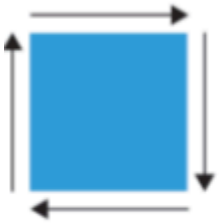
**Week 8 - Measurement Stage 5**

**Task**

| |
|---|
| A rectangle has a perimeter of 30 m.  What might be the area? |

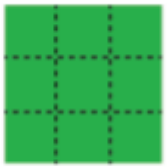
**Teaching Notes**

Ask the students what are the practical ways they can describe perimeter and area.



**PERIMETER**

The distance around the edge of a shape



**AREA**

The amount of space inside a shape

Perimeter is the length of the string that you will need to make the border of the shape.

Perimeter is the number of unit lengths (lengths of the same size) that you need to go around the shape.

If you were to walk around the shape, you need to count the number of steps you will need to make.

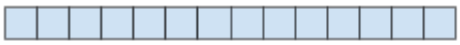
Area is the number of squares of the same shape and size that you will need to make the shape.

Area is the number of unit squares that covers the shape.

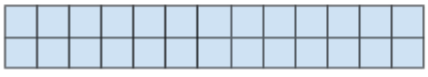
Area is the amount of paint you need to colour in the shape.

- Oftentimes, the students define perimeter as the outside of the shape and area as the inside of the shape.  Please correct this as this is really not a good definition of perimeter and area.

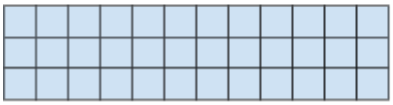
- Would the students find any pattern?  Is 8 × 7 the same as 7 × 8, etc?



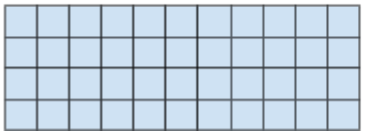
14 unit squares



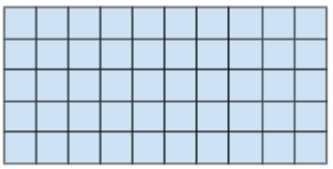
26 unit squares



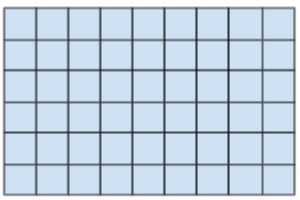
36 unit squares



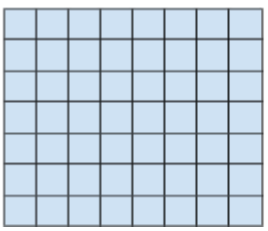
44 unit squares



50 unit squares



54 unit squares



56 unit squares

**Question 1** Solves a problem involving unit conversions and division Difficulty: 125.7 C: Correct

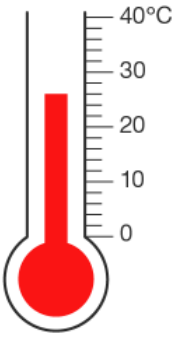
Jen is baking bread.

She divides 1 kilogram of dough equally onto four baking trays.

How much dough does she put onto each baking tray?

- 4 grams
- 100 grams
- 250 grams
- 1000 grams

**Question 2** Reads a scale with five markings between labelled markings Difficulty: 128.2 D: Correct




What temperature does this thermometer show?

- 20.3 °C
- 20.6 °C
- 23 °C
- 26 °C
- 28 °C

**Question 3** Adds two lengths given in different metric units Difficulty: 128.8 C: Correct

12 cm + 63 mm =

- 75 mm
- 75 cm
- 183 mm
- 642 cm
- none of these

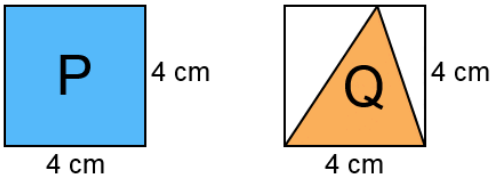
**Question 4** Converts a length in centimetres to decimal metres Difficulty: 133.7 C: Correct

What is 4050 cm in metres?

- 4.05
- 4.50
- 40.5
- 45.0
- 405

**Question 5** Finds the ratio of the areas of a given square and a given triangle Difficulty: 136.2 D: Correct

$$\frac{Area\ of\ triangle\ Q}{Area\ of\ square\ P} = r$$




What does *r* equal?

- $\frac{4}{3}$
- $\frac{3}{4}$
- $\frac{4}{7}$
- $\frac{1}{2}$
- $\frac{3}{7}$

**Question 6** Solves a simple problem requiring the conversion of metric units of mass Difficulty: 138.3 B: Correct

10 grams of gold is used to make a medal.

How many medals can be made from a gold bar that weighs 10 kg?

- 100
- 1000
- 10 000
- 100 000
- 1 000 000

**Question 7** Finds the area of a rectangle given its perimeter and one side length Difficulty: 138.9 B: Correct

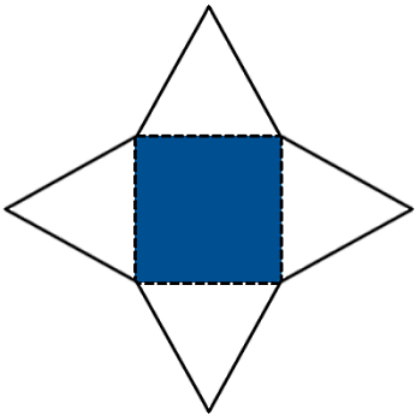
A rectangular playground has one side 6 metres long and a perimeter of 26 metres.

The area of the playground is

- 36 m²
- 42 m²
- 84 m²
- 92 m²
- 156 m²

**Question 8** Works out the perimeter of a compound shape from information about the area of its components Difficulty: 139.0 B: Correct

This star is made up of 4 equilateral triangles of equal area and a square.

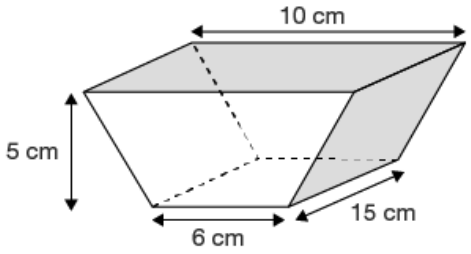


If the area of the shaded region is 9 $cm^2$, what is the perimeter of the star?

- 12 cm
- 24 cm
- 30 cm
- 36 cm

**Question 9** Calculates the volume of a prism with a trapezium base Difficulty: 139.2 B: Correct

The front and back faces of this prism are identical trapeziums.




not drawn to scale

What is the volume of the prism?

- 155 $cm^3$
- 600 $cm^3$
- 900 $cm^3$
- 1200 $cm^3$

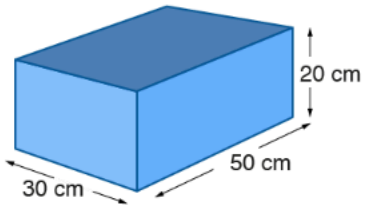
**Question 10** Recognises that objects occupying the same space must occupy same volume Difficulty: 139.8 C: Correct

Two blocks of wood occupy the same amount of space.

Which statement is true?

- The two blocks must have the same mass.
- The two blocks must have the same shape.
- The two blocks must have the same volume.
- The two blocks must have the same surface area.

**Question 11** Calculates the capacity in litres of a rectangular prism with dimensions given in centimetres Difficulty: 140.9 C: Correct



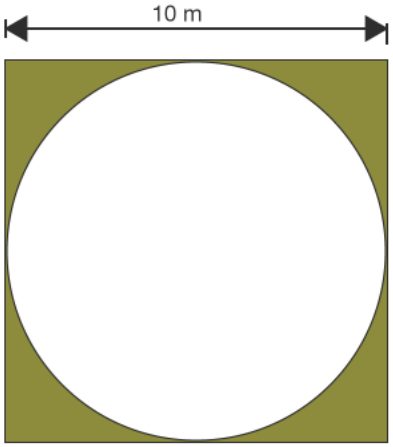

(One cubic cm holds 1 millilitre of water)

How many litres of water would this rectangular prism hold?

- 3 litres
- 10 litres
- 30 litres
- 100 litres
- 300 litres

**Question 12** Solves a problem involving calculating the area of squares and circles Difficulty: 141.4 D: Correct

In this diagram, a circle is drawn inside a square.

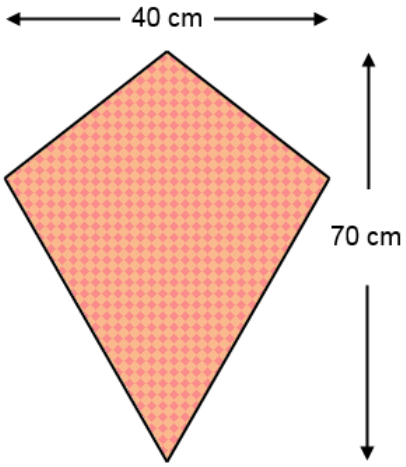



What is the approximate area of the shaded part?

(Use $\pi$ = 3 for approximation)

- 85 $m^2$
- 70 $m^2$
- 55 $m^2$
- 25 $m^2$
- 10 $m^2$

**Question 13** Calculates the area of a kite Difficulty: 141.6 B: Correct




The area of the kite shown is

- 700 square centimetres
- 1400 square centimetres
- 2800 square centimetres
- 5600 square centimetres

**Question 14** Recognises the effect on its volume and mass of doubling the side lengths of a cube Difficulty: 146.5 D: Correct

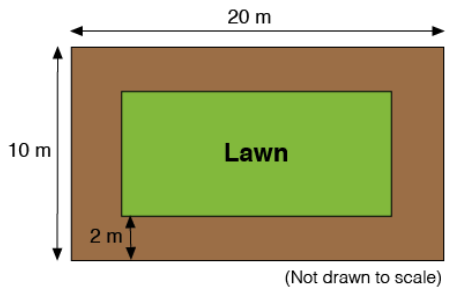
A small wooden cube, 1 cm × 1 cm × 1 cm, weighs 1 gram.

How many grams will a similar wooden cube with edges 2 cm in length weigh?

- 2
- 4
- 6
- 8
- 12

**Question 15** Identifies the calculation for the area of a given compound shape Difficulty: 148.7 B: Correct

This diagram shows a 2 metre wide footpath that goes around a lawn.




Which of these could be used to find the area of the footpath in square metres?

- $(20-2)\times(10-2)$
- $200-(16\times 6)$
- $(20-4)\times(10-4)$
- $200-(18\times 8)$
- $200-(40+20)$

**Question 16** Determines the correct statements about the relationship between the circumference and diameter of any circle Difficulty: 149.8 E: Correct

Mitchell says, 'If you measure the diameter of a circle, you can estimate its circumference by multiplying by 3.14.'

Helena says, 'If you measure the circumference of a circle, you can estimate its diameter by dividing by 3.14.'

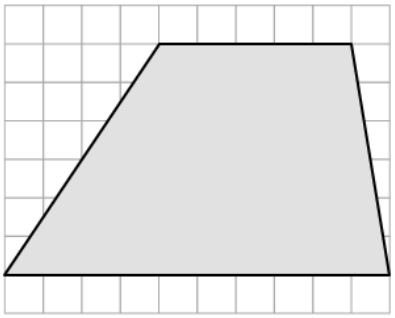
Kari says, 'If you divide the circumference measurement of a circle by its diameter measurement, you get about 3.14.'

Who is correct?

- ○ Mitchell only
- ○ Helena only
- ○ Kari only
- ○ Mitchell and Helena
- ○ all of them

**Question 17** Identifies a method for finding the area of a trapezium using composite figures Difficulty: 152.5 A: Correct

Matt and Jacinta want to work out the area of this figure drawn on a unit square grid.



Matt uses this method:

$$A = 6 \times 10 - \frac{1}{2} \times 4 \times 6 - \frac{1}{2} \times 1 \times 6$$

Jacinta uses this method:

$$A = 6 \times 5 + \frac{1}{2} \times 4 \times 6 + \frac{1}{2} \times 1 \times 6$$

Who is correct?

- ○ Both Matt and Jacinta are correct.
- ○ Matt is correct but Jacinta is incorrect.
- ○ Matt is incorrect but Jacinta is correct.
- ○ Both Matt and Jacinta are incorrect.

**Question 18** Estimates the area of a circle in the real world, given its diameter Difficulty: 152.6 C: Correct


(Use π = 3 for your approximation)

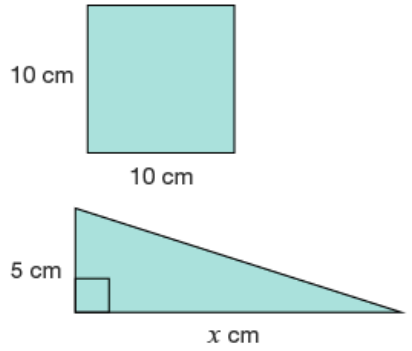
Which of these is the approximate area of the face of this 10 cent coin?

- ○ 15 mm²
- ○ 30 mm²
- ○ 75 mm²
- ○ 90 mm²
- ○ 300 mm²

**Question 19** Calculates a side length of a right-angled triangle given one side length and its area

**Difficulty: 154.2** **E: Correct**

This square and the right-angled triangle have equal areas.

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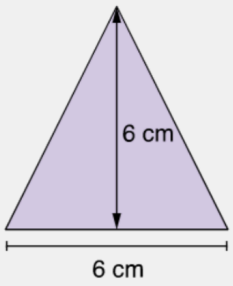
What is the value of $x$?

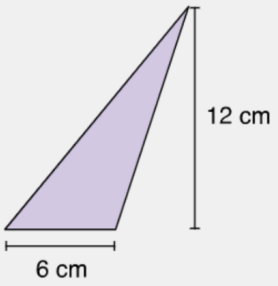
- 5 cm
- 10 cm
- 15 cm
- 20 cm
- 40 cm

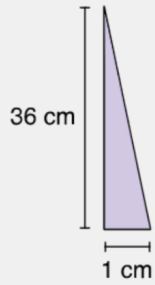
**Question** **Band 8** x00162574 - Calculates the area of a triangle

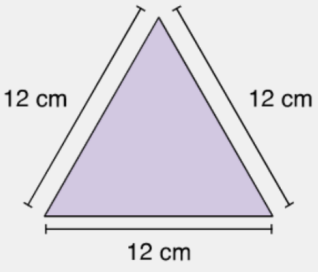
These triangles are not drawn to the same scale.

Which one has an area of 36 square centimetres?



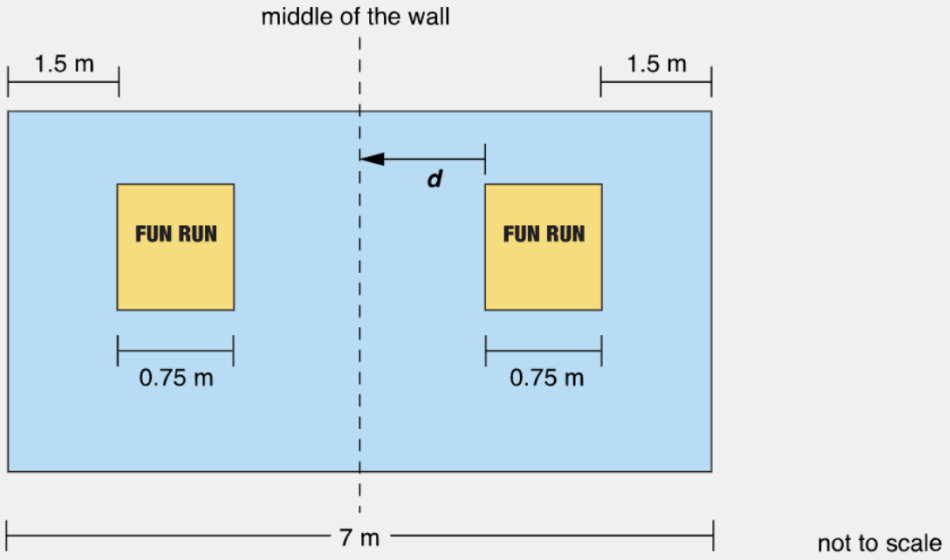



## Question 21 **Band 8** x00163552 - Solves a distance problem and converts a unit of length

Sanjeet puts two identical posters on his wall as shown.



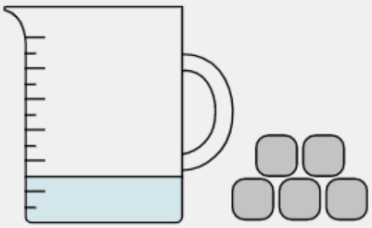

What is the distance *d* from the edge of each poster to the middle of the wall, in metres?

- (●) 1.25 m
- ( ) 1.5 m
- ( ) 2.25 m
- ( ) 2 m
- ( ) 4.75 m

## Question 22 **Band 8** x00057858 - Converts between volume and capacity units to solve a problem

Emma partly fills a jug with water, then reads the scale on the side of the jug.

She places 5 metal cubes that each have a volume of 1 $cm^3$ in the jug.

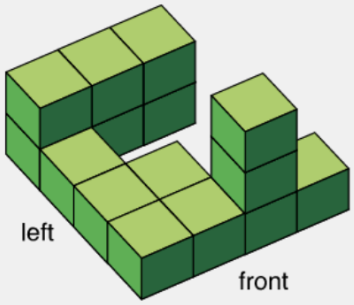


Emma reads the scale again.

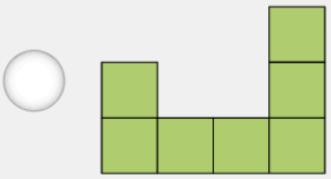
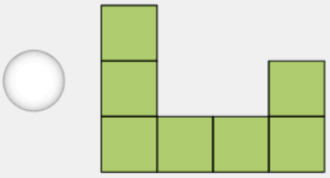
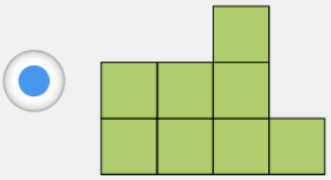
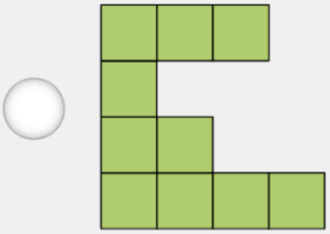
By how much does the water level in the jug increase?

- (●) 5 mL
- ( ) 50 mL
- ( ) 5 cm
- ( ) 50 cm

## Question 23 **Band 8** x00006820 - Relates an object to its front, side and top views



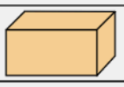

Which of these is the front view of this object made from cubes?

## Question 24 **Band 8** x00092618 - Converts between metric units to solve a problem

Jim has three kinds of building blocks.

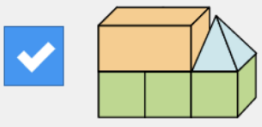
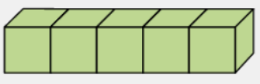
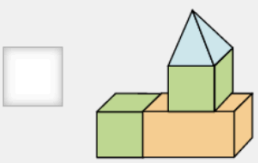
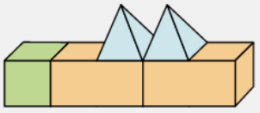
He records the mass of each kind of building block in a table.

| **Kind of block** |  |  |  |
|---|---|---|---|
| **Mass** | 70 g | 100 g | 130 g |

Jim builds an object using at least one of each kind of building block.

His object has a total mass of 0.5 kg.

Select **all** of the objects Jim could have made.

## Question 25 Band 9 x00057472 - Calculates the duration of an event

Lucy's watch works correctly but is not showing the correct time.

At 7:30 am Lucy's watch showed the time as 7:35 am.

Lucy should have been at school by 8:50 am.

When she arrived at school her watch showed the time as 9:10 am.

How many minutes late to school was Lucy?

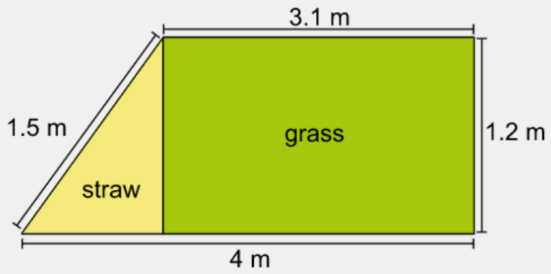
15 minutes

## Question 26 Band 9 x00094307 - Calculates the area of a triangle in context

Liam has a hutch for his guinea pigs.

It has a rectangular section of grass and a triangular section with straw for nesting.

The lengths of the sides of the hutch are shown below.




not to scale

What is the area of the straw section of the hutch?

- 0.54 $m^2$
- 0.675 $m^2$
- 2.4 $m^2$
- 3.6 $m^2$