



Learning Project Week 1 'Roller Coasters'

Age Range Year 5/6

Weekly Maths Tasks – aim to do one per day

Try to do 10 minutes of arithmetic/ mental maths each day:

- <https://www.topmarks.co.uk/maths-games/daily10>
(Choose level 5 addition & subtraction)
- Get your child to play on [Times Table Rockstars](#). TT Rockstars weekly sessions now set, children need to play a minimum of 5 garage and 3 studio sessions per week. There is also a weekly Battle of the Bands – Class 4 against Mrs Rogers for the children to have a go at! The more they play, the more likely they are to win!
- Maths (see below).

Area and perimeters

To find the area of a rectangle, multiply the length by the width. Use the formula $l \times w$.

To find the perimeter add the length of each side together. Use the formula $2l+2w$ for the perimeter of rectangles.

1. Area of rectangles
2. Area of compound shapes
3. Area of irregular shapes
4. Measure perimeter
5. Calculate perimeter

There are three levels of questions. Diving, Deeper and Deepest. For confidence you may want to start with Diving, but for those who want to, your child could start at Deeper. Have a go and see how far they get.

Weekly Reading Tasks – aim to do one per day

Try to read every day. There are some ideas here:

- Audible have made all their children's books free while schools are closed. Choose one and listen:

<https://stories.audible.com/discovery>

Send Mrs Rogers a review of the books you have listened to once you have heard it all, or send a 'Half Way Through' review. What do you like/not like about the story?

Read a book of your choice to an adult. Talk about the story and the characters. Predict what you think might happen next.

Explain why you like/do not like the book.

Complete one of the reading homework tasks from the list in your child's Homework book.

Weekly Spelling, Punctuation & Grammar Tasks – aim to do one per day

- Spelling Shed Challenges for the Weekly Spelling lists are up and running. Please play a minimum of 3 times a week.
- Practise using active and passive:
https://www.youtube.com/watch?time_continue=38&v=ZnL689Mpzew&feature=emb_logo
Watch the video and write 5 simple sentences in the active.
- Now change those sentences to passive, e.g. Jack climbed the tree. (active)
The tree was climbed by Jack. (passive)
- Practise more passive/ active sentences:
<https://www.englishgrammar.org/active-passive-voice-worksheet-8/>

Weekly Writing tasks – aim to do one per day

- Watch a range of online video clips of roller coaster rides to gain the perspective of the rider. Describe how they think the rider feels as he or she is on the ride, including what kind of things they might be saying and thinking. Generate speech bubbles for different videos and share them with the class. Build up a class bank of words and phrases on the theme.
- **Note:** There are many video clips online, but make sure you watch and vet them first because some may include bad language. Some clips include no speech at all, so the children will have to imagine what the rider might be thinking or shouting! You could divide the activity into things the rider says and thinks before, during and after the ride.
- **Useful links:** [Goliath Roller Coaster – YouTube](#)
- [Megafobia Roller Coaster – YouTube](#)
- Draw a roller coaster design on a long piece of paper, making sure it has plenty of twists, turns and loop the loops. Use labels to write dialogue between two riders at different points of the ride. Add detail in the dialogue that refers to the roller coaster's design.



- **Note:** For example, the children should refer to upcoming loops, corners and drops as well as other features of the ride. The work children create here will be used as a plan for a short narrative (story).
- Use their plans and ideas to draft a short narrative that includes dialogue. Use appropriate speech marks for direct speech and include a variety of synonyms for the word 'said', as previously explored. Read their work aloud as they progress to check it makes sense.
- **Note:** Recap how to use speech marks and other punctuation, such as question and exclamation marks. Children should also be encouraged to use more complex sentences that feature metaphors and similes, where appropriate.

Resources: Story with dialogue - The Jump (see resources included in this planning)

Learning Project to be done throughout the week

- **Design Technology:** Investigate roller coaster carriage designs, thinking about their structures and materials used in construction. Sketch ideas for a carriage design using cross-sectional and exploded diagrams to show details and safety features. Draw their final design on paper or using computer-aided design software, such as [Tinkercad](#), before adding colour and decoration to make it look authentic.
- **Science:** Build a loop the loop track for marbles. Experiment with the drop to see what height it needs to be for the marble to complete the loop without falling off. Once the marble is successfully looping the loop, investigate further by changing the angle of the drop and the size of the loop. Accurately record variable changes (size of the loop/angle of drop) and the outcome of their trials. Answer questions such as 'Why does the marble stay on the track? What is the biggest diameter loop the marble will travel around and still stay on?' **Note:** The track could be made with flexible, plastic u-shaped channelling from a DIY shop, or use a commercial toy, such as Hot Wheels. Alternatively, using half toilet roll tubes taped together works well too.
- **Computing:** Design a roller coaster. Model how the roller coaster will work by using software, such as Scratch, to make a sprite perform a loop the loop. Edit their program so that their roller coaster travels horizontally before and after completing the loop. Explore ways of moving the sprite forwards and backwards. Build in an emergency stop, but remember that the carriage should stop when upright and not upside-down!
- **Art:** Imagine they are riding a moving roller coaster and work in pairs to take a series of portrait photographs that capture moments of pleasure, fear and surprise. Use a zoom lens to focus on facial expressions rather than backgrounds. Upload the images to the computer and use photo-editing software to add details and effects. **Note:** There are many photos of people riding roller coasters online. Children might want to experiment by taking photos upside-down so that their hair is standing on end, or by using a fan to make it seem like they are moving at high speed. They could use photo-editing software to turn themselves a shade of sickly green!
- **PE:** Every day, Joe Wicks has a 30 minute workout at 9 am. Join in via YouTube. Fancy something a little more calming than Joe Wicks, then there is also Cosmic Yoga: <https://www.youtube.com/user/CosmicKidsYoga>

Family learning

- **ART:** Why not all get involved in the virtual rollercoaster ride.
- **PSHCE:** Your child may have concerns about the current situation. Childline has lots of advice about how to discuss it with your child. <https://www.childline.org.uk/info-advice/your-feelings/anxiety-stress-panic/worries-about-the-world/coronavirus/>



The Jump

By Steve Poole

As I nervously climbed up to the platform, I had plenty of time to think. Plenty of time to chicken out...

I don't have to prove myself to them, I thought. I could quite easily just turn around and not go through with it. I could carry on living with the sneers and put downs, just like I always had. *No, you don't have to prove yourself to them*, argued my other self, *but you have to prove yourself to you*.

Put simply, my choices were: do the bungee jump, or don't do the bungee jump.

"Whatever you do, don't look down." Their words rang in my ears, impossible to ignore. So of course I looked down, and immediately felt light headed. Suddenly, my legs seemed to have a mind of their own, and for a moment I was frozen; rooted to the spot. I looked down once again at the thin blue strip of river – it looked so far away. If all went to plan, my head would be briefly immersed in it before the bungee cord yanked me back up. A dark cloud of impending doom seemed to hover above me as unwelcome thoughts entered my mind.

I couldn't help thinking back to the time when I first came to live in this town. In an effort to fit in with the kids at school, I'd accompanied several of them on my bike to a top place called Jawbreaker Hill, after the school day had ended. I should have guessed my invitation wasn't an act of kindness. The clue was in the name: Jawbreaker Hill. Not the kind of place where you form lasting friendships!

"You'll NEVER do it, you chicken," one of them had taunted, watching me from the bottom of the hill. I couldn't bring myself to nudge my bike towards the edge and plummet down. The chant of, "Chicken! Chicken! Chicken!" rang in my ears. "Whatever you do, don't look down," the same cruel boy yelled up to me, and those were the last words I could bear to hear. I came to the conclusion there and then: this wasn't what friends did. I turned by bike around and rode home so they wouldn't see the stinging tears streaming down my face.

I would like to say that nothing came of my crisis of confidence in that moment; that I had gone on to make friends with those who would support rather than tease me, but that would be lying. Years of brutal bullying would follow as I was hounded relentlessly by those who had witnessed my weakness. I was easy prey.

But today I would do something which none of them had done, which none of them had even dared to think about. At 14 years old, I was the youngest person to have signed up to bungee jump off the bridge above the town's narrow gorge. Impossibly high and ridiculously dare-devilish, this would make them see my full potential! I had made sure everyone in the school knew about this death-defying leap. There was no backing out now.

Under the weight of these thoughts, I struggled to regain my composure. Although I was breathing heavily and could taste the fear in my mouth, I continued my climb up to the platform. I was sick of being ridiculed and laughed at on a daily basis. It was they who had clipped my wings. Well, no more. They were going to watch me leap from the nest as a fledgling, then fly as a confident bird.



As I finally clambered onto the platform, the sun glared defiantly at me. It felt like the world was watching. After a few moments, a bungee instructor helped me into my harness, securing each strap in place.

“Alright?” she asked.

“No,” I replied with a smile. The woman laughed, but not a sneering, mocking laugh, which was the kind I was used to, but a warm, supportive laugh which gave me the self-assurance I needed.

“Okay,” she said, “You’re all set. I’ll count from three to one and when I shout, ‘Jump,’ you just have to fall forwards. You got that?”

Before my mind could persuade me otherwise, I quickly replied, “Got it.”

“Good. You really will be fine,” she added, to calm my fears. “Ready?”

“Ready.”

It was nearly the moment of truth. I smiled.

“Three-two-one...JUMP!”

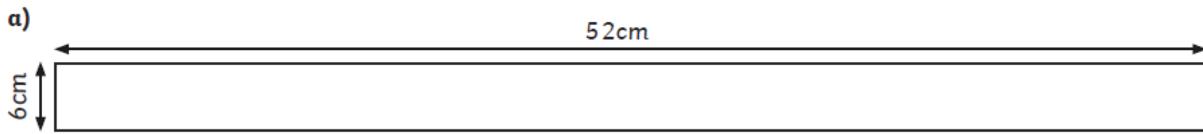
Without hesitation, I let my body fall forward as instructed. I felt the wind and the sun kissing my face. Soaring...free falling...heart-rushing...diving...perfection!

Strangely, despite the speed, I couldn’t remember ever feeling so clam. So this is what living felt like! *Real* living. Even before the rope had reached the end of its journey, so much had changed. It was an odd realisation. It no longer mattered what they thought of me. What was more important was what I thought of myself. Now, I wasn’t just calm, I was positively relaxed. I started to really enjoy the fall, knowing full well that it marked the beginning of my ascent back up.

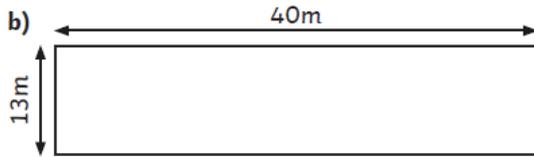
This fledgling had become an eagle.



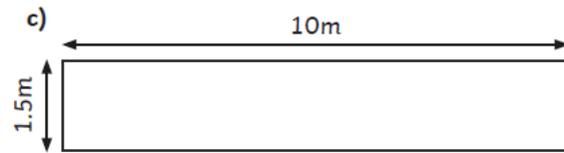
1) Calculate the area of the following rectangles:



area = _____

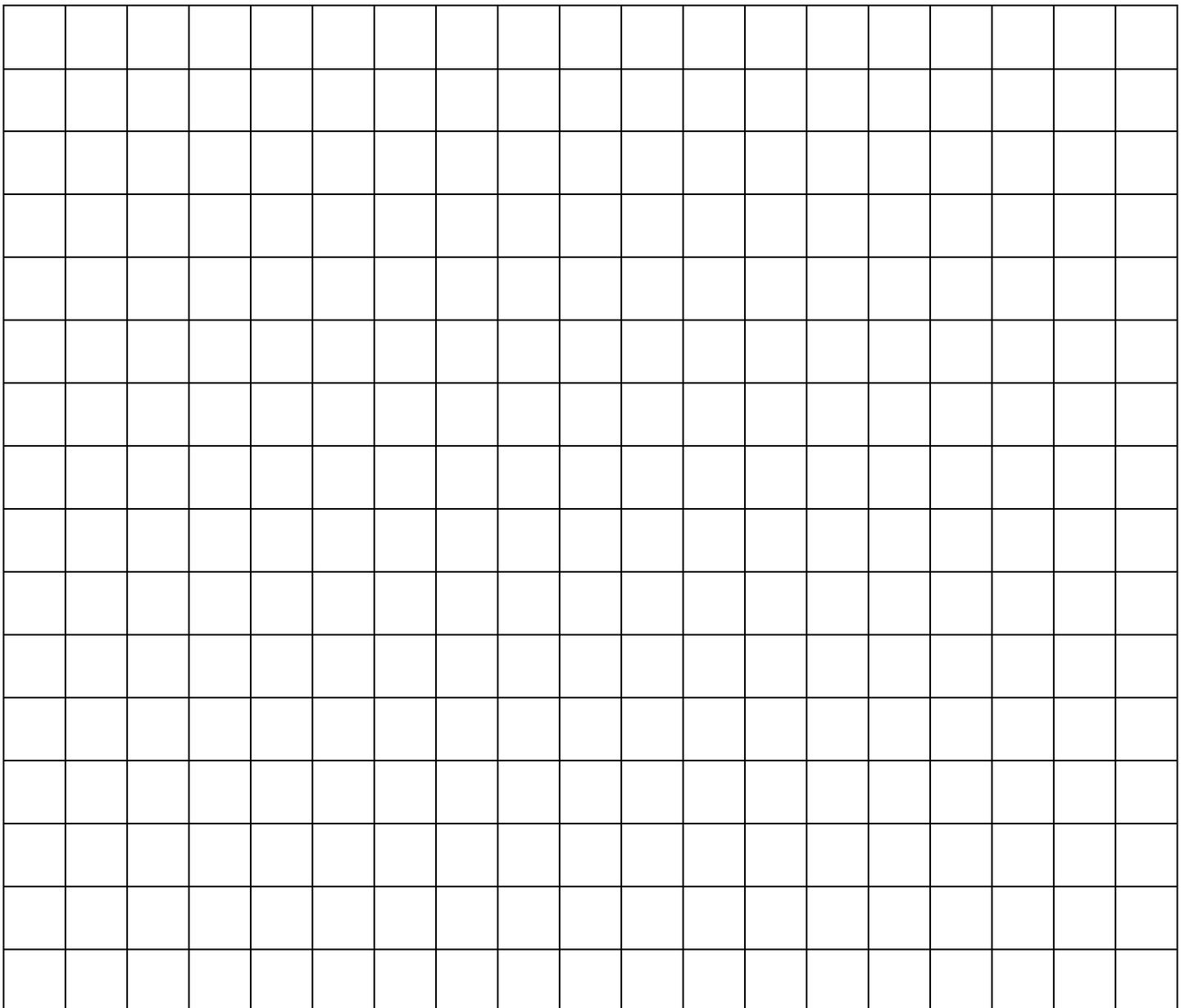


area = _____



area = _____

2) Draw 3 different rectangles with an area of 30cm^2 on squared paper and label the lengths of their sides.





1) Here is the layout of one floor of a house not drawn to scale.



Use the clues below to work out the area of each room and the total area of this floor of the house.

- The garage and the kitchen are identical rectangles.
- The whole house is 20m long and 15m wide.
- The garage has walls of 15m and 4m.
- The living room is a square.

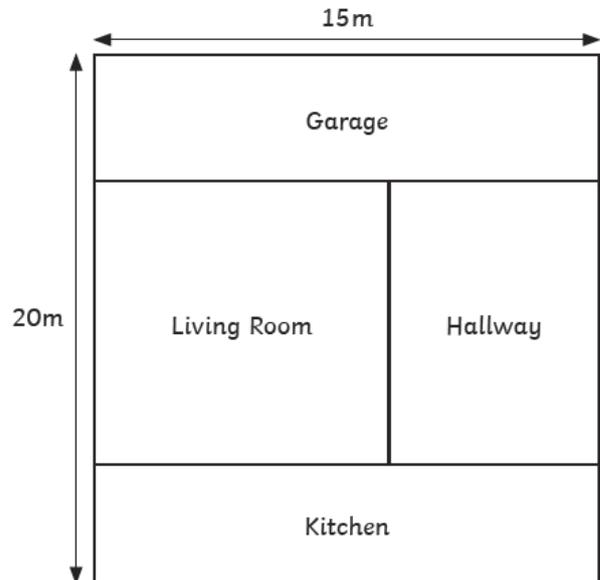
Garage: _____

Living Room: _____

Hallway: _____

Kitchen: _____

Total Area: _____



2) Investigate a different way of dividing up the house into four rooms. The length and width of the whole house and its total area should be the same as in question 1. Write some clues for a friend to solve.



- 1) a) 312cm^2 b) 520m^2 c) 15m^2



- 2) *Answers will vary but may include rectangles with the following measurements:
 $1\text{cm} \times 30\text{cm}$, $2\text{cm} \times 15\text{cm}$, $3\text{cm} \times 10\text{cm}$, $5\text{cm} \times 6\text{cm}$*

- 1) If a square and a rectangle whose sides are not all equal have the same area, they will have the same perimeter.
They could have different perimeters.
- A square can never have an area greater than 9cm^2 but less than 16cm^2 .
They could have sides of between 3cm and 4cm in length.
- If I cut an 80cm^2 rectangle into 2 new rectangles, they will have a combined area of 80cm^2 .



- 2) *6cm and 18cm*

- 1) Garage: 60m^2
Living Room: 144m^2
Hallway: 36m^2
Kitchen: 60m^2
Total Area: 300m^2



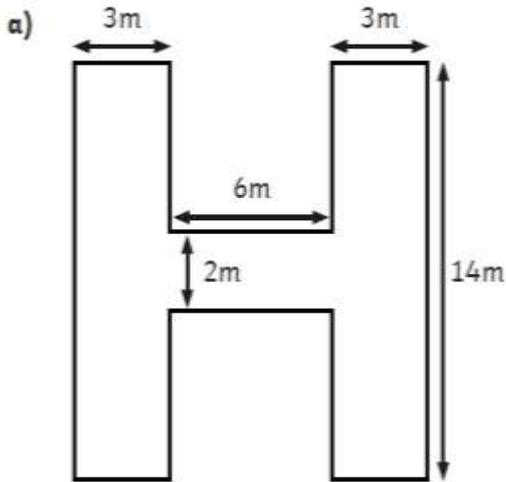
- 2) *Children will find different solutions to this problem. The total area of the four rooms should be 300m^2 .*



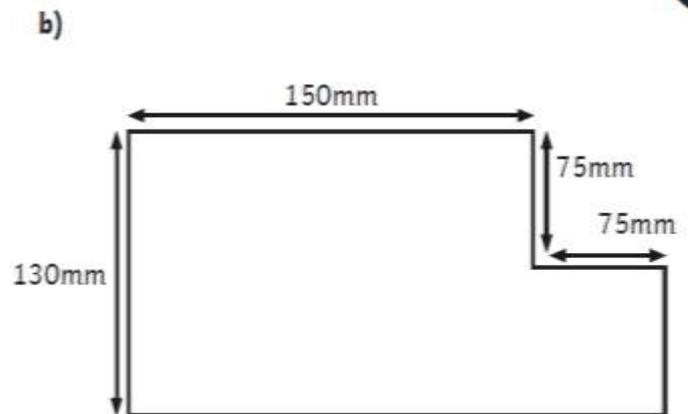
Area of Compound Shapes.

HINT: Think about chopping these shapes into rectangles and finding the area of each rectangle.

1) Find the area of the following shapes.

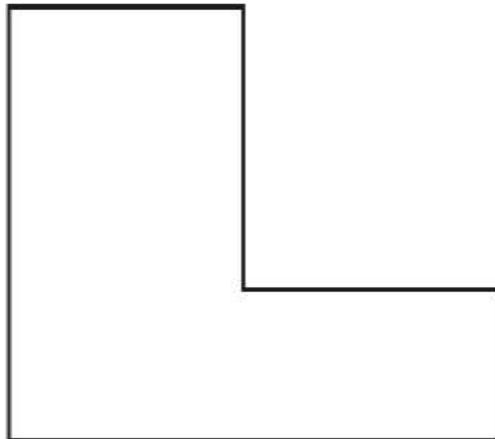


area = _____



area = _____

2) Use a ruler to draw on the ways you could split this shape to work out its area.





1) Draw 3 different compound shapes, each with an area of 45cm^2 .



2)

The only way of finding the area of a compound shape is to split it into smaller rectangles, find their areas, then add them together?



Do you agree with her?
Explain your answer:

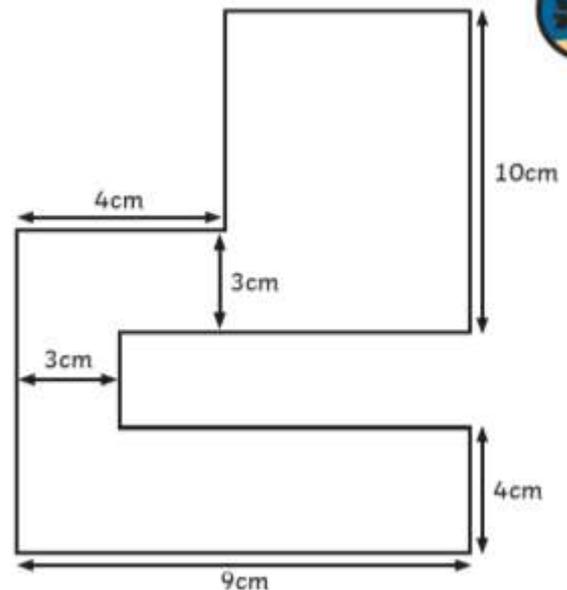
1) Ianto wants to calculate the area of this shape.

a) He says, "It is impossible to work out the area of this shape without more measurements." Is he right?

Prove it!

b) Investigate how many more measurements Ianto needs in order to find the area.

c) If the total area is 107cm^2 , what could the missing lengths be?





- 1) a) 96cm^2
b) $23\,625\text{mm}^2$ or 236.25cm^2



- 2) Lines drawn as shown:



- 1) Answers will vary.
2) No. She could find the area of the whole rectangle, then subtract the area of the 'missing' piece or pieces.



- 1) a) Yes. Children should demonstrate that the shape cannot be split into rectangles where every side length is known.
b) By splitting the shape into 4 rectangles, children should find that only 2 more measurements are needed in order to make finding the area possible.
c) To make an area of 107cm^2 , the sides could measure (clockwise from top right) 10cm , 6cm , 3cm , 6cm , 4cm , 9cm , 10cm , 4cm , 7cm and 5cm .

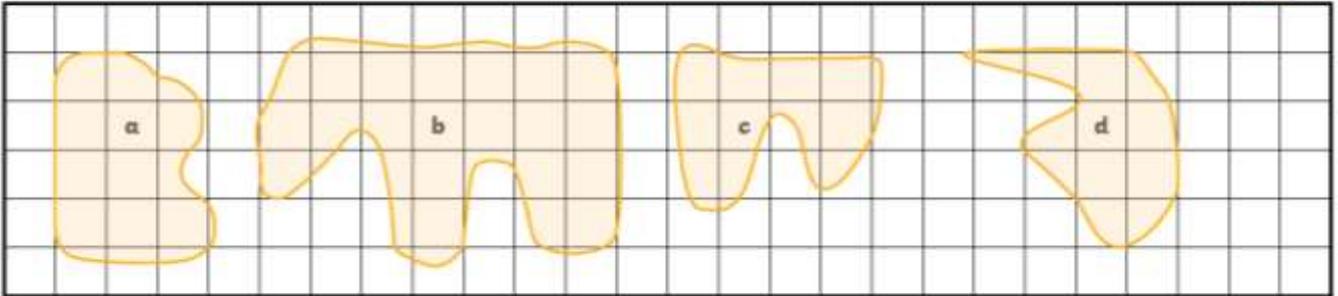




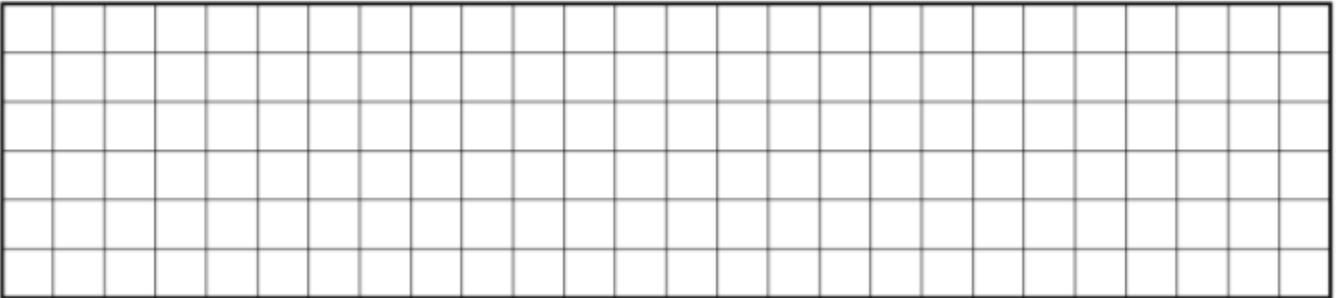
Area of Irregular Shapes

HINT: Count the squares and add part squares together.

1) Estimate the size of each shape on this grid, in squares:



2) On this grid, draw an irregular shape with an estimated area of 9cm^2 .



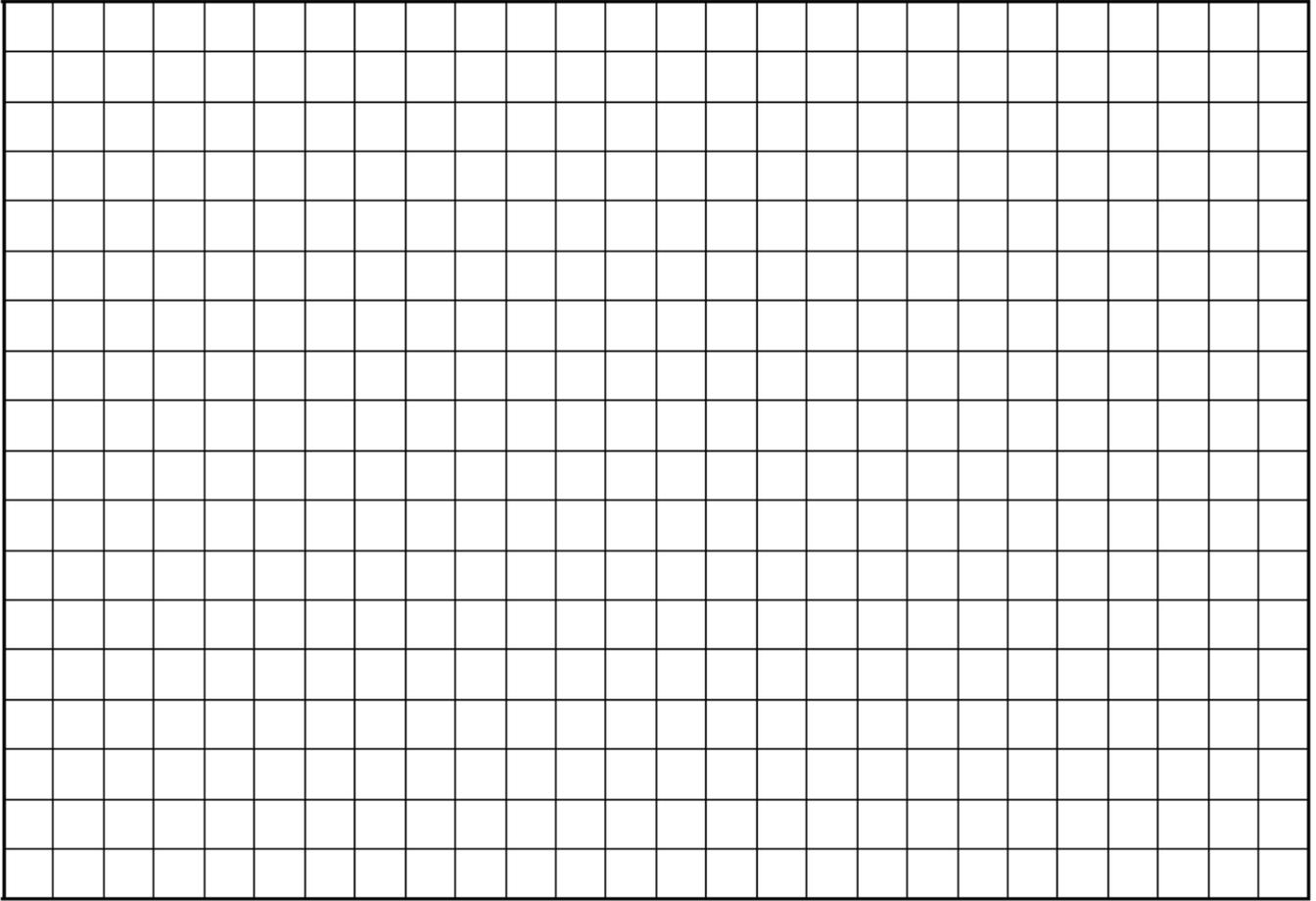


1) On this grid, draw a series of circles which have areas of approximately:

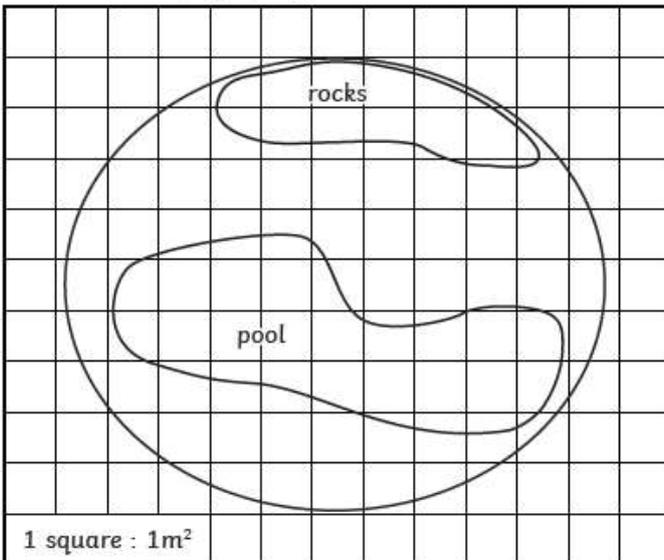
a) 12cm^2

b) 28cm^2

c) 50cm^2



2) Look at this map of a penguin enclosure:



Caryn says,

"I estimate the pool and rocks together have an area of 30m^2 ."

Jay says,

"I think the pool, on its own, has an area of around 29m^2 ."

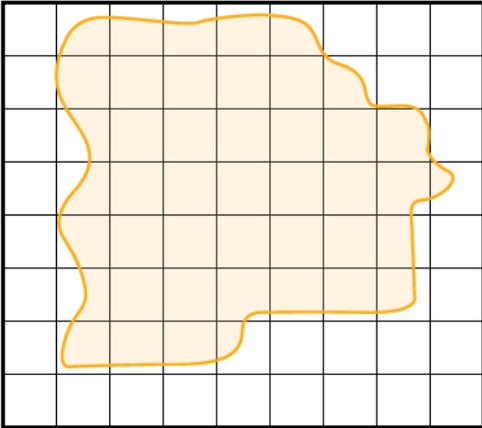


Who do you agree with?

Explain the mistake that one of the children has made.



- 1) Twinkl Zoo is opening a new area. On their planning map, the designers have shaded this irregular shape where building can take place.



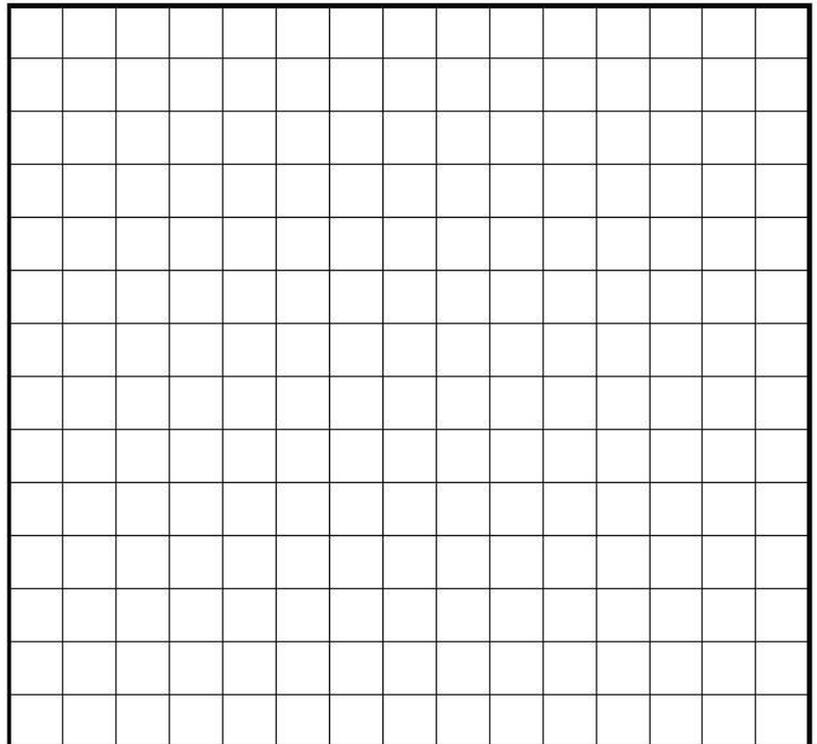
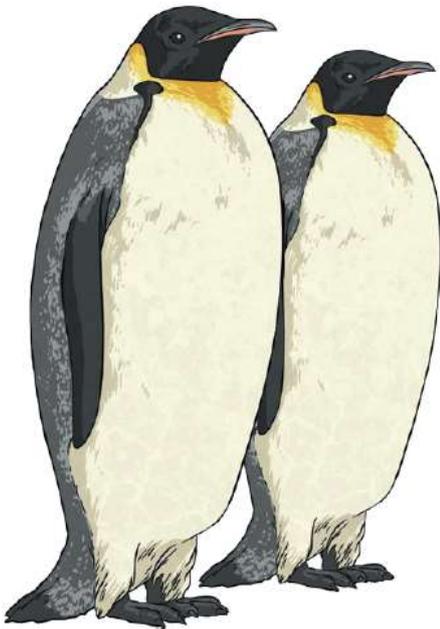
Each square represents 10m^2 .

They would like to open a 120m^2 penguin enclosure and a 70m^2 otter enclosure, both with curved walls.

Plan where the 2 enclosures could fit. Remember there will need to be space between them.

- 2) Challenge: design your own zoo enclosure layout made up of irregular shapes on the grid.

- Each square represents 1m^2 .
- At least 120m^2 must be open area for animals to roam.
- At least 20m^2 must be indoor pens.
- At least 20m^2 must be water.
- You need to allow space for visitors to move around the area.





1) Allow +/- 1 square difference.

A = 11 squares

B = 23 squares

C = 9 squares

D = 9 squares

2) Answers will vary.



1) a) The circle will have a diameter of approximately 4cm.

b) The circle will have a diameter of approximately 6cm.

c) The circle will have a diameter of approximately 8cm.

2) Caryn has estimated the area correctly. Jay has counted the partial squares the pool covers as whole square metres.



1) Shapes drawn by the children will vary but should have curved lines and measure 12cm^2 and 7cm^2 .

2) Answers will vary.



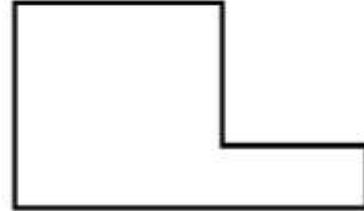
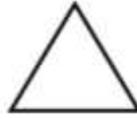


Measuring Perimeter

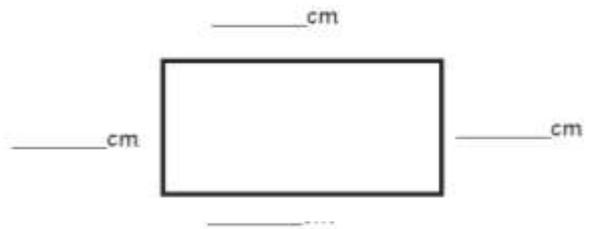
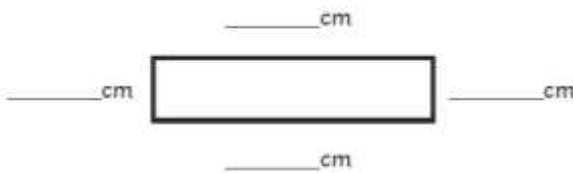
1) Find the perimeter of these shapes in centimetres.
Make sure you use a ruler carefully so that your measurements are accurate.



a) Perimeter = _____ b) Perimeter = _____ c) Perimeter = _____



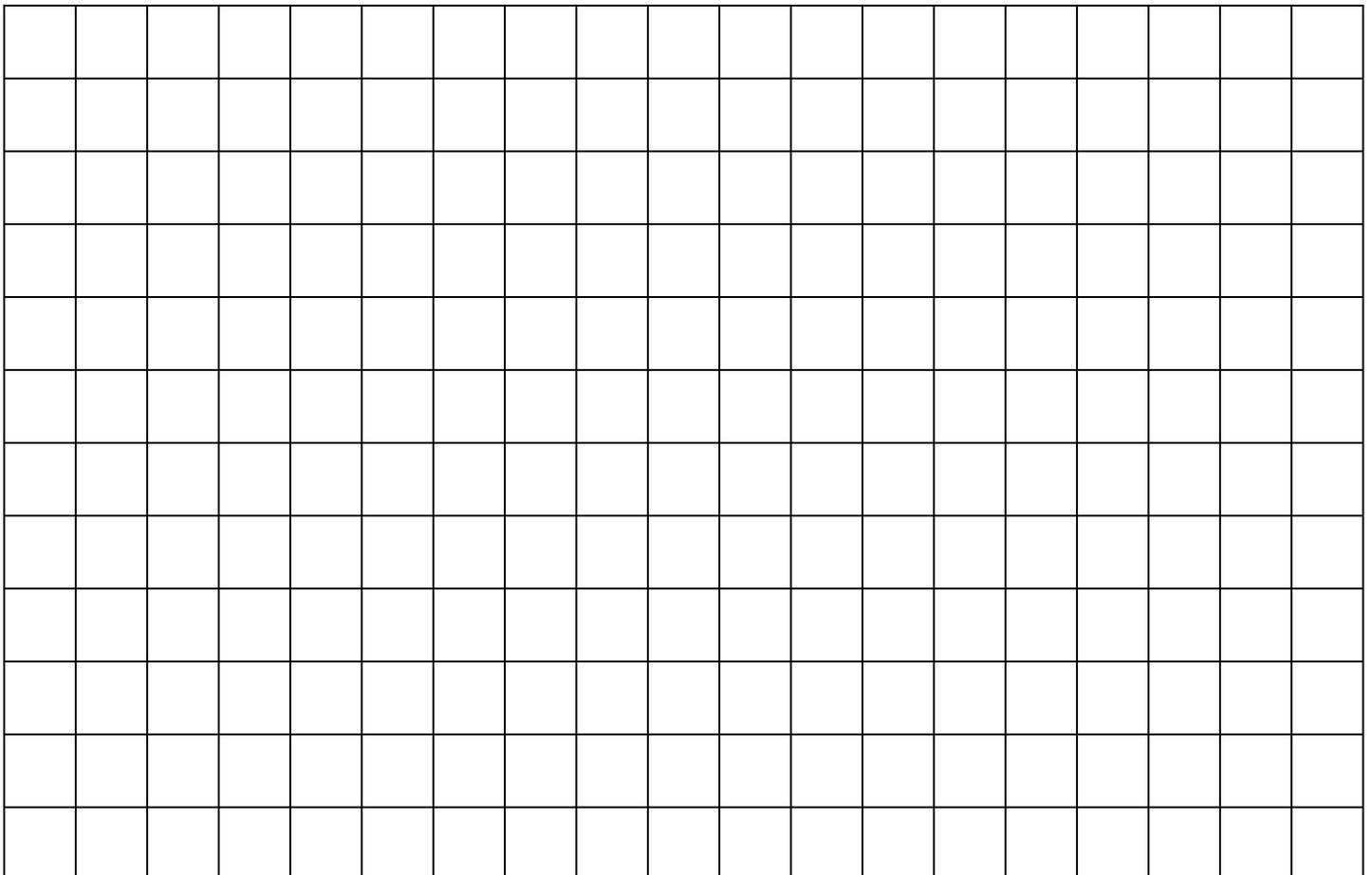
2) a) Measure and label the sides of these rectangles in centimetres.



b) Use two rectangles identical to these to draw a compound rectilinear shape.

What is the perimeter of your shape?

Does the perimeter change when you use the same rectangles to make a different compound rectilinear shape?



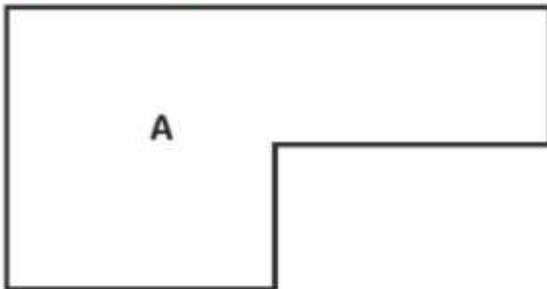


1)

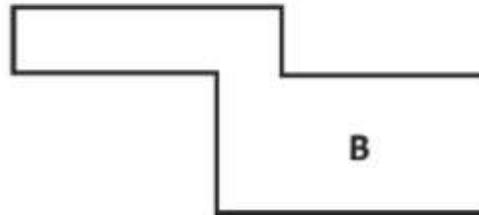


Meera

I think shape B has a longer perimeter than shape A because it has more sides.



A



B

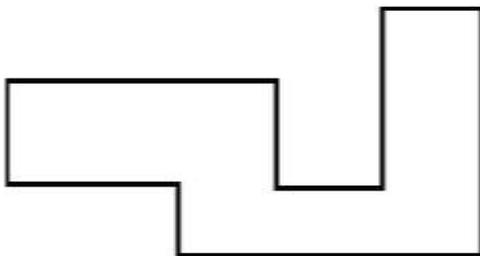
Do you agree with Meera? Explain your reasoning.

2)



David

A rectangle with one side measuring 7.5cm and the adjacent side measuring 4.5cm would have the same perimeter as this compound rectilinear shape.



Do you agree with David? Explain your reasoning.



- 1) How many different rectangles can you draw that have a perimeter of 60cm? (Each side length needs to be a whole number.)



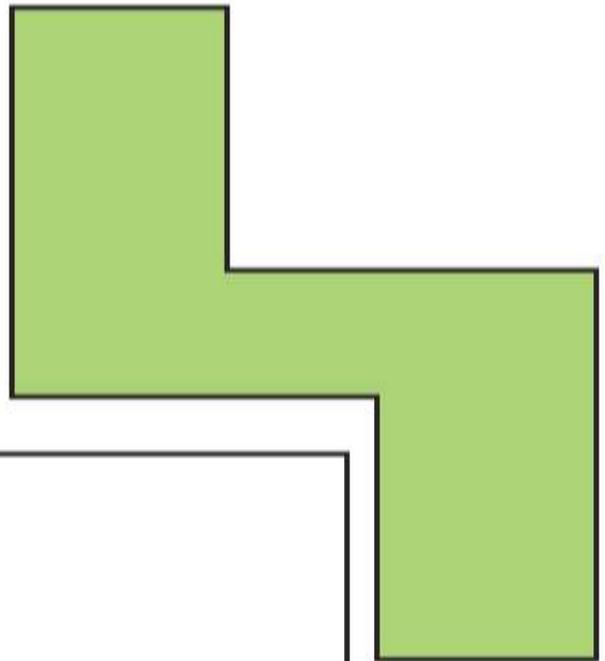
Do you have to draw all your answers or can you find a systematic way of recording the lengths of the sides?

- 2) Here is the shape of a field. It is drawn to a scale of 1cm:10m. This means that 1cm on the drawing represents 10m in real life.

The farmer has 250m of wooden fencing and 150m of electric fencing to use around the perimeter of the field.

Find all the possible combinations of fencing in multiples of 5m that the farmer can use to completely enclose the field.

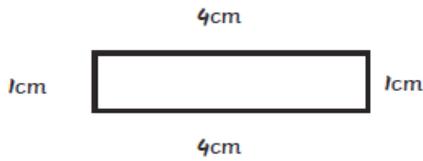
Find a systematic way to record your findings.



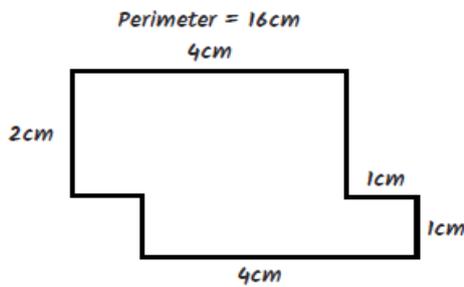
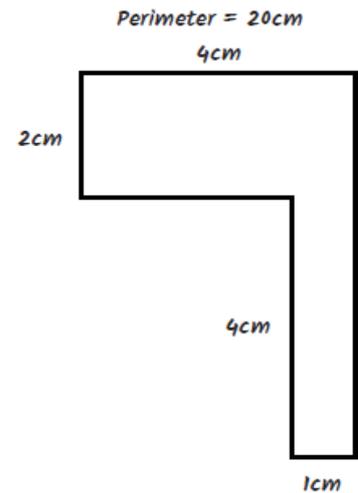
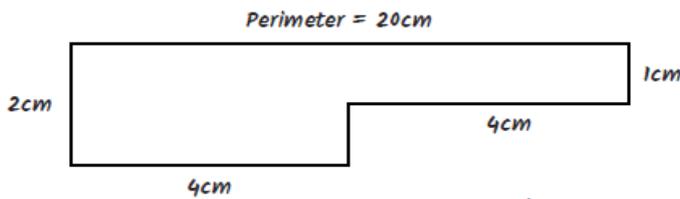


- 1) a) 10cm
b) 6cm
c) 16cm

2) a)



b) Example answers:



- 1) Meera is incorrect as shape A has a perimeter of 24cm and shape B has a perimeter of 19cm.
2) David is correct. The compound shape has a perimeter of 24cm, which is the same as the rectangle he has described.



- 1) There are 15 different possible rectangles, with the following measurements: 1cm by 29cm, 2cm by 28cm, 3cm by 27cm, 4cm by 26cm, 5cm by 25cm, 6cm by 24cm, 7cm by 23cm, 8cm by 22cm, 9cm by 21cm, 10cm by 20cm, 11cm by 19cm, 12cm by 18cm, 13cm by 17cm, 14cm by 16cm and 15cm by 15cm.
2) The field has a perimeter of 37cm which scales up to 370m.



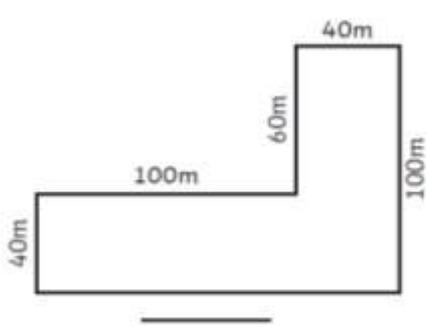
Wooden Fencing	Electric Fencing
250m	120m
245m	125m
240m	130m
235m	135m
230m	140m
225m	145m
220m	150m



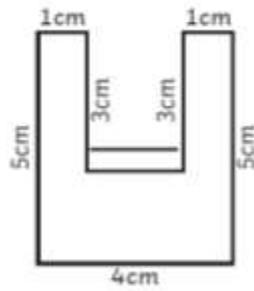
Calculate Perimeter



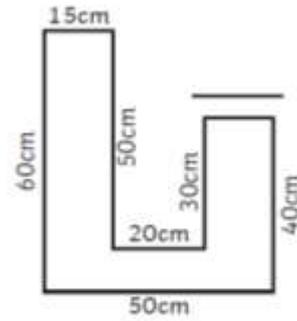
- 1) a) Use the labelled sides to find the length of the unlabelled side on each of these shapes.
b) Calculate the perimeter of each shape.



Perimeter = _____



Perimeter = _____

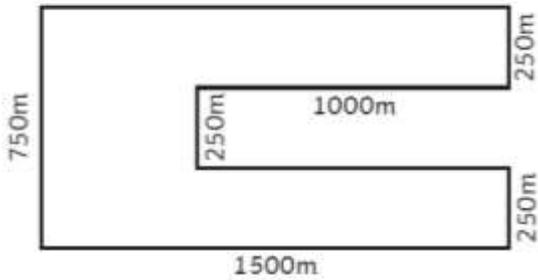


Perimeter = _____

- 2) Each square has an area of 1cm^2 .
a) What is the perimeter of the shape? _____
b) Draw two other rectilinear shapes with the same perimeter.



1) Toby says, "This shape has a perimeter of 4000m."



a) Explain his mistake:

b) Calculate the correct perimeter:

2) Are these statements true or false? Explain how you know.

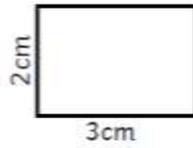
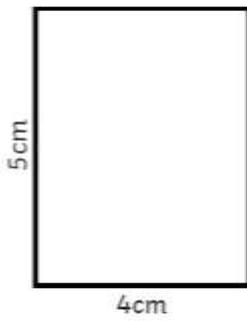
a) A rectangle with sides 2cm and 8cm, will have the same perimeter as a square with 5cm sides.

b) A long, thin rectangle will always have a longer perimeter than a shorter, wider rectangle.

c) If you put a square with sides of 4cm and a square with sides of 6cm side by side on a straight line, they make a rectilinear shape with a perimeter of 40cm.



1) a) Use these shapes to create a compound rectilinear shape.



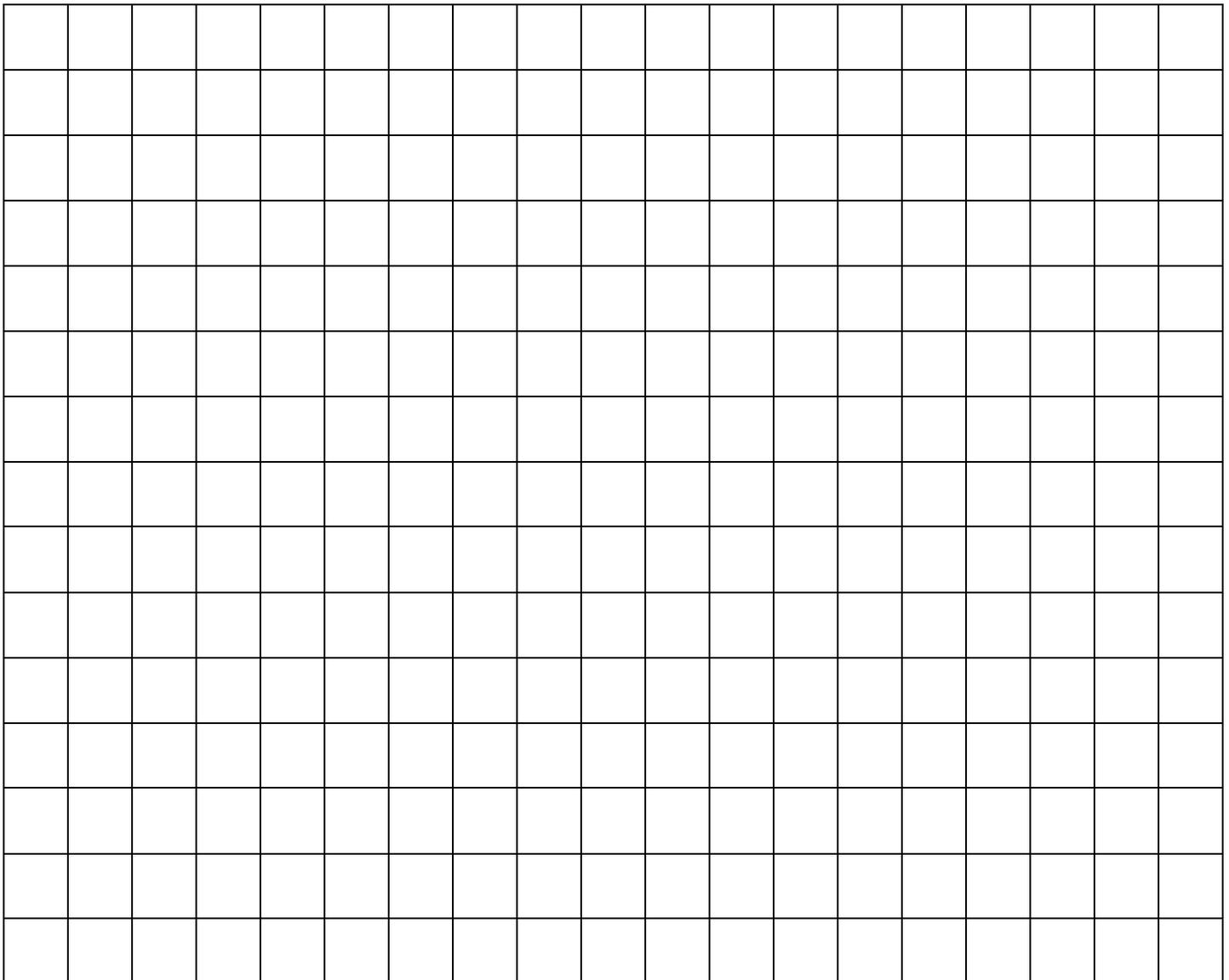
(Shapes are not drawn to scale.)

What is the perimeter of your new shape? _____

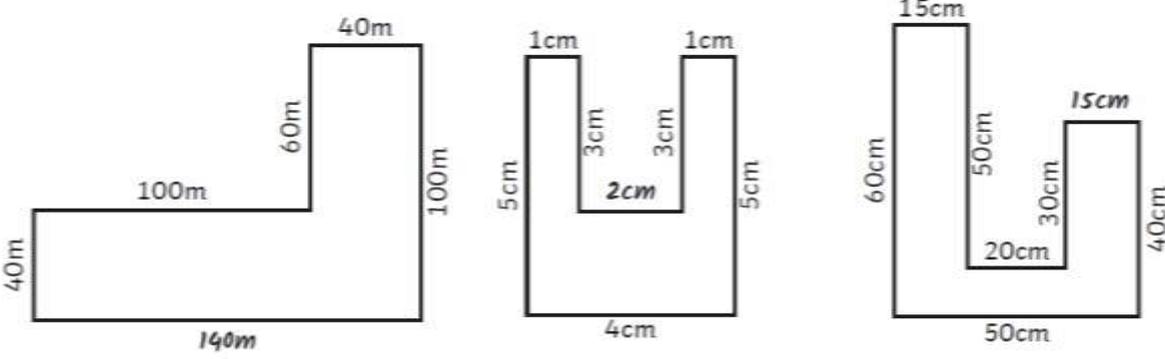
b) Amma says, "I can rearrange the rectangles to make a new shape with a different perimeter."

Is she correct? _____

Prove It!





1) 

Perimeter = 480m Perimeter = 24cm Perimeter = 280cm

2) a) 18cm
b) Multiple shapes are possible. Both should have a perimeter of 18cm.



1) He has only added the measurements labelled.
6500m

2) a) This is true because $2\text{cm} + 2\text{cm} + 8\text{cm} + 8\text{cm} = 20\text{cm}$ so the perimeter of the rectangle is 20cm and the square also has a perimeter of 20cm because $4 \times 5\text{cm} = 20\text{cm}$.
b) False. Look for explanations giving examples that disprove the statement, e.g. A long, thin rectangle with sides of 6cm and 1cm has a perimeter of 14cm, which is smaller than the perimeter of a shorter, wider rectangle with sides of 5cm and 3cm, which would be 16cm.
c) This is false because the rectilinear shape will have a perimeter of 32cm (no matter which way round you put the two squares).



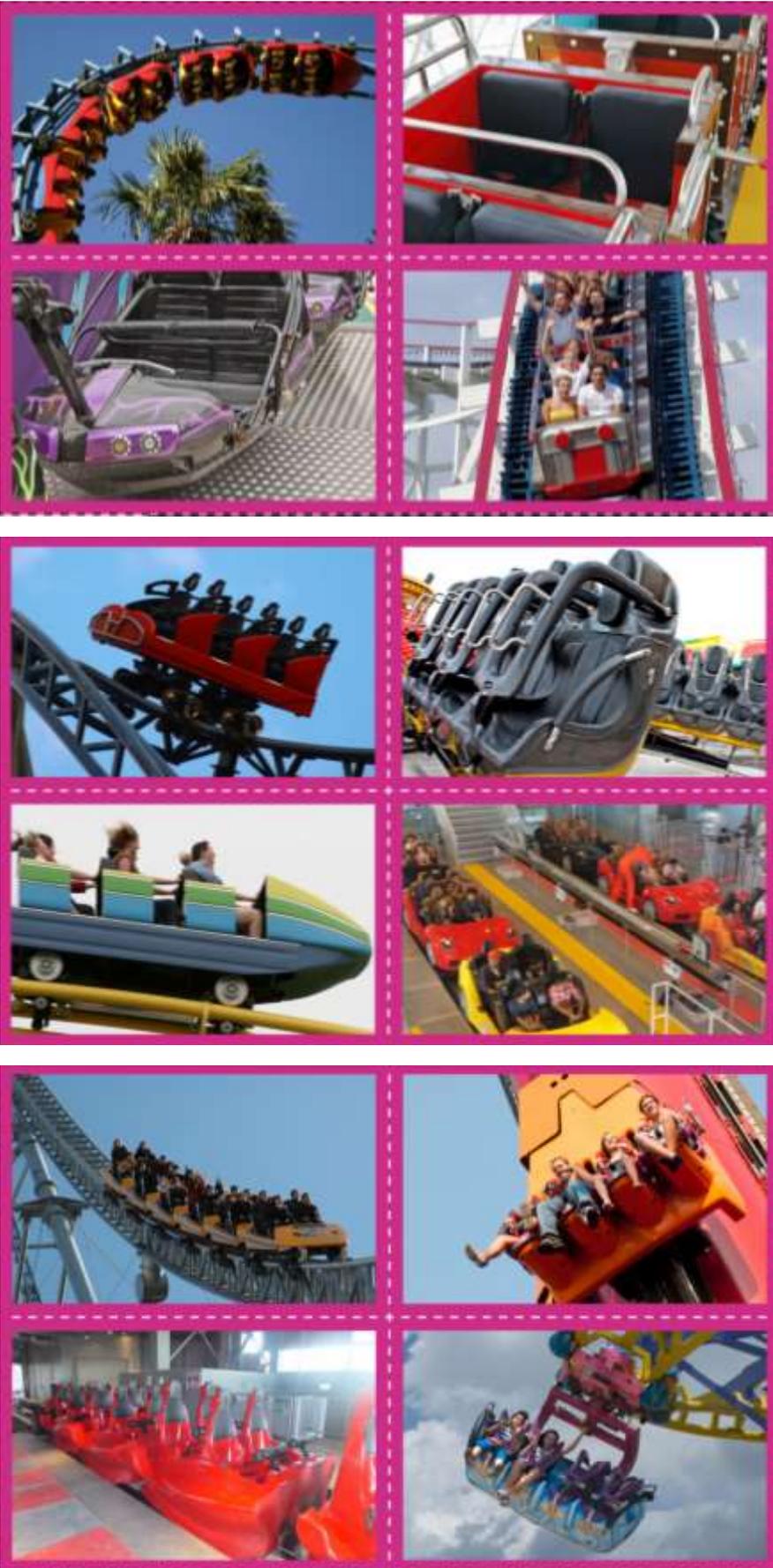
1) a) Answers will vary.
b) Yes. Children should demonstrate that they can rearrange the shape and calculate the new perimeter accurately.

2) a) Multiple answers possible. Check that shapes have the specified perimeters.
b) Tarj is partly right because if you draw an extra square onto the outside of a shape, touching only 1 edge, you are adding 3 more sides. Each side on centimetre square paper is 1cm so adding an extra square adds 3cm to the perimeter. However, if you add the square into a corner of the shape, touching 2 edges, the perimeter will not change, and if you add it into a notch in the shape, touching 3 edges, the perimeter will decrease.





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