Striving To Improve

PHOTOCOPY MASTERS

Angles, Shapes And Mensuration

For students aged 11 - 15 years who are underachieving at their year level.

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Ready-Ed Publications

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Contents

Teachers' Notes

This resource is focused on the Measurement and Geometry Strand of the Australian Mathematics Curriculum. It is intended for lower ability students and those who need further opportunity to consolidate these core areas in Mathematics. Each section provides students with the opportunity to consolidate written and mental methods of calculation, with an emphasis on process and understanding.

The section entitled *Angles* enables students to review types of angles and naming angles. There is the opportunity to practise drawing angles and using angles within a context. Students then have the opportunity to investigate angles in a triangle and to also classify the different types of triangles. These activities are a useful way to scaffold a new unit of Mathematics and will help build confidence for lower ability students to attempt more challenging problems at their year level.

The section entitled *Shapes And Mensuration* familiarises students with units of length, mass and capacity and provides activities to consolidate unit conversions using mental strategies. The activities then move on to exploring perimeter and area of rectangles and triangles and allow for a thorough consolidation of these foundational concepts. Students then engage with simple volume and capacity ideas.

The activities can be used for individual students needing further consolidation in a mainstream classroom or as instructional worksheets for a whole class of lower ability students. The activities are tied to Curriculum Links in the Australian Curriculum ranging from grade levels of Year 4 through to Year 7 and are appropriate for students requiring extra support in Years 7, 8 and 9.

It is hoped that *Angles*, *Shapes And Mensuration* will be used to help teachers provide appropriate resources and support to those students in greatest need. The book as a whole can be used as a programme of work for those students on a Modified Course or Independent Learning Programme. Activities are sufficiently guided so that students can work independently and at their own pace without constant supervision and guidance from the teacher.

Angles

Types Of Angles

Students explore the various types of angles and the conventions for naming and describing angles. Drawing angles, measuring angles and using a protractor is a central skill and allows for some hands-on work. These first activities allow for a thorough consolidation of angles before moving on to applying and analysing angles in a variety of polygons.

Angle Properties

Students review some angle properties, including parallel lines, which serves as a foundation for future work in geometry. Students are encouraged to calculate unknown quantities mentally and without measuring the angles.

Triangles

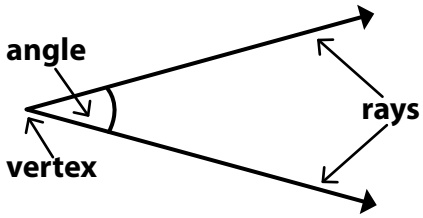
Students explore the angles in a triangle and engage with the classification of the various types of triangles. This is important foundational work before moving onto other types of polygons.

Applying Angles

A variety of different activities involving drawing and using angles is given as a fun means of working with angles.

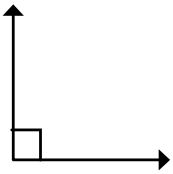
* *With some angle measuring activities students may find it helpful to extend lines so that they can be matched with numbers shown on a protractor.*
* *Please note that students may encounter slight variations with answers provided because of photocopying inconsistencies.*

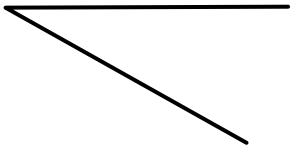
❂ Looking At Different Angles



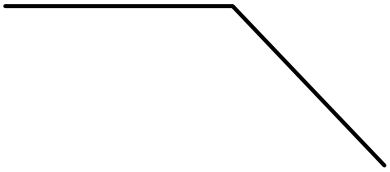
- An angle is the amount of turn between two lines around a common point. The lines are known as rays and the point at which they meet is called a **vertex**.

- A **right** angle is an angle that measures exactly 90°. They are often marked with a square at the angle.





- An **acute** angle is an angle less than 90°.



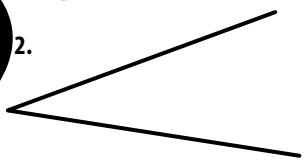
- An **obtuse** angle measures between 90° and 180°.

✳ TASK A **Draw two examples of an acute angle and two obtuse angles.**

✳ TASK B **Tick the angles below that are right angles. Draw a circle around the acute angles and put a cross inside the angles that are obtuse.**

1.

2.



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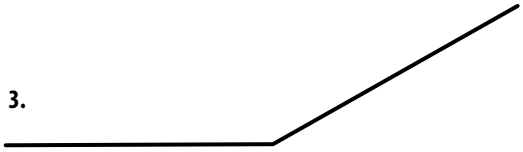

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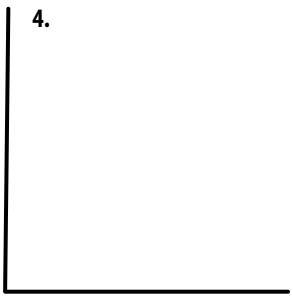

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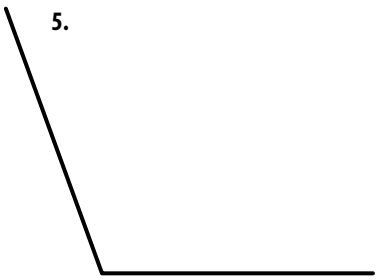

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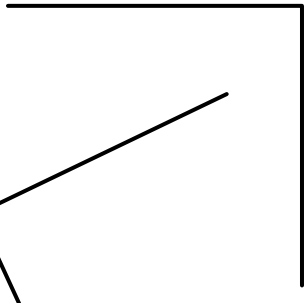

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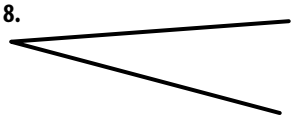
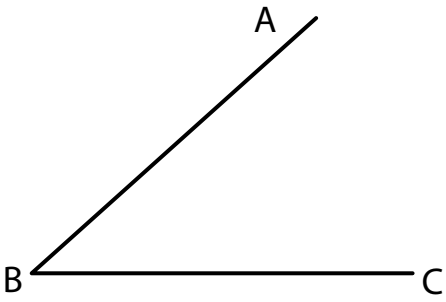


9.

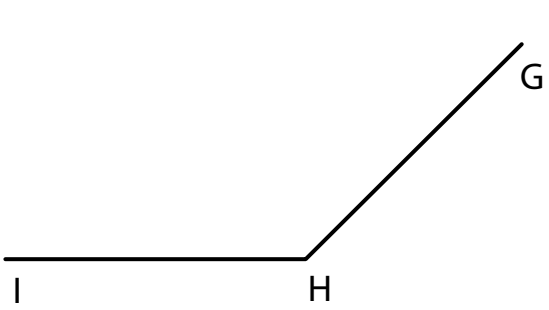
✻ Measuring Angles 2

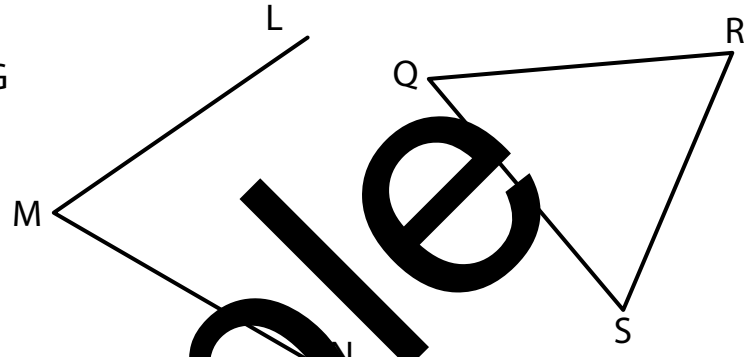
✻ TASK A **Measure angle ∠ABC using a protractor.**

∠ABC = _____



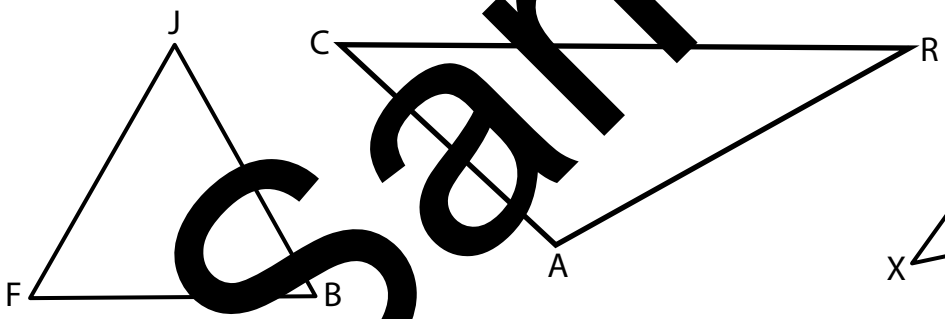
✻ TASK B **Look at the angles in the diagrams below. Find the size of these angles.**

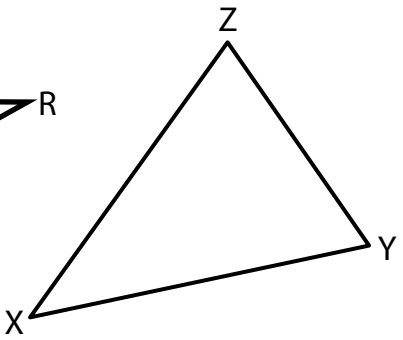




∠GHI = ... ∠LMN = ... ∠QR = ... ∠QSR = ...

✻ TASK C **Measure the angles listed for each triangle.**



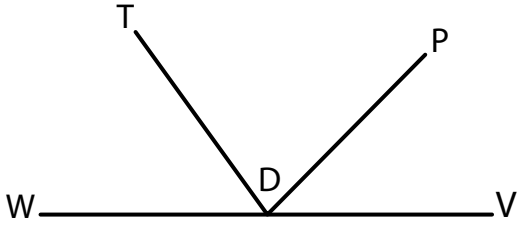


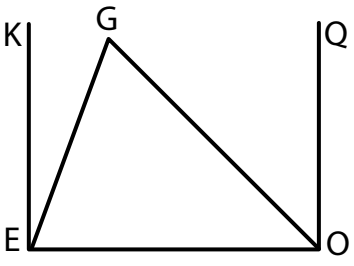
∠JFB = ... ∠CAR = ... ∠XYZ = ...

∠FBJ = ... ∠RCA = ... ∠YXZ = ...

∠FJB = ... ∠ARC = ... ∠YZX = ...

✻ TASK D **Measure the angles in the diagrams below.**

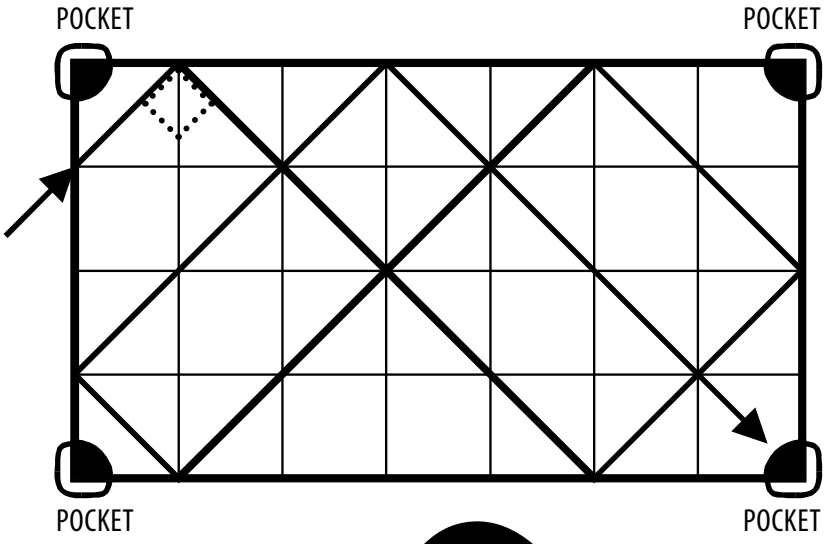




∠TDP = ... ∠WDV = ... ∠GEK = ... ∠QOG = ...

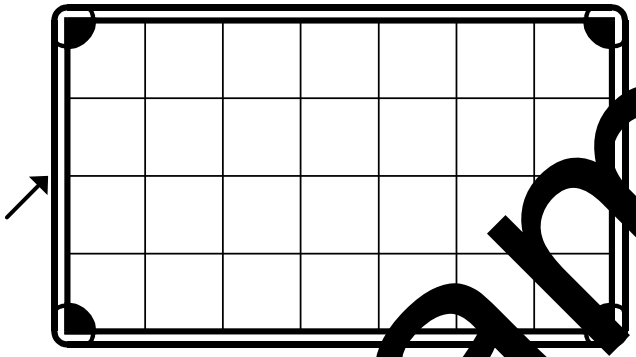
Snooker Angles

- Here is a diagram of a snooker table with only four pockets. The way in which it works is very simple. If you hit the ball it then bounces off the side cushion at a 90° angle until it finally lands in a pocket. In the example right, the track of the ball is mapped out for you.

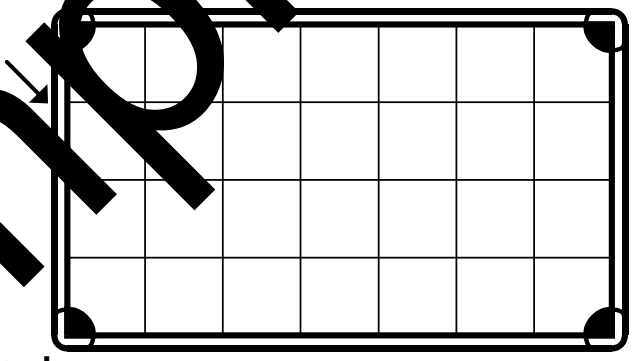


TASK A **Using this method, work out which pocket each of the following balls will go into if they are hit in the direction of the arrow. Draw a circle around the pocket.**

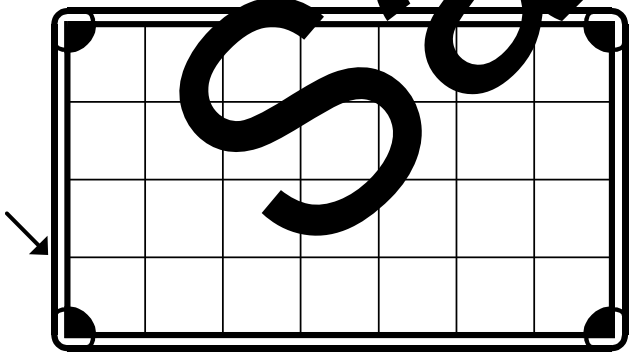
a.



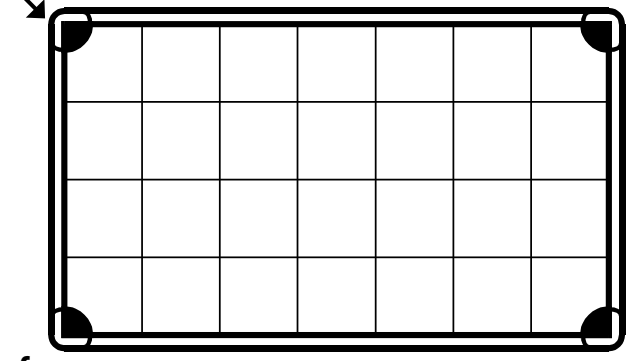
b.



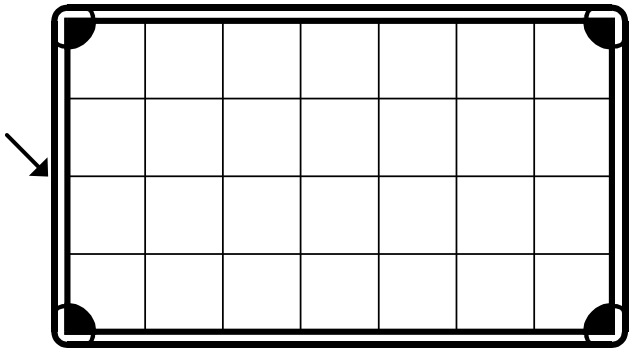
c.



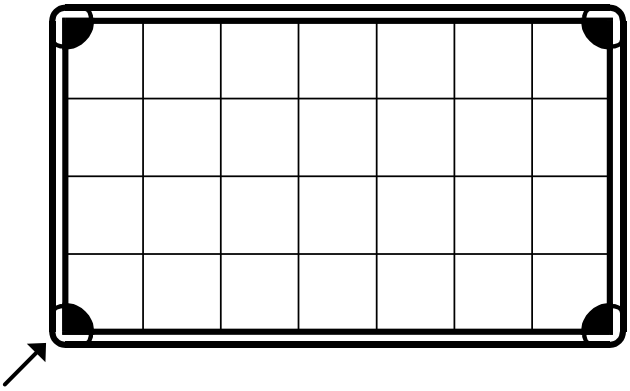
d.



e.



f.



Shapes And Mensuration

Units And Unit Conversion

Students explore the various types of "everyday" units involving length, mass and capacity. The emphasis is on developing mental strategies to fluidly move between different units and to understand the importance of uniform units when working with calculations.

Perimeter And Area

An exploration of perimeter and area is important for a thorough understanding of these topics. Once grasped these activities focus on extending their understanding to work with rectangles and triangles. A calculator may be useful for some of these calculations and an emphasis on correct units is to be encouraged.

Volume And Capacity

An introductory look at volume and capacity is presented here as an exploration of these concepts. These activities can serve as a foundation to further work on volume and 3D shapes.

Exercises

Try these exercises without any help.

a) Name some units that we use to measure length. _____

_____

_____

b) Name some units that we use to measure mass. _____

_____

_____

c) Name some units that we use to measure volume. _____

_____

_____

d) How many centimetres in 2.3 metres? _____

e) Which is smaller, 2 litres or 200 millilitres? (circle correct answer)

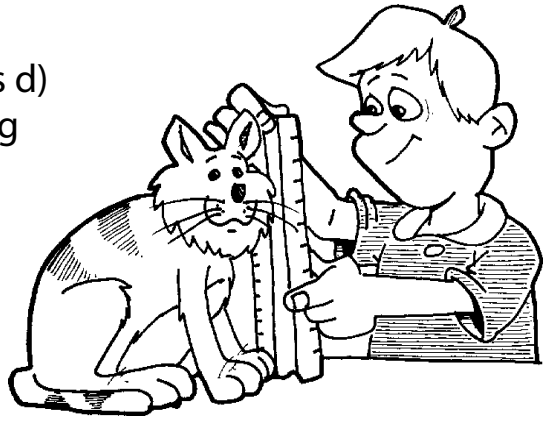
f) How many kilolitres in 534 litres? _____

g) Which is bigger, 45 millimetres or 45 centimetres?
(circle correct answer)

h) How many milligrams in one gram? _____

How did you go?

- If you answered some or all of questions a) to c) correctly then you know something about what **type of units** we can use to make various measurements.
- If you answered some or all of questions d) to h) correctly then you know something about the **size of units**.

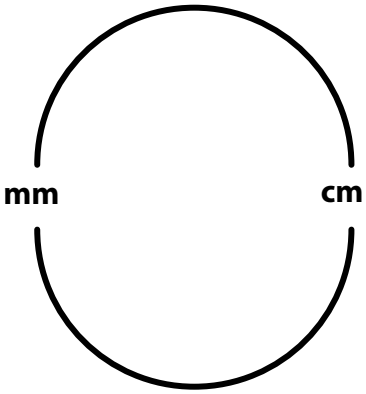


❂ Length Conversions 1

✳ TASK A Converting millimetres to centimetres

To convert mm to cm we divide by 10.
Write this in symbols on the diagram right.

To convert cm to mm we multiply by 10.
Write this in symbols on the diagram right.



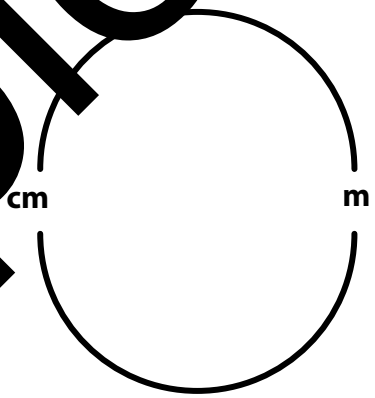
Convert each of the following.

a) 1 cm = _____mm	b) 50 mm = _____ cm	c) 35 mm = _____cm
d) 20 cm = _____ mm	e) 7.2 cm = _____ mm	f) 4[illegible] = _____cm

✳ TASK B Converting centimetres to metres

To convert cm to m we divide by 100.
Write this in symbols on the diagram right.

To convert m to cm we multiply by 100.
Write this in symbols on the diagram right.



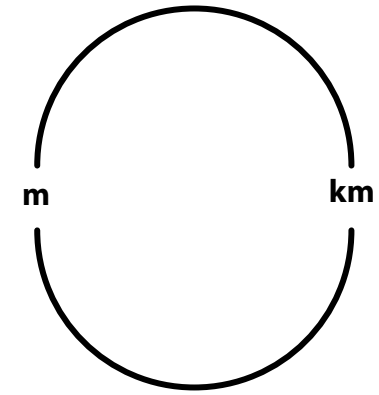
Convert each of the following.

a) 5 m = _____cm	b) 2[illegible] cm = _____m	c) 42 m = _____cm
d) 351 m = _____	e) 27 cm = _____m	f) 32 cm = _____m

✳ TASK C Converting metres to kilometres

To convert m to km we divide by 1000.
Write this in symbols on the diagram right.

To convert km to m we multiply by 1000.
Write this in symbols on the diagram right.



Convert each of the following.

a) 3 km = _____m	b) 2000 m = _____km	c) 4.3 km = _____m
d) 355 m = _____km	e) 12 m = _____km	f) 215 km = _____m