



Full name: \_\_\_\_\_

Teacher: \_\_\_\_\_

Due date: \_\_\_\_\_

# YEAR 8 MATHEMATICS

## Assignment

### Term 3

### 2023

#### Outcomes Assessed

- **MA4-1WM** communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols
- **MA4-2WM** applies appropriate mathematical techniques to solve problems
- **MA4-3WM** recognises and explains mathematical relationships using reasoning

#### Content Assessed

Refer to the attached assignment booklet and instructions. Each student is to complete tasks of their choosing.

**Weighting**

**15%**

**Due:**

This assignment is due to your classroom teacher two weeks from the date received (due in Week 7).

**Penalties as per assessment booklet** – Failure to submit the assignment within the negotiated time frame may result in N-award in Mathematics.

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## Gardner's Multiple Intelligences and Revised Blooms Taxonomy

This assignment has been designed to give all students an opportunity to best demonstrate their ability in Mathematics. Students can choose from tasks aligned to the different categories of Gardner's Multiple Intelligences. The tasks are also aligned to the Revised Bloom's Taxonomy - a multi-tiered model of classifying thinking according to six cognitive levels of complexity. Thus, students can choose tasks according to their preferred modes of learning, or try different styles of learning. Students are also able to revise and explore key concepts of this unit by completing lower-order tasks and then challenge themselves to develop their understanding and skills by completing higher-order tasks.

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### Instructions

***You do not have to answer all the questions!***

Each box in the Task Grid (on the next page) is a task.

1. You must complete **30 marks** worth of questions.
  2. You must include at **least 2 tasks from the *creating*** and at **least 2 tasks from the *evaluating*** column as part of your 30 marks.
  3. Answer each question in the space provided. If you are asked to attach a task to the back of this booklet, then you must clearly label the task number and maintain question order.
  4. Please highlight on the Task Grid which tasks you have completed.
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### Marking

Marks are awarded based on the difficulty and amount of work required to complete each task. Marking guidelines are provided under each task description.

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## Gardner's Multiple Intelligences and Revised Blooms Taxonomy

This assignment has been designed to give all students an opportunity to best demonstrate their ability in Mathematics. Students can choose from tasks aligned to the different categories of Gardner's Multiple Intelligences. The tasks are also aligned to the Revised Bloom's Taxonomy - a multi-tiered model of classifying thinking according to six cognitive levels of complexity. Thus, students can choose tasks according to their preferred modes of learning, or try different styles of learning. Students are also able to revise and explore key concepts of this unit by completing lower-order tasks and then challenge themselves to develop their understanding and skills by completing higher-order tasks.

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### Instructions

***You do not have to answer all the questions!***

Each box in the Task Grid (on the next page) is a task.

1. You must complete **25 marks** worth of questions.
2. You must include at **least 1 task from the *creating*** and at **least 1 task from the *evaluating*** column as part of your 25 marks.
3. Answer each question in the space provided. If you are asked to attach a task to the back of this booklet, then you must clearly label the task number and maintain question order.
4. Please highlight on the Task Grid which tasks you have completed.

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### Marking

Marks are awarded based on the difficulty and amount of work required to complete each task. Marking guidelines are provided under each task description.

# Task Grid

Multiple Intelligences	Bloom's Taxonomy: Six Thinking Levels					
	Knowing	Understanding	Applying	Analysing	Creating	Evaluating
<b>Verbal/Linguistic</b> I enjoy reading, writing & speaking	1) Terminology  <b>1 mark</b>	2) Grid Reference  <b>2 marks</b>	3) Sector Graph  <b>3 marks</b>	4) Worldwide Measurement  <b>2 marks</b>	5) Pi Recital  <b>2 marks</b>	6) Easter Egg Hunt  <b>3 marks</b>
<b>Logical/Mathematical</b> I enjoy working with numbers & science	7) Rounding Decimals  <b>2 marks</b>	8) Converting Units  <b>3 marks</b>	9) Distance Travelled?  <b>3 marks</b>	10) How long is a piece of string?  <b>2 marks</b>	11) Creating Triads  <b>2 marks</b>	12) Packaging Problem  <b>3 marks</b>
<b>Visual/Spatial</b> I enjoy painting, drawing & visualising	13) Footy Fan  <b>2 marks</b>	14) How many cubes?  <b>2 marks</b>	15) Host Regions  <b>2 marks</b>	16) Formulae Poster  <b>4 marks</b>	17) Optical Illusion  <b>3 marks</b>	18) Grand old Duke of York  <b>4 marks</b>
<b>Bodily/Kinaesthetic</b> I enjoy doing hands-on activities, sports & dance	19) Counting Area  <b>1 mark</b>	20) Counting Area Again  <b>2 marks</b>	21) How much chalk?  <b>2 marks</b>	22) Pool Problem  <b>3 marks</b>	23) Make a rap/compose a song  <b>3 marks</b>	24) Circular Dilemma!  <b>3 marks</b>
<b>Technology</b> I enjoy using computers	25) Exploring Number Systems  <b>3 marks</b>	26) Online Game  <b>2 marks</b>	27) Shikaku Puzzle  <b>3 marks</b>	28) The maximum area problem  <b>3 marks</b>	29) Evaluation Tool  <b>3 marks</b>	30) Pasqual's Triangle  <b>5 marks</b>

# Task Details

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## Verbal/Linguistic

### 1) Terminology

Fill in the blanks. All terminology used below relates to the Algebra Unit.

(1 mark)

a) L\_\_e      t\_rm\_\_

b) \_xp\_\_di\_g

c) S\_\_st\_t\_\_e

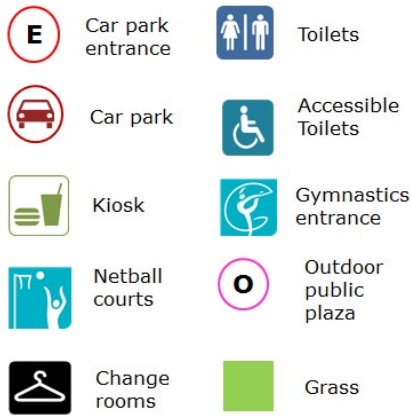
d) \_lg\_\_ra\_c      te\_h\_i\_\_es

e) F\_\_t\_r\_\_

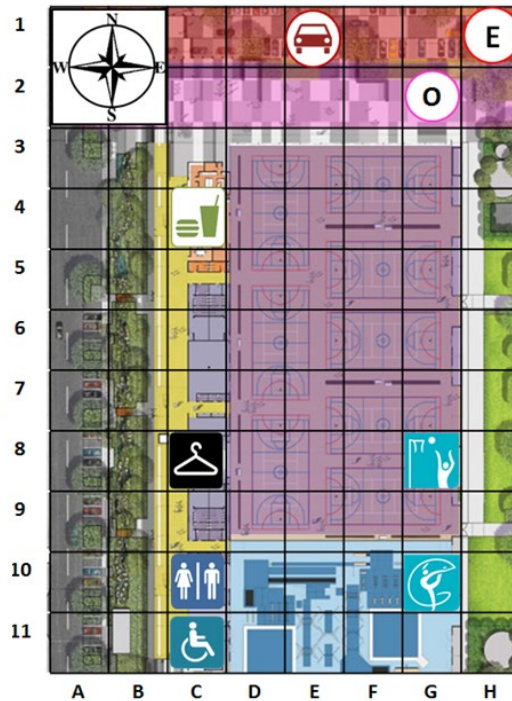
f) Ex\_\_ess\_\_n

## 2) Grid Reference

### Coomera Indoor Sports Centre



Pictograms: Courtesy Gold Coast Commonwealth Games Corporation. Used with permission.



Where will you be if you are at the following grid references in the table below?

Add the answers to the table.

(2 marks)

Grid reference	Location
(H, 1)	
(G, 8)	
(C, 4)	
(G, 2)	

3) **Sector Graph (3 marks)**

20 friends are trying to find the most popular take away food. They each get to submit one choice.

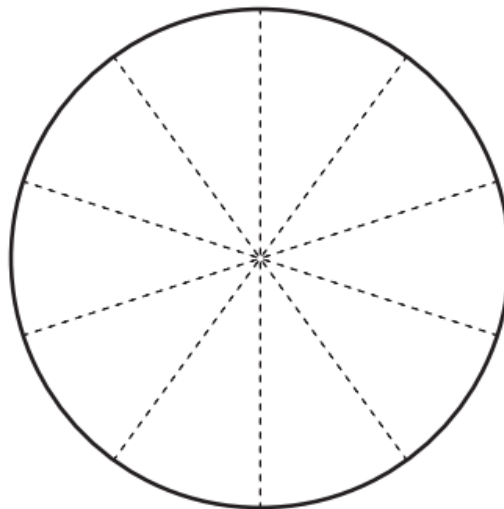
a) Find the missing values in the table below.

(1 mark)

Take Away Food	
KFC	12
Pizza	
McDonalds	3
Total	

b) Complete the sector graph to display this data.

(2 marks)



#### 4) Worldwide Measurement

Write a short paragraph explaining why it is essential that we use the same measurement system worldwide. Make reference to our current measurement system and its advantages over previous measurement systems. Give at least three examples to support your argument.

(2 marks)

#### 5) Pi Recital

Pi ( $\pi$ ) is a very special number which relates the circumference (perimeter) of a circle to its diameter or radius. It is a never-ending number that has been recited up to a whopping 67 890 digits. One way to remember the digits is to come up with a phrase or sentence where the number of letters in each word equates to the order of the digits in pi. See the examples below:

"How I wish I could calculate pi"      OR      "May I have a large container of coffee?"  
3 . 1 4 1 5                                      9 2                                      3 . 1 4 1 5                                      9 2 6

You are to come up with your own phrase such that the number of letters in each word represents the order of the digits of pi. Aim for a phrase of at least 10 digits.

(2 marks)



6) Easter Egg Hunt

Use the photo below of “The Lost Children at an Easter Hunt” to solve this problem.

Assume the boy on the far right is exactly 136 cm tall.



Edgar E. Porter, one of the White House policeman, was detailed to care for the lost and strayed children during the Easter egg rolling at the White House today, April, 1923, United States Library of Congress

How tall, to the nearest centimetre, are children A, B and C in the photograph.

HINT: Use a ruler and measure carefully to a tenth of a centimetre and let your Math do the rest!

**(3 marks)**

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## Logical/Mathematical

### 7) Rounding Decimals

Rounding numbers correctly is important! For example, in 1987 the government in the UK underestimated inflation by 0.1%. This caused them to have to pay out an extra 100 million pounds (180.6 million Australian dollars) on things such as pensions.

Correctly round these numbers to the decimal places specified in the brackets.

**(2 marks)**

a) 1.432 (1 decimal place)

b) 78.45767 (2 decimal places)

c) 0.0125 (3 decimal places)

d) 39.9636 (1 decimal place)

### 8) Converting Units

Complete the questions below by converting:

**(3 marks)**

a) 20cm to mm

b) 1.2km to m

c) 568 000cm to km

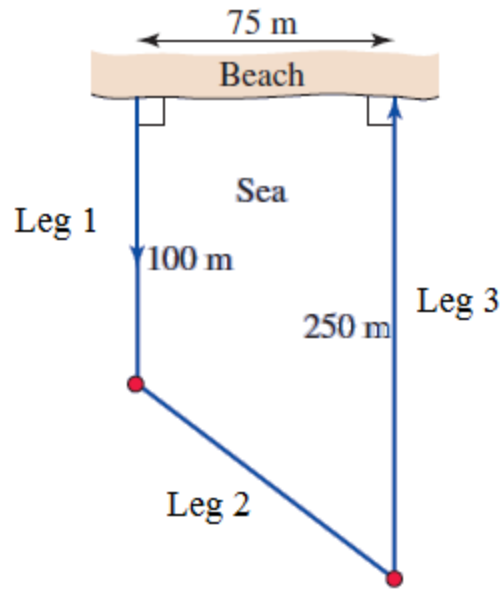
d) 2260mm<sup>2</sup> to cm<sup>2</sup>

e) 84.9ha to m<sup>2</sup>

f) 18 500L to m<sup>3</sup>

### 9) Distance Travelled?

An iron woman race involves 3 swim legs and a beach run, as shown in the figure below.



a) What is the length of Leg 2 in the race? Round your answer to the nearest metre.

**(1 mark)**

b) If she has a swim rate of 2.15 mins/100m, how long (in minutes) should it take her to complete the swimming portion of the race?

**(2 marks)**

### 10) How long is a piece of string?

One quarter of a length of rope is cut off and used. Later on, two-thirds of the remainder is cut off and used. It is found that only 6 metres of rope remains. How long was the original rope?

(2 marks)

### 11) Creating Triads

Pythagorean triads are 3 integers (whole numbers) that satisfy Pythagoras' Theorem. This means that the 3 numbers could be the sides of a right-angled triangle. Follow the steps below to successfully create your own Pythagorean Triad. You must show all steps to receive full marks.

(2 marks)

#### Steps:

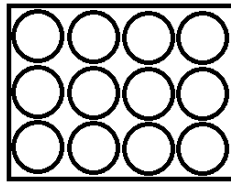
- 1) Start with any odd number, and make this the shortest length of the triangle (call it "a").
- 2) To find another short side (call it "b") use the formula  $b = \frac{a^2-1}{2}$ . Remember that "a" is your odd number from step 1.
- 3) You now have the two short sides of the triangle and can use  $c^2 = a^2 + b^2$  to calculate the third side (hypotenuse, c).
- 4) List your Pythagorean Triad. E.g. {3, 4, 5}. Do not use this one.

## 12) Packaging Problem

The dog food sold at the supermarket comes in a cylindrical tin with a height of 12 cm and a radius of 4 cm.



In order to be easily transported from the Sydney distribution point to the Orange supermarket, the dog food tins must be packaged inside a cardboard box. Each cardboard box can contain 2 levels of 12 tins in the layout shown below. Each tin is stacked with sides touching.



Calculate the dimensions (width, breadth and height) of the cardboard box. Show all necessary working.

(3 marks)



## Visual/Spatial

### 13) Footy Fan

The data below shows the number of tackles each player made during a single game.



## Cronulla Sharks

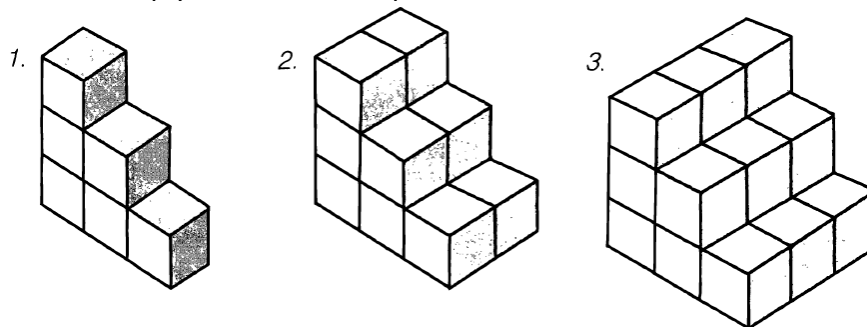
6	17	25	33	33	36	39	40	44	48	49	50	51	53	55	60
---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Display this data using a stem-and-leaf plot.

(2 marks)

### 14) How many cubes?

Use the diagram below to help you answer the questions.



a) Complete the table below for the surface area of each tower.

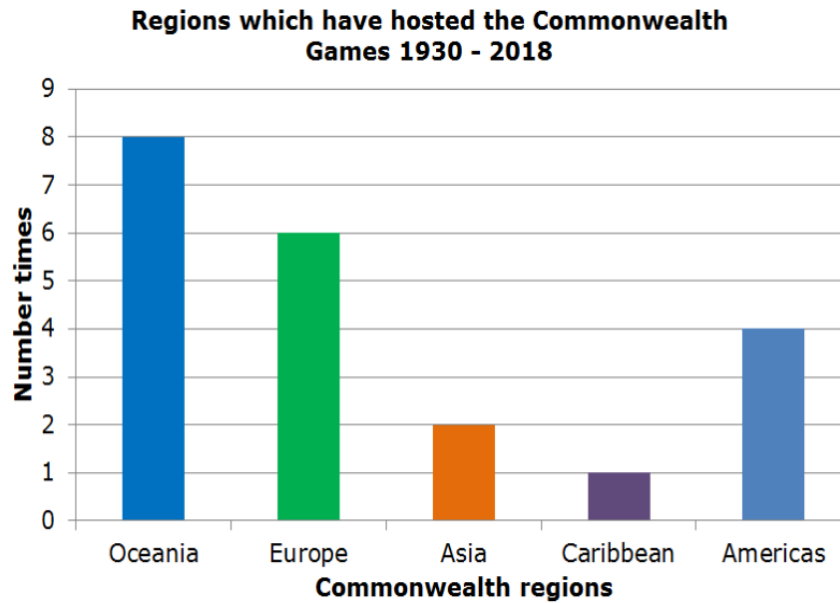
(1 mark)

	Tower 1	Tower 2	Tower 3
Surface Area			

b) In words or algebraically, explain/write a rule that would help you calculate the surface area of the 10<sup>th</sup> tower.

(1 mark)

### 15) Host Regions



a) Which region has hosted the Commonwealth Games the most and which has hosted the least?  
**(1 mark)**

b) Provide possible reasons why these regions have hosted the most and the least number of Commonwealth Games.  
**(1 mark)**

### 16) Formulae Poster

Design an A4 summary sheet with useful measurement formulae to be displayed in class. Make sure to include the following:

- Pythagoras' Theorem (finding the hypotenuse) with an example
- Pythagoras' Theorem (finding the short side) with an example
- Area of Squares, Rectangles and Triangles, with examples of each
- Area of Special Quadrilaterals (Kite/Rhombus, Parallelogram, Trapezium), with examples of each

**(4 marks)**

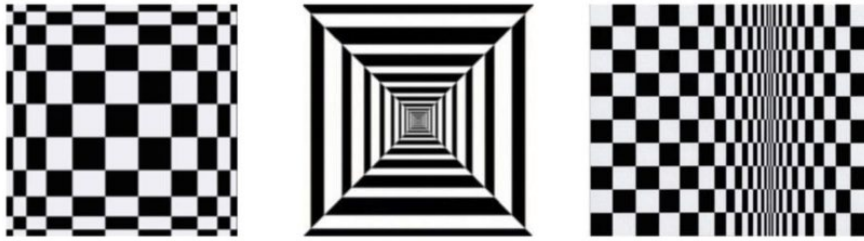
Please complete in space provided on next page.

# Formulae Poster



**17) Optical Illusion (3 marks)**

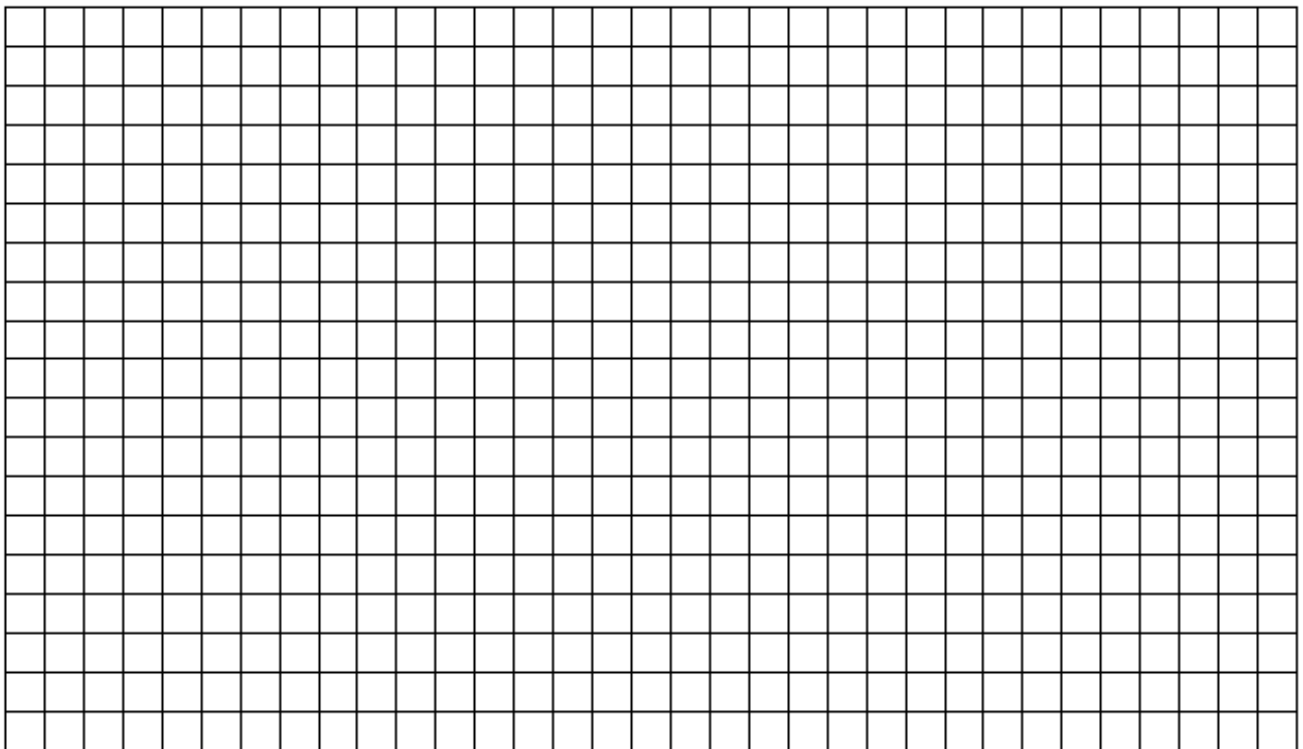
This task combines art, Mathematics and design. Optical illusions are geometric shapes and patterns, often coloured in black or white. Looking at the three examples below:



In a short paragraph, explain what patterns cause the optical illusion.

**(1 mark)**

b) Create your own optical illusion on the grid provided below. Write clear instructions on how you created your optical illusion. **(2 marks)**



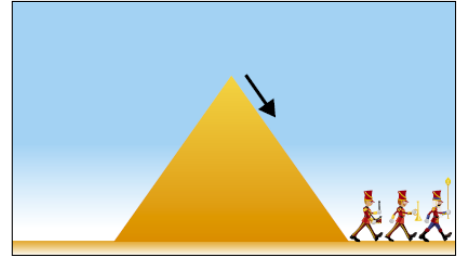
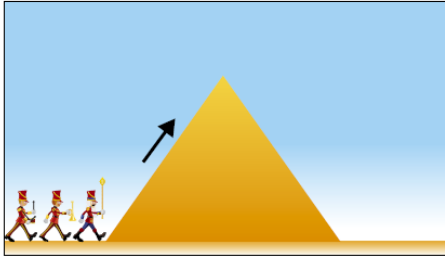
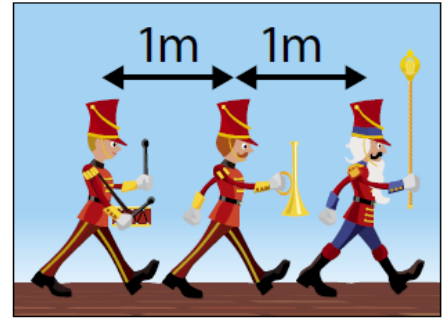
Instructions:

## 18) The Grand old Duke of York

The Grand old Duke of York had 10 000 men...

What you need to know:

- They stand in a long line, 1 metre apart.
- They climb a hill that is 3 km up and 3 km down.
- They march at a speed of 4 km per hour.



a) Calculate the length of the line of men, to the nearest metre.

(1 mark)

b) How long does it take for 1 man to march to the top of the hill and back down again?

HINT: Use the formula  $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

(1 mark)

c) Assume that once each man has marched to the top of the hill and back down again, they continue marching forward at a constant speed of 4 km per hour.

How many hours and minutes would it take for all 10 000 men to march to the top of the hill and back down again?

(2 marks)

## Bodily/Kinaesthetic

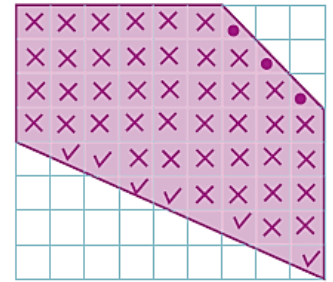
### 19) Counting Area?

To estimate the area by counting squares:

- count whole squares as 1 square unit
- count squares with more than half shaded as 1 square unit
- count squares with exactly half shaded as  $\frac{1}{2}$  square unit
- do not count squares with less than half shaded.

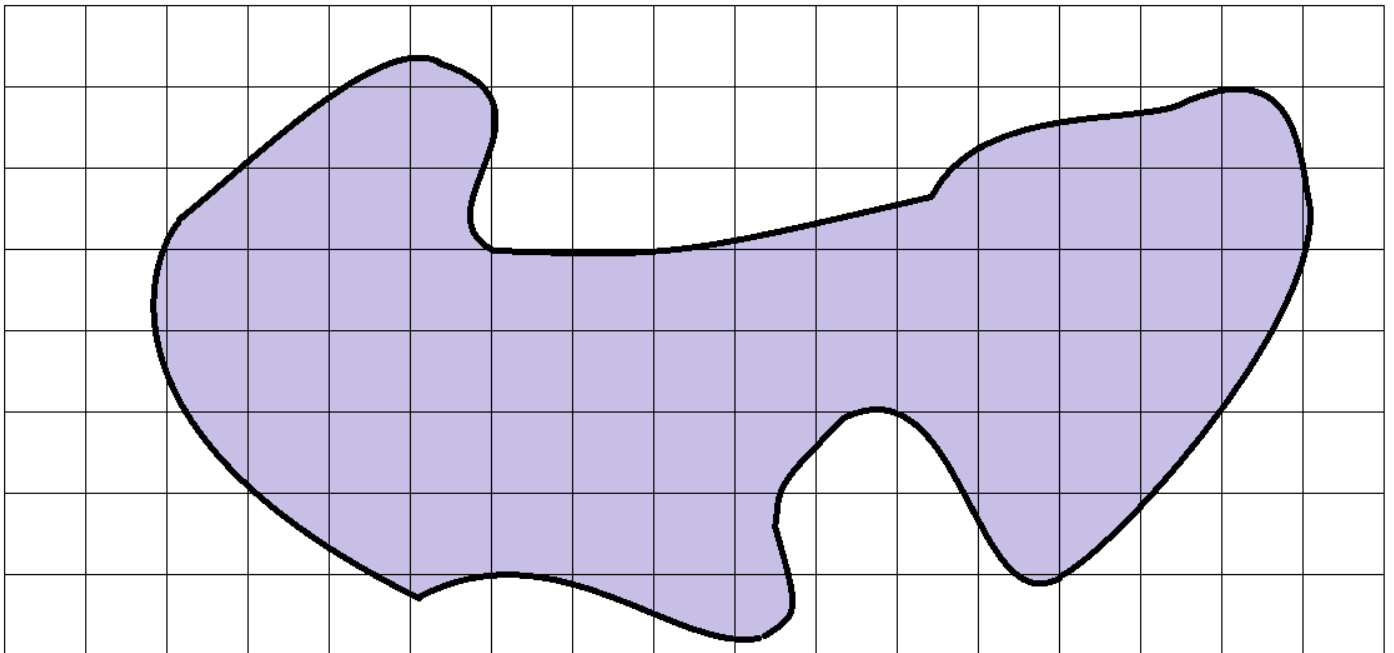
There are 42 complete squares.	42	(X)
There are 6 with more than half shaded.	+ 6	(✓)
There are 3 with exactly half shaded.	+ $1\frac{1}{2}$	(●)
	<hr style="width: 50px; margin-left: auto; margin-right: 0;"/>	
	$49\frac{1}{2}$	

$\therefore$  Area  $\approx 42 + 6 + 1\frac{1}{2} = 49\frac{1}{2}$  square units.



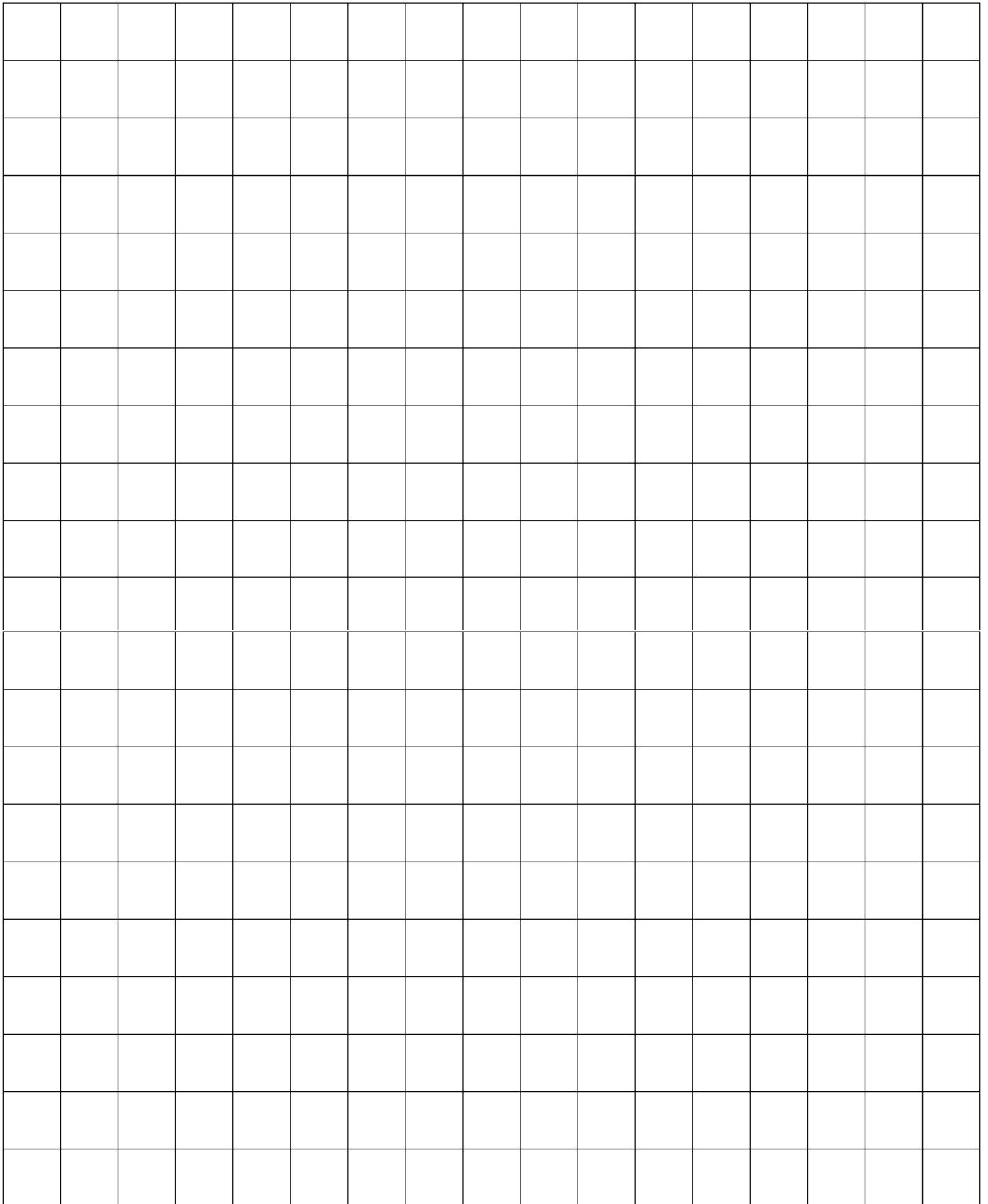
Using the strategy outlined above, determine the area of the shape below.

(1 mark)



## 20) Counting Area... Again

You are going to use the strategy explained in question 19 (previous page) to estimate the area of your hand in the grid below. **(2 marks)**

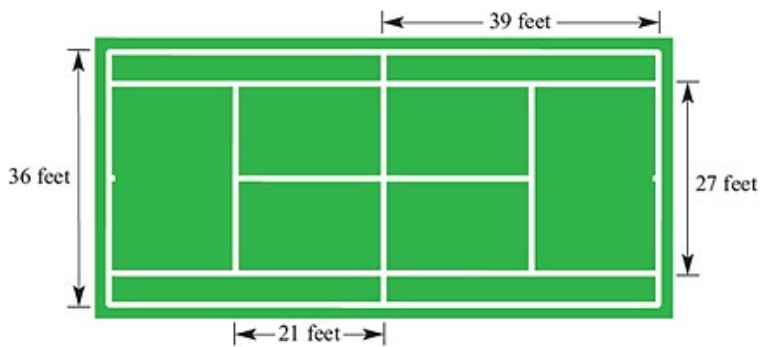


### 21) How much chalk?

A grass tennis court has white chalk lines, of which are shown in feet.

Find the total number of metres of chalk required to mark all the lines of the tennis court pictured below given the approximation: **1 foot = 0.3 metres**.

**(2 marks)**



### 22) Pool Problem

A new rectangular pool which is 6m in length and 4m in breadth is to have a single-width paved path installed around its perimeter. Each paver is 0.5m long and 0.5m wide.

a) Draw a diagram to show the pool, including the new path. Label all dimensions.

**(2 marks)**

b) How many pavers are required to run the full perimeter of the pool.

**(1 mark)**

### 23) Make a rap/ compose a song

Compose a rap or a song that includes everything “Data.” You may wish to perform it and hand in the video or simply write it down and submit a written version.

Your rap must address the following criteria:

- Be at least 2 verses in length
- Involve a minimum of 5 data concepts
- Have a clear flow from line to line

**(3 marks)**

### 24) Circular dilemma!!!

An athlete trains on the inner lane of the track pictured below.



The track consists of two straight lengths, with a distance of 85 metres, and two curved semicircles with a radius of 36.5 metres.

The athlete jogs 10 laps, 5 days a week. How far does he jog each week? Round your answer to the nearest whole number of metres.

**(3 marks)**



## 26) Online Game

The given link is an online set of questions on Pythagoras' Theorem.

Click on the link below and complete the quiz.

<https://www.mathgames.com/skill/8.57-pythagorean-theorem-find-the-hypotenuse>

Please take a screenshot of your results and staple to the back of this assignment.

**(2 marks)**

## 27) Shikaku Area Puzzle

Visit the website <https://www.puzzle-shikaku.com/> and complete the following 3 levels of shikaku puzzle.

- 5 x 5 shikaku
- 10 x 10 shikaku
- 15 x 15 shikaku

Please take a screenshot of your completed puzzles and staple to the back of this assignment.

**(3 marks)**

## 28) The maximum area problem

A farmer is using 20 metres of fencing to make a rectangular goat pen. He wants to know what length and width of the rectangle will give him the greatest paddock area?

a) Set up the spreadsheet shown below and finish it to calculate the area of rectangles with a perimeter of 20. Copy the formula in each column down to row 11 and print and staple your results to the back of this assignment.

**(1 mark)**

	A	B	C	D
1				
2	<b>Length</b>	<b>Width</b>	<b>Area</b>	<b>Perimeter</b>
3	1	9	=A3*B3	=2(A3+B3)
4	2	8	=A4*B4	=2(A4+B4)
:	:	:	:	:
11	9	1	=A11*B11	=2(A11+B11)

b) What length and width gives the largest area?

**(1 mark)**

c) What length and width would give the greatest area using 36 metres of fencing?

**(1 mark)**



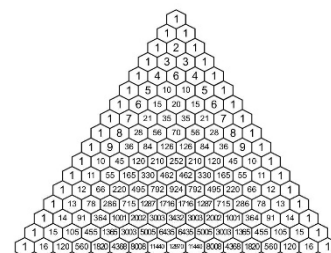
## 29) Evaluation Tools

Create a quiz using technology (e.g. Quizlet, Kahoot!, Jeopardy, Quizizz). The quiz must be your own and have a minimum 10 of mathematical questions. It should ask questions regarding topics we have covered this year, be challenging and have the correct solutions present. Screenshots are to be stapled to the back of this assignment.

(3 marks)

## 30) Pasqual's Triangle!

Go to the link <https://www.transum.org/Maths/Activity/Pascals/Triangle.asp>



- a) You are required to complete level **1, 2 and 3** and then answer the following questions.

With this task you can check your solution at any time by hitting the CHECK button at the bottom of the page.

On the completion of each level, take a screen shot of your solution and staple to the back of this assignment.

(3 marks)

- b) The row of Pascal's Triangle containing just two ones is normally referred to as row 1. The solitary one at the top of the triangle is row zero. Row two contains the numbers 1,2 and 1 in that order. Use this fact to help you answer the following questions.

(2 marks)

i) What is the number in row 5 next to the one?

ii) What is the sum of all the numbers in row 4?

iii) What is the sum of all the numbers in rows 0 – 6?

iv) The sum of the numbers in a particular row add up to  $x$ . What do the numbers in the row below this row add up to?

End of Assignment! 😊