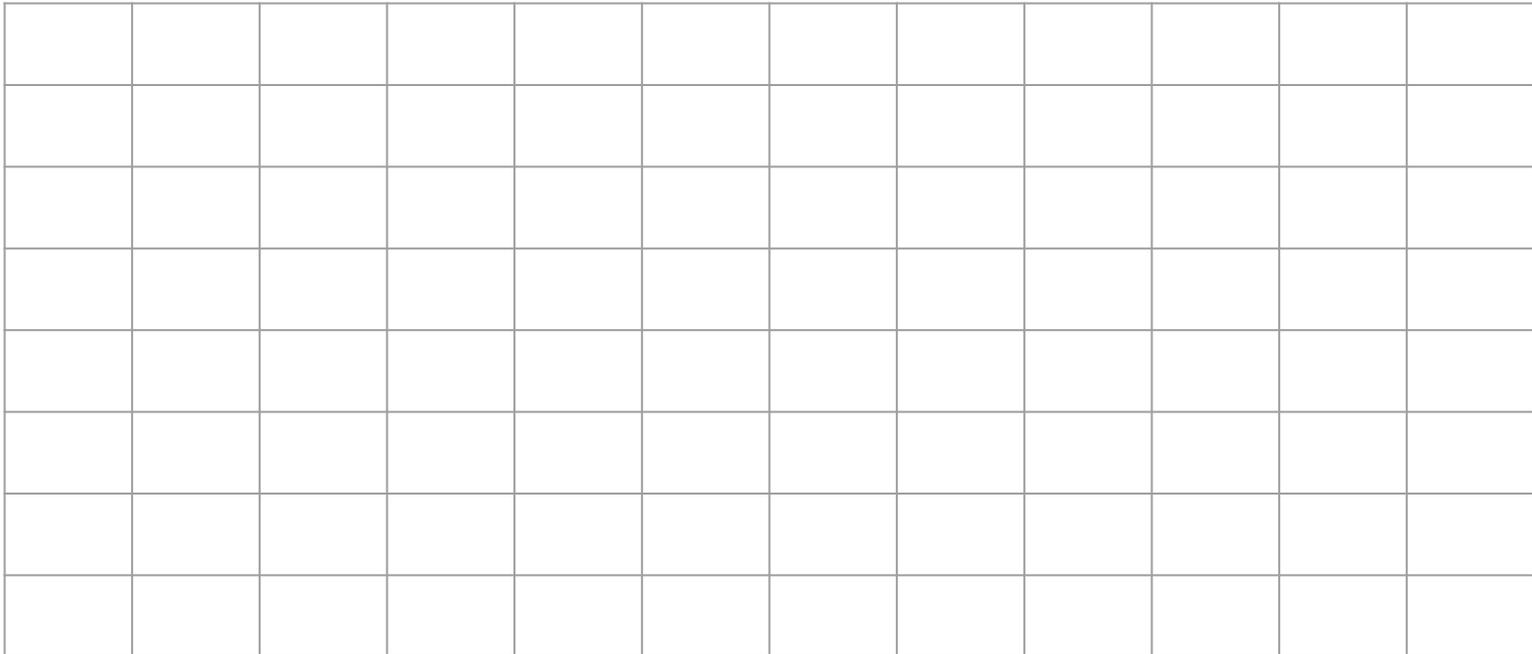
We obtained three different numbers for the area of our banner. How can we explain this fact?

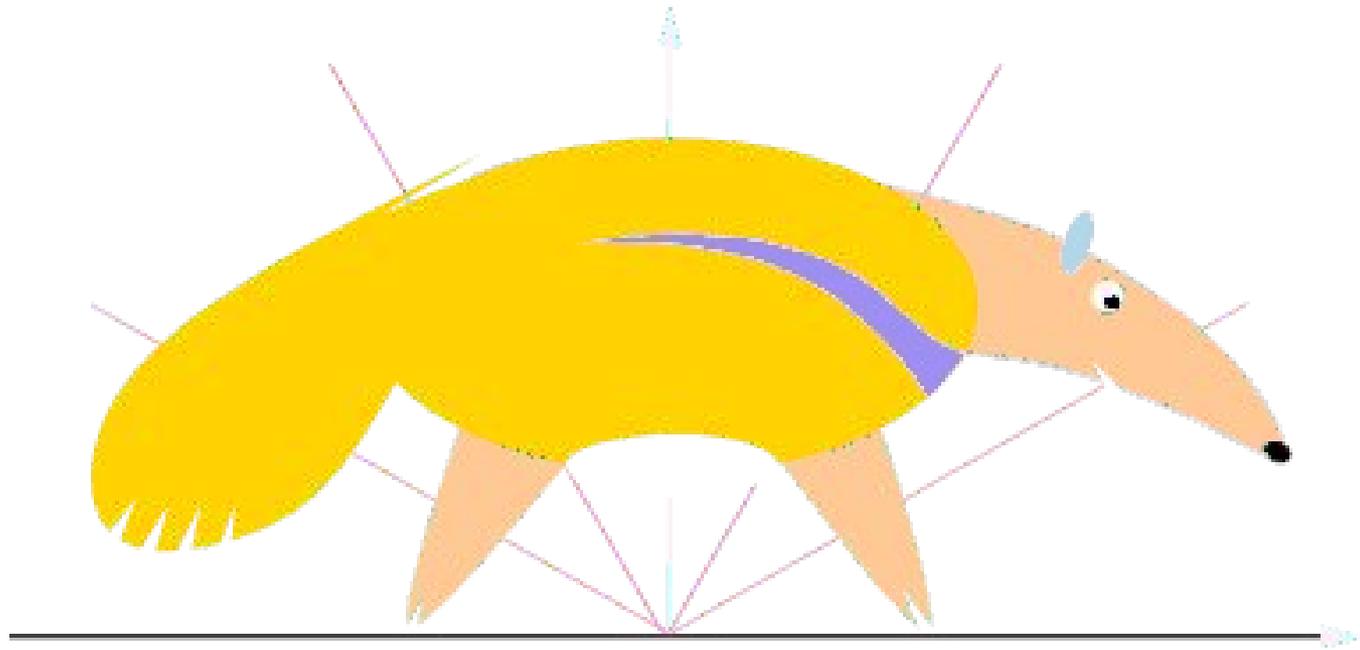
The banner challenge

The following banner has as units rectangles measuring 1 shoe long times 1 pencil tall:



Draw an animal whose area is equal to 44.5 units.

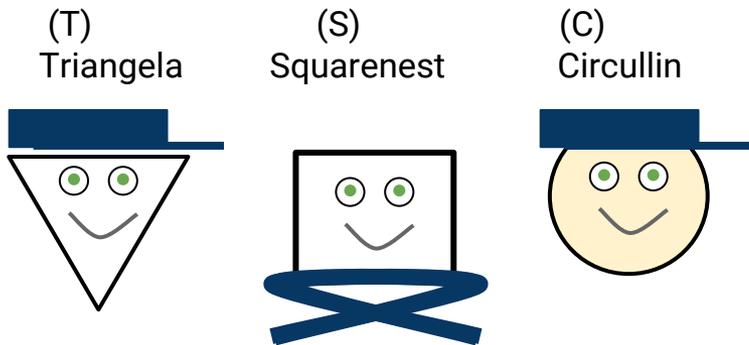




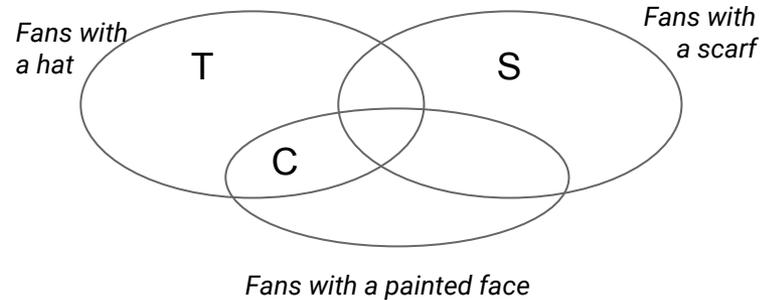
Zot! Zot! Zot!

Using Venn diagrams

In the example illustrated below, Triangela (T) has decided to wear a hat, Squarenest (S) has decided to wear a scarf and Circlollin (C) has decided to both paint his face and wear a hat:



We can represent this situation by means of a **Venn diagram**. We draw three regions, each representing one property: wear a hat, wear a scarf and paint the face. We then put the fans T, S and C inside or outside the regions, according to the picture:



We also **code** this information into a “mathematical formula”, using +, → and parenthesis:

```
HAT→(Triangela) + SCARF→(Squarenest) + HAT→(Circollin)
```

This formula says: *put a hat to Triangela, put a scarf to Squarenest and put a hat to Circollin.*

Here is another *code* to write the same instructions:

```
HAT→(Triangela + Circollin) + SCARF→(Squarenest)
```

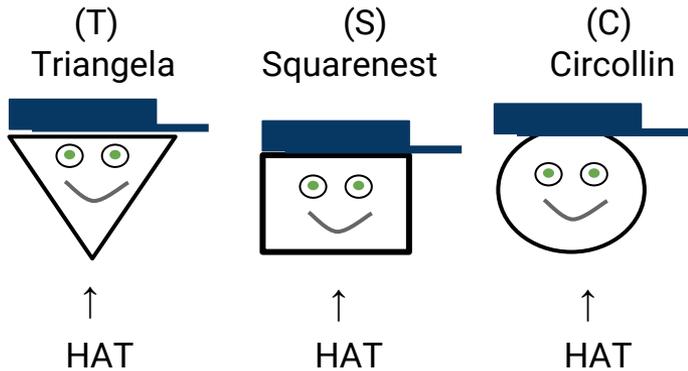
This code reads: *put a hat to both Triangela and Circollin, put a hat to Squarenest.*

The second one is a **shorter code**, hence it is preferable.

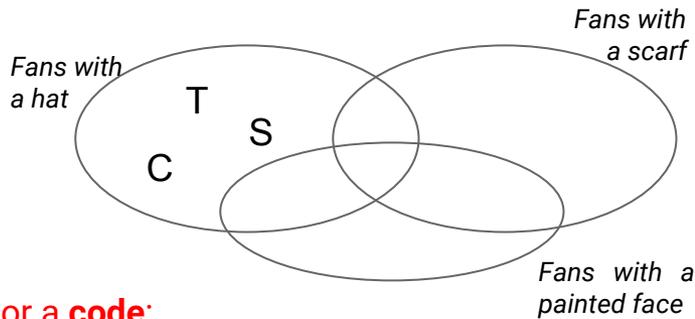


Another example:

This time every fan is wearing a hat (and nothing else).



We can represent a situation using a Venn diagram:



or a code:

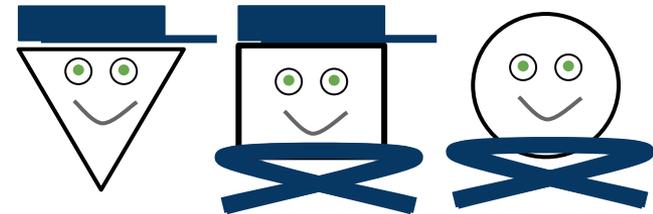
$$\text{HAT} \rightarrow (\text{Triangela}) + \text{HAT} \rightarrow (\text{Squarenest}) + \text{HAT} \rightarrow (\text{Circollin})$$

This formula reads: *put a hat to Triangela, put a hat to Squarenest and put a hat to Circollin.*

That is the same as: *put a hat to Triangela, Squarenest and Circollin.* So we can use the **shorter code**:

$$\text{HAT} \rightarrow (\text{Triangela} + \text{Squarenest} + \text{Circollin}) = \text{HAT} \rightarrow (\text{all})$$

Last example:



$$\text{HAT} \rightarrow (\text{triangela} + \text{squarenest}) + \text{SCARF} \rightarrow (\text{all} - \text{triangela})$$

