1MEM STUDENT ASSESSMENT TASKS

CREATIVE CIRCLES 1

⬤ ASSESSMENT CRITERIA

CONCEPTS & TECHNIQUES

E	D	C	B	A
CT1 Limited knowledge or understanding of mathematical information or concepts.	CT1 Basic knowledge and some understanding of simple mathematical information and concepts in some familiar contexts.	CT1 Knowledge and understanding of simple mathematical information and concepts in familiar contexts.	CT1 Knowledge and understanding of mathematical information and concepts in familiar and some unfamiliar contexts.	CT1 Knowledge and understanding of mathematical information and concepts in familiar and unfamiliar contexts.
CT2 Attempted application of basic mathematical skills or techniques, with limited accuracy in solving routine problems.	CT2 Application of basic mathematical skills and techniques to find partial solutions to routine problems in some contexts.	CT2 Application of some mathematical skills and techniques to find solutions to routine problems in familiar contexts.	CT2 Effective application of mathematical skills and techniques to find mostly accurate solutions to routine and some complex problems in a variety of contexts.	CT2 Highly effective application of mathematical skills and techniques to find efficient and accurate solutions to routine and complex problems in a variety of contexts.
CT3 Some gathering and attempted representation of simple data in a familiar context.	CT3 Some gathering, representation, and basic interpretation of simple data in familiar contexts.	CT3 Gathering, representation, and interpretation of data in familiar contexts.	CT3 Gathering, representation, and interpretation of data in familiar and some unfamiliar contexts.	CT3 Gathering, representation, and interpretation of a range of data in familiar and unfamiliar contexts.
CT4 Attempted use of electronic technology to find a solution to a routine problem.	CT4 Some appropriate use of electronic technology to find solutions to routine problems.	CT4 Generally appropriate and some effective use of electronic technology to find solutions to routine problems.	CT4 Mostly appropriate and effective use of electronic technology to find mostly accurate solutions to routine and some complex problems.	CT4 Appropriate and effective use of electronic technology to find accurate solutions to routine and complex problems.

REASONING & COMMUNICATION

RC1 Limited interpretation of mathematical results.	RC1 Some interpretation of mathematical results in some familiar contexts.	RC1 Generally accurate interpretation of mathematical results in familiar contexts.	RC1 Mostly accurate interpretation of mathematical results in familiar and some unfamiliar contexts.	RC1 Accurate interpretation of mathematical results in familiar and unfamiliar contexts.
RC2 Limited awareness of the use of mathematical reasoning in solving a problem.	RC2 Attempted use of mathematical reasoning to consider the appropriateness of solutions to routine problems.	RC2 Appropriate use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions to routine problems.	RC2 Effective use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions to routine and some complex problems.	RC2 Highly effective use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions to routine and complex problems.
RC3 Limited use of mathematical notation, representations, or terminology.	RC3 Some use of familiar mathematical notation, representations, and terminology.	RC3 Generally appropriate use of familiar mathematical notation, representations, and terminology.	RC3 Mostly accurate use of appropriate mathematical notation, representations, and terminology.	RC3 Proficient and accurate use of appropriate mathematical notation, representations, and terminology.
RC4 Attempted communication of an aspect of mathematical information.	RC4 Attempted communication of simple mathematical ideas and information.	RC4 Appropriate communication of mathematical ideas and information.	RC4 Clear and appropriate communication of mathematical ideas and information to develop some logical arguments.	RC4 Clear and effective communication of mathematical ideas and information to develop logical and concise arguments.

SUBJECT: ESSENTIAL MATHEMATICS – STAGE 1

ASSESSMENT TYPE: 2: FOLIO

DESCRIPTION: This project requires you to plan and produce a folio of work demonstrating your developing understanding of circles and other two dimensional shapes, and how they are used in everyday and design contexts. You will progressively develop proficiency in applying mathematical skills and techniques to find solutions to two dimensional shape problems.

This assignment has FOUR tasks:
- Task 1: SHAPE IN EVERYDAY CONTEXTS
- Task 2: SHAPE IN DESIGN CONTEXTS
- Task 3: CROP CIRCLES
- Task 4: 'MY WORLD' LOGO

You will present your work in a folio up to 6 A4 pages in length.
You may select your work from the range of tasks you complete to create your folio.
As you work through the tasks in this assignment, you need to record all of your working to provide clear evidence of the steps you have taken to arrive at a solution.

ASSESSMENT CRITERIA:

CT2 Knowledge and understanding of mathematical information and concepts

RC1 Interpretation of mathematical results

RC2 Use of mathematical reasoning to draw conclusions and consider the appropriateness of solutions

RC3 Use of mathematical notation, representations, and terminology

RC4 Communication of mathematical ideas and information

1.
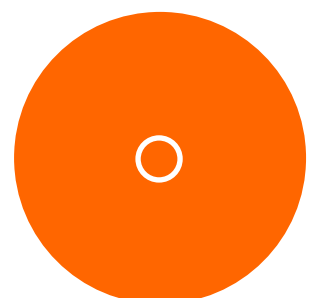
⬤ SHAPE IN EVERYDAY CONTEXTS

① Select 10 everyday items in a range of different shapes. For each item:
- Document the item you have selected
- Identify name of the shape of the item
- Identify whether the shape is regular or irregular?
- Calculate the sum of the interior angles for this shape?

② Use the orange and lemon slices below to draw and label the following parts of a circle:
- circumference
- diameter
- radius
- sector
- arc
- chord

③ In Alice Springs, as depicted below, Kidman Street, Elder Street and Wilkinson Streets run parallel to each other. Milner Road traverses Kidman, Elder and Wilkinson Streets in a straight line.

a Provide a definition of each of the following terms and identify one example from the map below:

- Supplementary angles
- Corresponding angles
- Alternative angles
- Vertically opposite angles
- Co-interior angles

b What will be the sum of angles **c**, **d**, **e** and **f**? *Explain why?*

c What will be the sum of angles **g** and **h**? *Explain Why?*

d If angle **a** is 111° - find angles **b**, **c**, **d**, **e**, **f**, **g**, and **h**. Show your reasoning?

2.
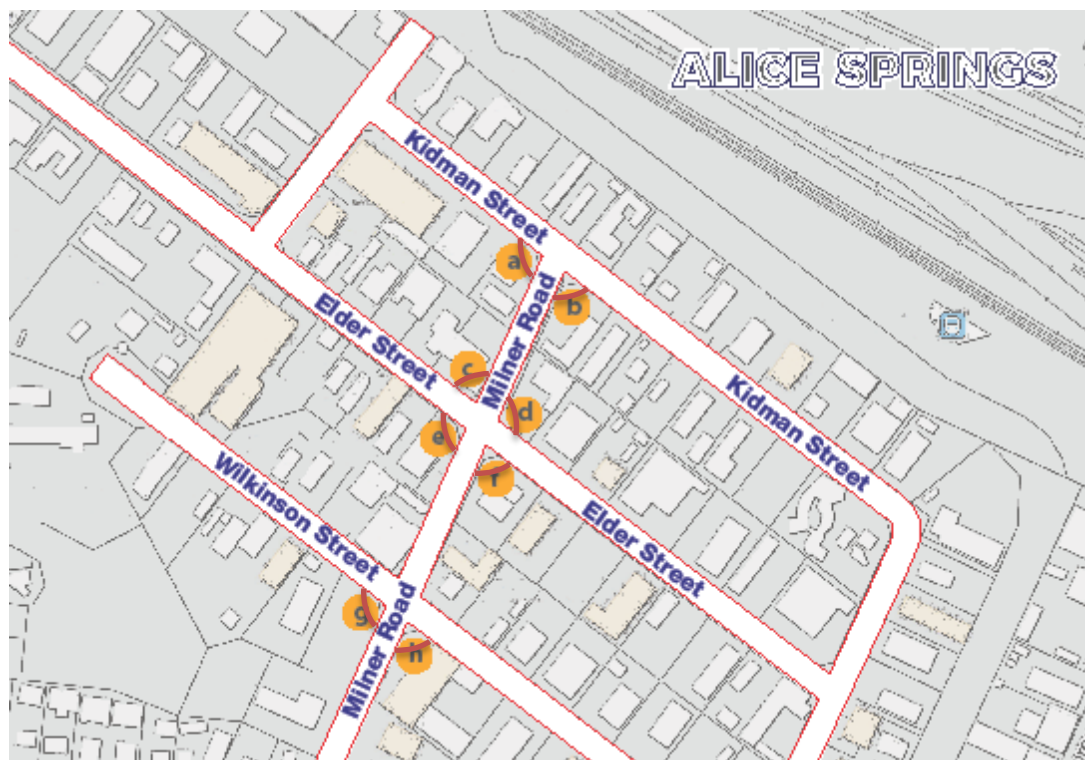
shape in design contexts

⭕ LOGO DESIGN ANAYSIS

Task. Select two logos to analyse.
For each logo, analyse the maths and the symbolism behind this logo by completing the following:

Part 1 – Geometry analysis

1. Identify all regular and irregular shapes used in this logo design – this could include enclosed shapes, implied shapes, or shapes implied through use of negative space.

2. **Estimate** the interior angles of corners of each of the shapes in the logo.

3. Work your way through a problem solving process to **calculate** the interior angles of as many of the corners of each of the shapes in the logo as you can. Show all of your working.
   Some process suggestions that might help:
      - Find the centre of the logo
      - Draw a horizontal and vertical line through the centre of the logo
      - Draw a circle around the logo
      - Identify any regular shapes
      - Identify any right angles, straight angles or parallel lines

Part 2 – Composition and symbolism analysis (not assessed)

4. Identify how this logo has been composed to have a sense of internal harmony.
   This could include:
      - identifying any structural lines used to balance the design
      - use of repetition
      - relationships between the sizes of various shapes

5. Identify any symbolism you can see in the logo.
   This could include:
      - When you look at this logo, what do you see?
      - What imagery do shapes or combinations of shapes suggest?
      - Why do you think the graphic designers chose this combination of colours?

3.

⭕ CROP CIRCLES

What do we need to know to solve this problem?
Where could we look to find an answer?

a Devise a strategy for how you might be able to accurately recreate this crop circle design using a compass, ruler, pencil and paper.
- Brainstorm and describe a technique for accurately drawing a square inside a circle
- Brainstorm and describe a technique for accurately drawing a circle inside a square

b The inner circle is divided into sixths with a diamond shape in each segment.
- Brainstorm and describe a technique for accurately diving a circle into six equal segments.

c Use the skills you have acquired to redraw this crop circle design onto a sheet of paper.
- Show all of your working and measuring lines
- Make step-by-step bullet-point notes to describe your technique

d Describe techniques you might use to draw your design full size in a wheat field.

4.

⭕'MY WORLD' LOGO

Scenario. Dairy product company 'My World' have a tag line 'Welcome to My World'. They want their branding to represent the community the milk is produced in – your community.

- Use your maths skills to design a 'mandala' style logo for 'My World' dairy company
- The logo must incorporate a range of shapes within an outer circle
- The patterns within each shape must be symbolic of something about your community

1. Form-storm 4-6 ideas for patterns / symbols that represent your community

2. Form-storm 4 ideas for mandala designs
   How many shapes will you use?
   Which shapes will you use?
   Why did you select these shapes?

3. What new knowledge and skills do you need to be able to create your design?
   Document how you acquire these skills.

4. Develop one of your mandala designs towards a final solution using pencil, compass and ruler on paper.

5. Recreate your design in Adobe Illustrator, Geometers Sketchpad or similar.

6. Create a colour and black-and-white version of your final logo.