2024 Parents' Engagement Session

Study Skills and Expectations of Primary Mathematics (Primary 5 & 6)

20 April 2024

Passionate Learners, Gracious Citizens

Objectives

- To better equip you with knowledge and skills in coaching your child in Mathematics by creating an awareness of the expectations for Primary 5 & 6 Mathematics

- To increase collaboration between parents and the school

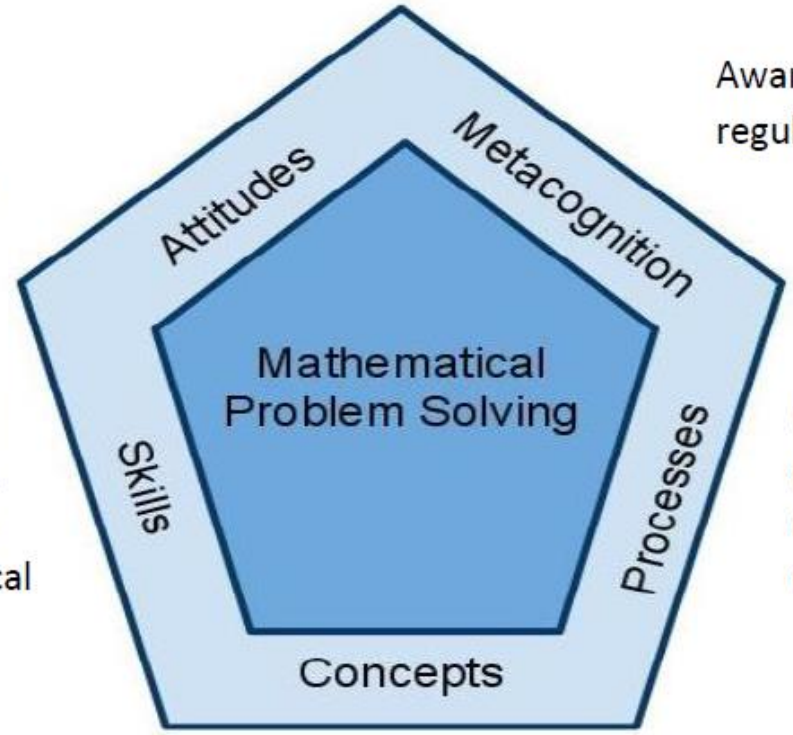
Aims of Primary Mathematics: Laying a Strong Foundation

- ✓ Acquire mathematical concepts and skills for everyday use and continuous learning in mathematics
- ✓ Develop thinking, reasoning, communication, application and metacognitive skills through a mathematical approach in problem-solving
- ✓ Build confidence and foster interest in mathematics

Singapore Mathematics Curriculum Framework

Belief, appreciation, confidence, motivation, interest and perseverance

Awareness, monitoring and regulation of thought processes



Proficiency in carrying out operations and algorithms, visualising space, handling data and using mathematical tools

Competencies in abstracting and reasoning, representing and communicating, applying and modelling

Understanding of the properties and relationships, operations and algorithms

Examination Format –
Standard Mathematics

Paper & Duration	Booklet	Item Type	No. of questions	No. of marks per question	Weighting
1 (1 h)	A	Multiple-choice	10	1	10%
			5	2	10%
	B	Short-answer	5	1	5%
			10	2	20%
2 (1 h 30 min)		Short-answer	5	2	10%
		Structured / Long-answer	12	3, 4, 5	45%
2 h 30 min	Total		47	------	100%

Examination Format –
Foundation Mathematics

Paper & Duration	Booklet	Item Type	No. of questions	No. of marks per question	Weighting
1 (1 h)	A	Multiple-choice	10	1	10%
			10	2	20%
	B	Short-answer	10	2	20%
2 (1 h)		Short-answer	10	2	20%
		Structured	6	3, 4	20%
2 h	Total		46	------	90%

Mark Scheme

Short Answer and Structured/Long Answer [Questions with 2 or more marks]

‘M’ mark - Mark awarded for any *correct method* applied to the *appropriate numbers*

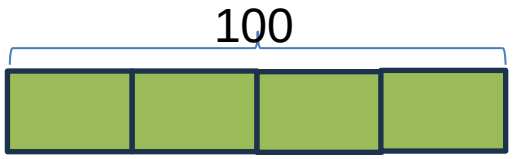
‘A’ mark - Numerically *correct answer*

Sample Marking Scheme

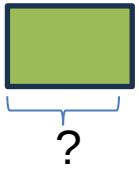
Mrs Tan baked 4 times as many curry puffs as chicken pies.
She baked 100 curry puffs.
How many chicken pies did she bake?

Sample solution (1)

curry puffs → 4 units



chicken pies → 1 unit



100 ÷ 4 [M1] = 25

Ans: 25 [A1]

Sample Marking Scheme

Mrs Tan baked 4 times as many curry puffs as chicken pies.
She baked 100 curry puffs.
How many chicken pies did she bake?

Sample solution (2)

100 ÷ 4 [M1] = 24

Ans: 24 [A0]

Sample solution (3)

4 ÷ 100 [M0] = 25

Ans: 25 [A0]

P5 SMA Syllabus

SEMESTER 1

1. Whole Numbers
2. Operations of Whole Numbers
3. Fractions and Mixed Numbers
4. Multiplication of Whole Numbers, Fractions and Mixed Numbers
5. Area of Triangle
6. Ratio

SEMESTER 2

7. Volume of Cube and Cuboids
8. Decimals
9. Percentage
10. Average
11. Rate
12. Angles
13. Triangles and Quadrilaterals

P6 SMA Syllabus

SEMESTER 1

1. Algebra
2. Fractions
3. Ratio
4. Percentage
5. Circles
6. Angles in Geometric Figures

SEMESTER 2

7. Solid Figures and Nets
8. Pie Charts
9. Volume of solids/liquids
10. Speed

P5 FMA Syllabus

SEMESTER 1

1. Whole Numbers – Place Values
2. Whole Numbers – Addition and Subtraction
3. Whole Numbers – Multiplication and Division
4. Fractions – Addition and Subtraction
5. Geometry

SEMESTER 2

6. Decimals – Place Values
7. Decimals – Four Operations
8. Fractions - Multiplication
9. Time

P6 FMA Syllabus

SEMESTER 1

1. Fractions - Division
2. Decimals – Multiplication and Division
3. Percentage
4. Average

SEMESTER 2

5. Pie Charts
6. Triangles. Squares and Rectangles
7. Volume

Whole Numbers (Key Ideas)

- ✓ Place Value
- ✓ Comparing and Ordering
- ✓ Estimation
- ✓ Multiply / divide by tens, hundreds and thousands without using a calculator
- ✓ Apply the order of operations and use of brackets

Misconceptions - Operations of Whole Numbers

Solve the expression from left to right, starting with the first operation.

1) $23 + 15 - 4 \times 2$
$= 38 - 4 \times 2$
$= 34 \times 2$
$= 68$

Confused with which operation to do first

2) $23 + 15 - 4 \times 2$
$= 38 - 4 \times 2$
$= 38 - 8$
$= 30$

Fractions (Key Ideas)

- ✓ Associate fractions with division
- ✓ Convert a fraction to a decimal and vice versa
- ✓ Addition and Subtraction
- ✓ Multiplication and Division
- ✓ Unitary Method

Misconceptions– Fractions

$3 \div 6$

$= 2$

Confused between (3 ÷ 6) and (6 ÷ 3). They will give the answer as 2 for both questions.

Misconceptions– Fractions

$$6 \times \frac{2}{9}$$

$$= \frac{12}{54} \div 2 = \frac{6}{27}$$

Multiply both the numerator and denominator.

$$\frac{6}{1} \times \frac{9}{9} \times \frac{2}{9}$$

$$= \frac{54}{9} \times \frac{2}{9}$$

$$= \frac{108}{9}$$

The child makes the denominator the same. Does he know why common denominators are needed when working with addition and subtraction of fractions?

Misconceptions– Fractions

$\frac{2}{3} \div 3$

$= \frac{2}{3} \times \frac{3}{1}$

$= \frac{6}{3}$

$= \frac{2}{1} = 2$ wholes

Confused with multiplication and division of fractions.

$\frac{3}{4_2} \times \frac{1}{2_1}$

$= \frac{3}{2}$

Cancel wrongly

Ratio (Key Ideas)

- ✓ Equivalent Ratio
- ✓ Ratio in its simplest form
- ✓ Ratio of 2 or 3 given quantities
- ✓ Find 1 quantity given the other quantity and their ratio

Misconceptions– Ratio

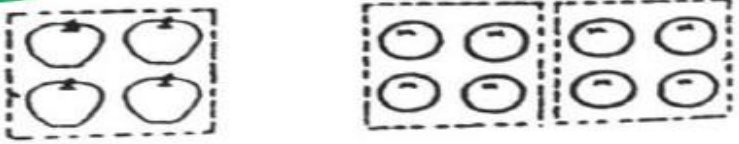
- ***Cannot see ratio as relative size***

The ratio of the number of apples to the number of oranges is 4 : 8

Grouping in twos:

The ratio of the number of apples to the number of oranges is 2 : 4

Grouping in fours:



The ratio of the number of apples to the number of oranges is 1 : 2

Ratio (Exclusion)

Exclude ratios involving fractions and decimals

$$\frac{3}{5} : \frac{4}{5} = 3 : 4$$

$$1.4 : 0.7 = 2 : 1$$

Percentage (Key Ideas)

- ✓ A part of a whole as a percentage
- ✓ Use the % symbol
- ✓ Relate fractions, decimals and percentage
- ✓ Discount, GST and annual interest

Common error patterns

What are the possible error patterns?

- $\frac{6}{10}$ = 6 %

Denominator is not 100

- 0.5 = 5 %

- 60 = 60%
- 60% = $420
- 2/5 x 100 = 40%

See % as a quantity

- 20% of A = 20% of B,
  where A and B are of different quantities

Not able to relate % part of a whole of two given quantities

Percentage (Misconceptions)

See % as a quantity

- 60 = 60%
- 60% = $420
- 2/5 x 100 = 40%

Percentage increase/ decrease

- Not able to identify the base

E.g. A plant measured 20 cm on Monday. On Friday, its height increased to 28 cm. Find the percentage increase in height from Monday to Friday.

Increase = 28 – 20 = 8 cm
% increase = 8/28 x 100% = ____%

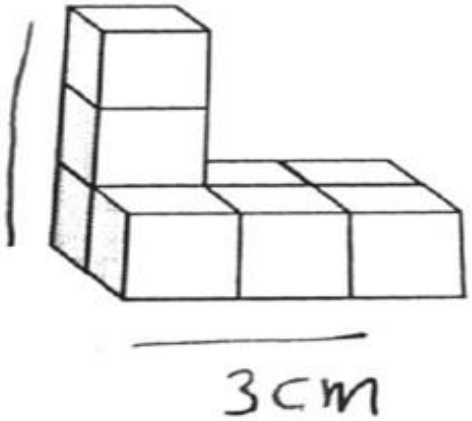
Volume (Key Ideas)

- ✓ Build solid with unit cubes
- ✓ Draw cubes and cuboids on an isometric grid
- ✓ Measure volume in cubic units/centimetres/metres
- ✓ Use formula to calculate the volume of cube/cuboid
- ✓ Find volume of liquid in a rectangular tank

Misconceptions–
Volume of cube and cuboid

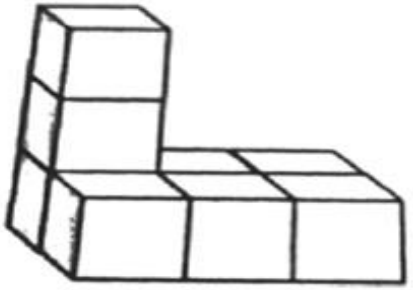
Unable to visualise the hidden objects (cube) in a diagram.

The solid is made up of 1-cm cubes. Find the volume of the solid.



Ans: 9 cm^3

The solid is made up of 1-cm cubes. Find the volume of the solid.

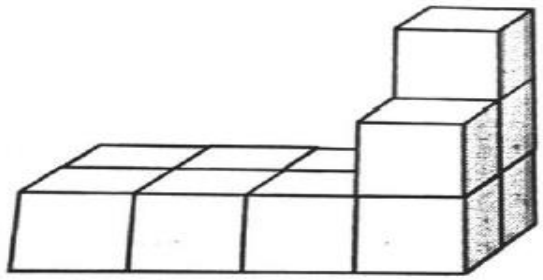


Ans: 7 cm^3

Misconceptions–
Volume of cube and cuboid

Use the formula to find volume of solid.

The solid is made up of 1-cm cubes. Find the volume of the solid.

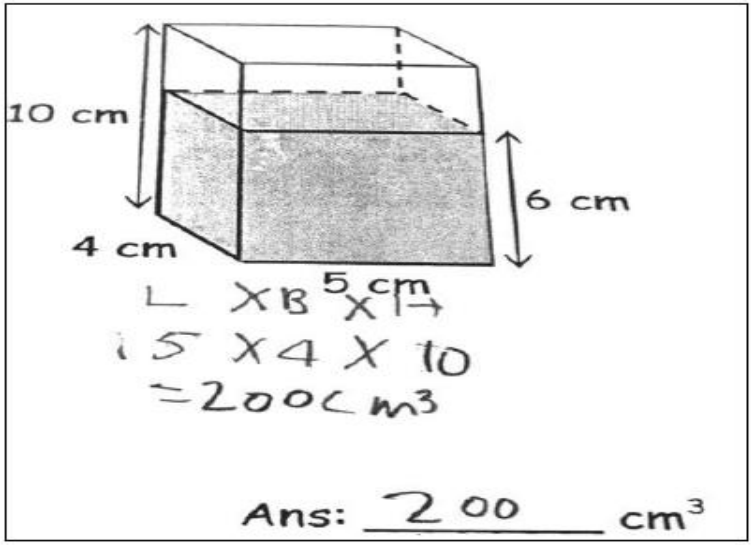


4 x 2 x 3 = 24

Ans: 24 cm^3

Use height of tank to find volume of water (tank is <u>not</u> filled to the brim).

The tank contains some water. How much more water is needed to fill up the tank?



L x B x H

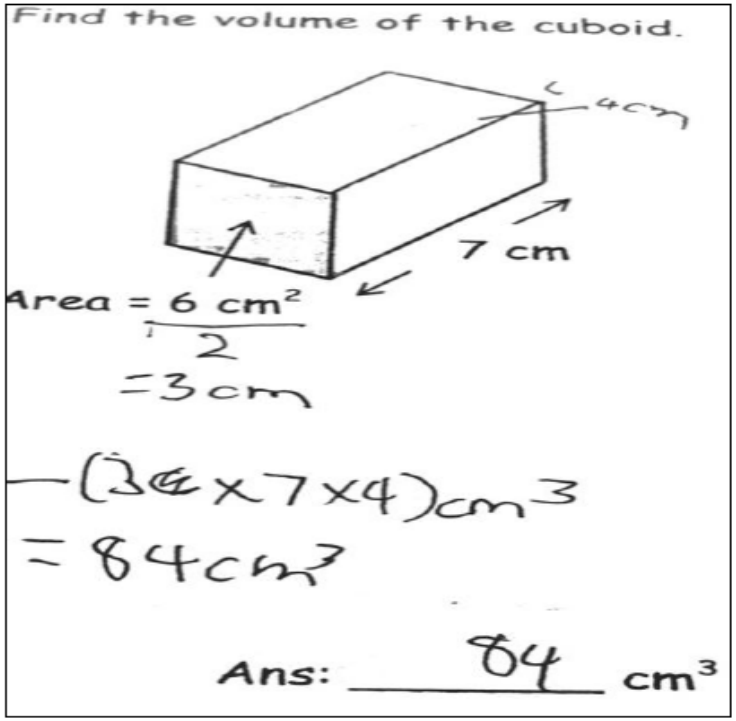
= 5 x 4 x 10

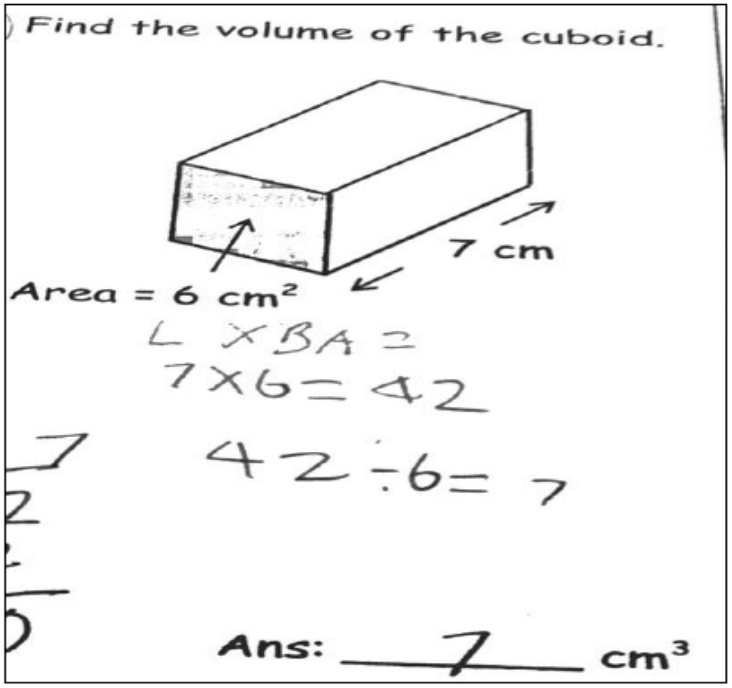
= 200 cm^3

Ans: 200 cm^3

Misconceptions– Volume of cube and cuboid

Do not know how to apply the formula, given the area and height of cuboid. Cannot identify the base, height and length of cuboid.





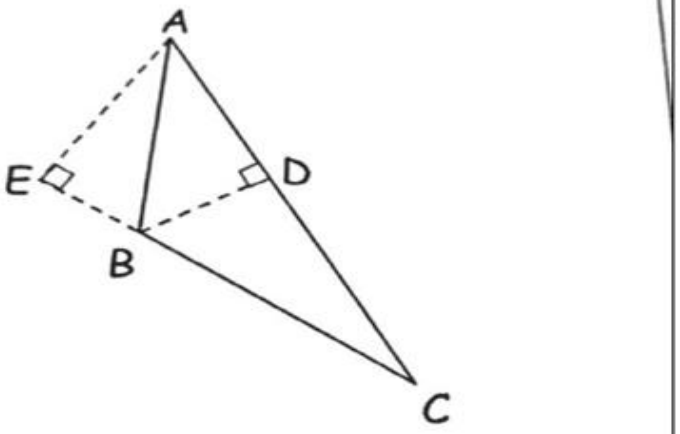
Area of a Triangle (Key Ideas)

- ✓ Base of a triangle and its corresponding height
- ✓ Concept of area of a triangle
- ✓ Formula of area of triangle

Misconceptions– Area of Triangle

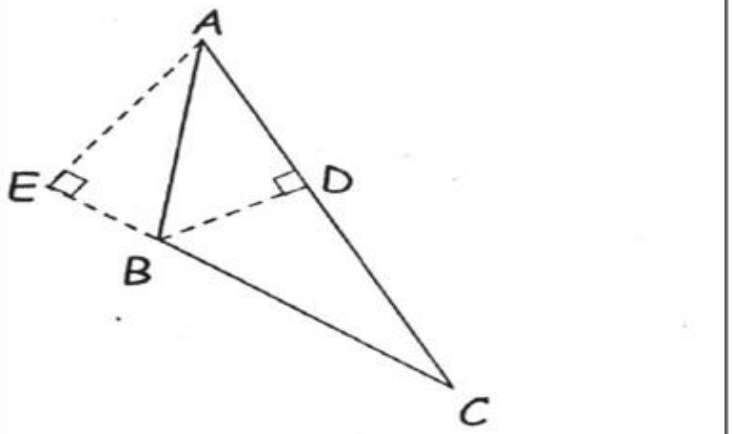
Height is within a triangle, especially for obtuse triangle

In the triangle ABC, BC is the base. Which is the height?



Ans: AB

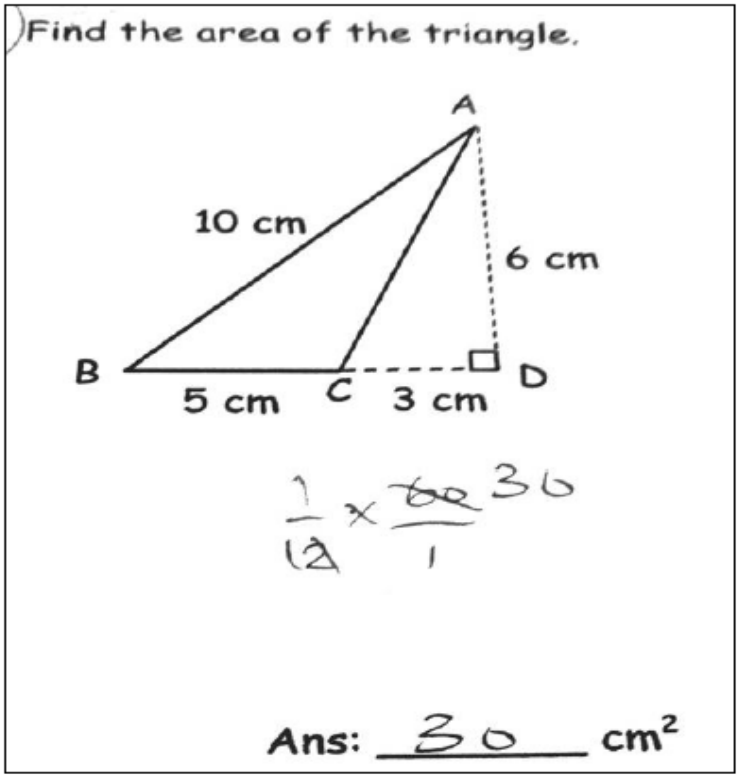
In the triangle ABC, BC is the base. Which is the height?

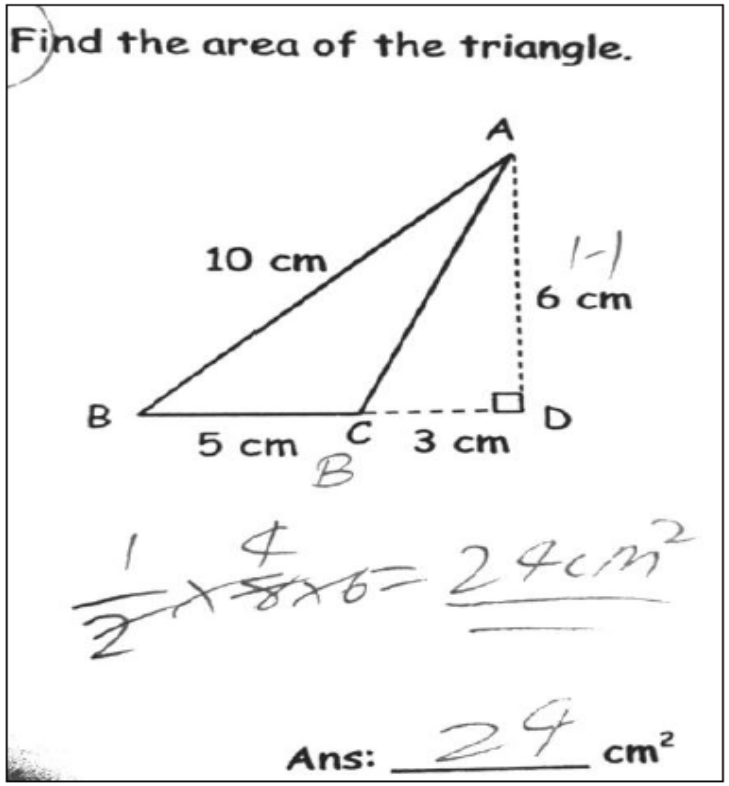


Ans: BD

Misconceptions– Area of Triangle

Cannot identify the base and height of a triangle

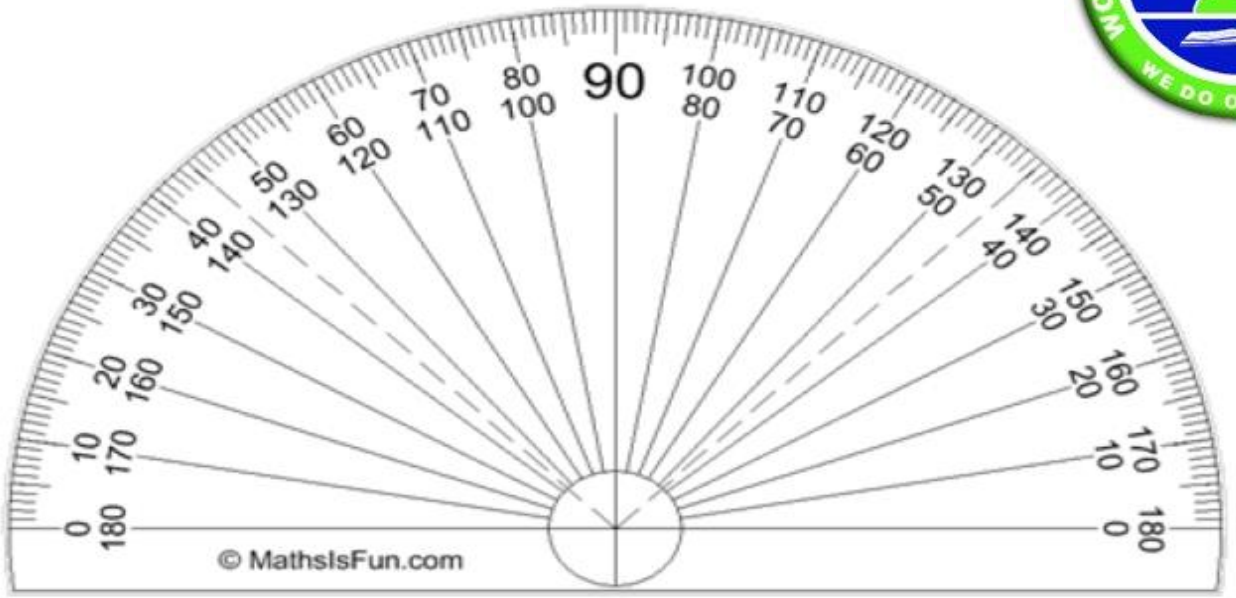


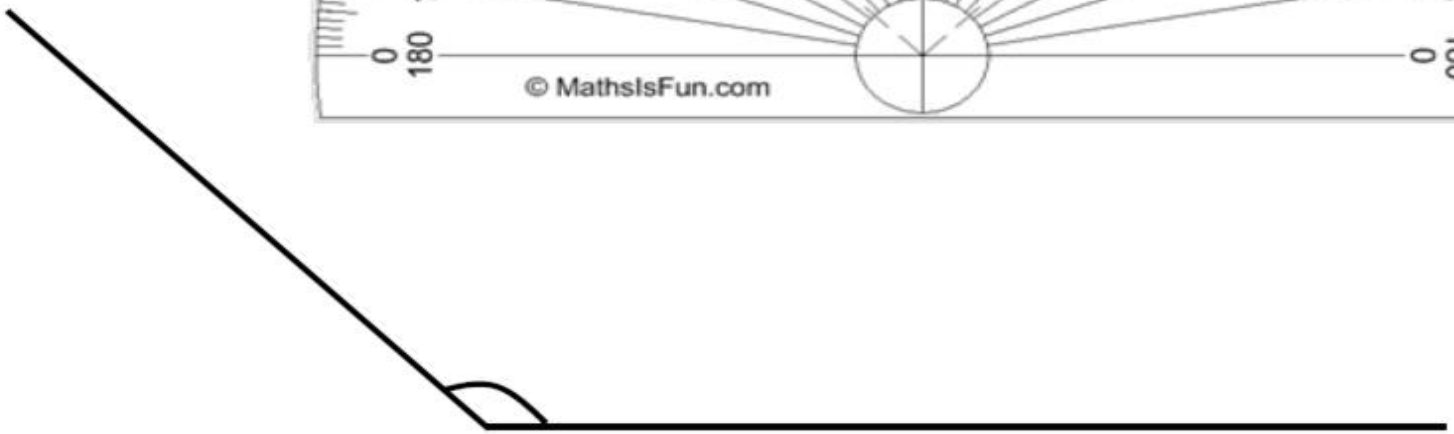


Angles (Key Ideas)

- ✓ Label, measure and draw angles
- ✓ Use of properties of angles to find unknown angles
  - Angles on a straight line
  - Angles at a point
  - Vertically opposite angles

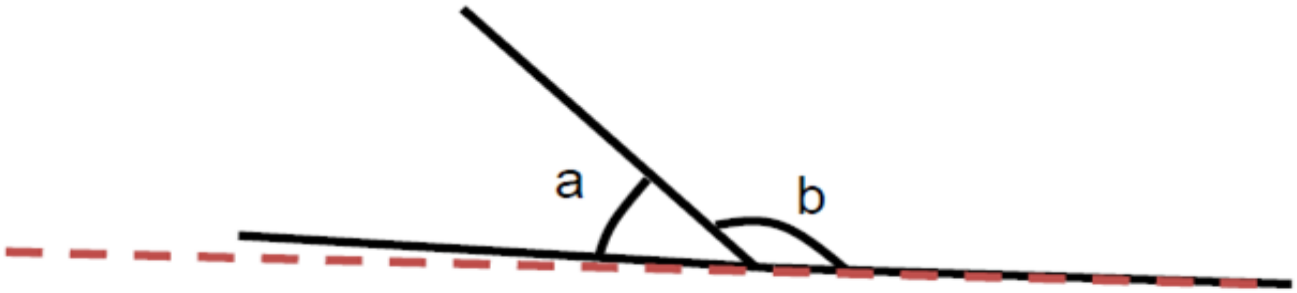
Common error patterns





45° or 135°?

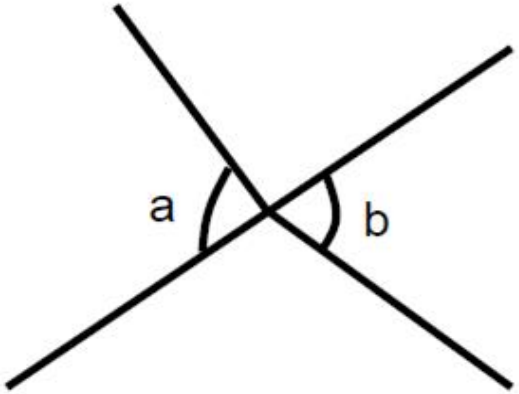
Common error patterns



$\angle a + \angle b = 180° ?$

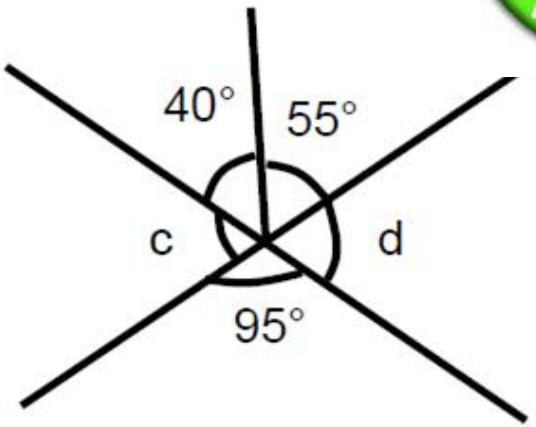
Unclear concept of angles on a straight line; Angles that appear to be on a straight line adds up to 180°
Usually , the question will state that the line is straight.

Common error patterns



$\angle a = \angle b$?

Unclear concept of vertically opposite angles. Is anything vertically opposite always equal?



$\angle c = 360° - 40° - 55° - 95°$?

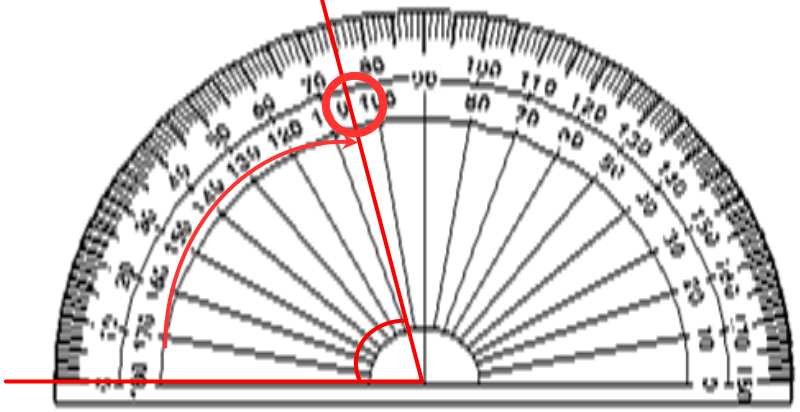
Unclear concept of angles at a point; Subtracts even though there are 2 missing angles.

Geometry

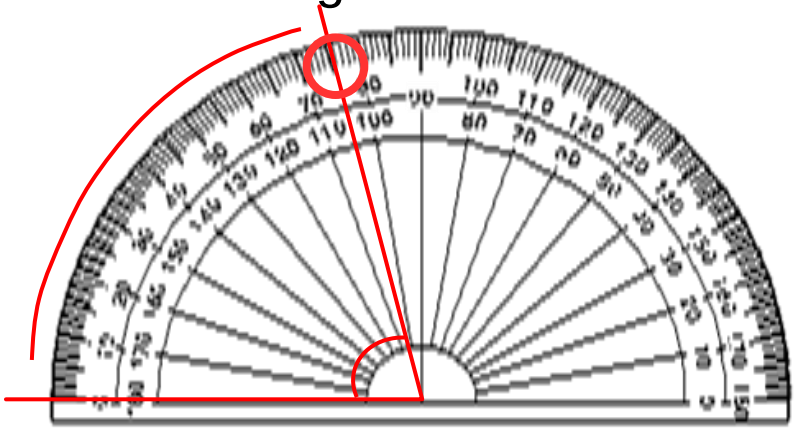
- ✓ For geometry, important to have the mathematical instruments, protractor, ruler and set square.
- ✓ Know how to use the tools eg: ruler starting from zero
- ✓ Accuracy is important for this topic

Geometry

Reading from the inner scale:



Reading from the outer scale:

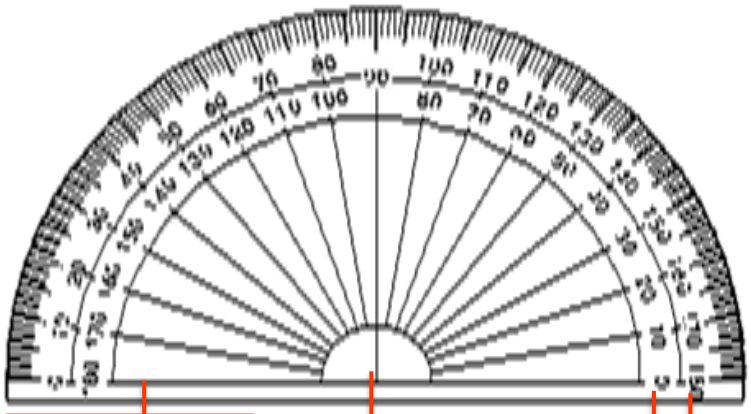


Common error:

Using the wrong scale when measuring angle

Geometry

- Know the parts of the protractor
- Be very accurate when drawing or measuring angles



1 degree or 1°

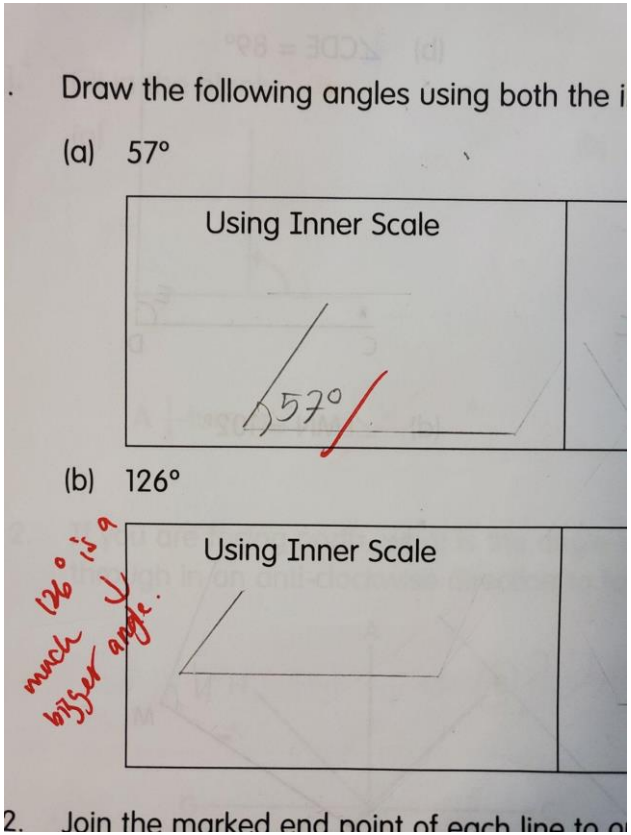
base line

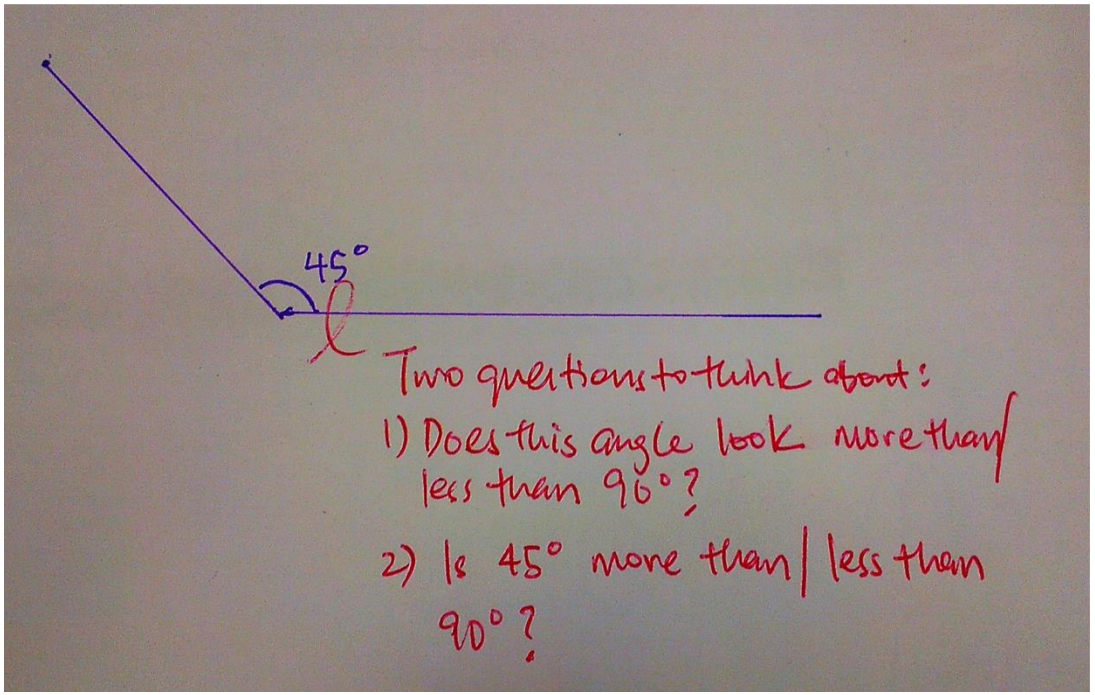
centre mark

inner scale

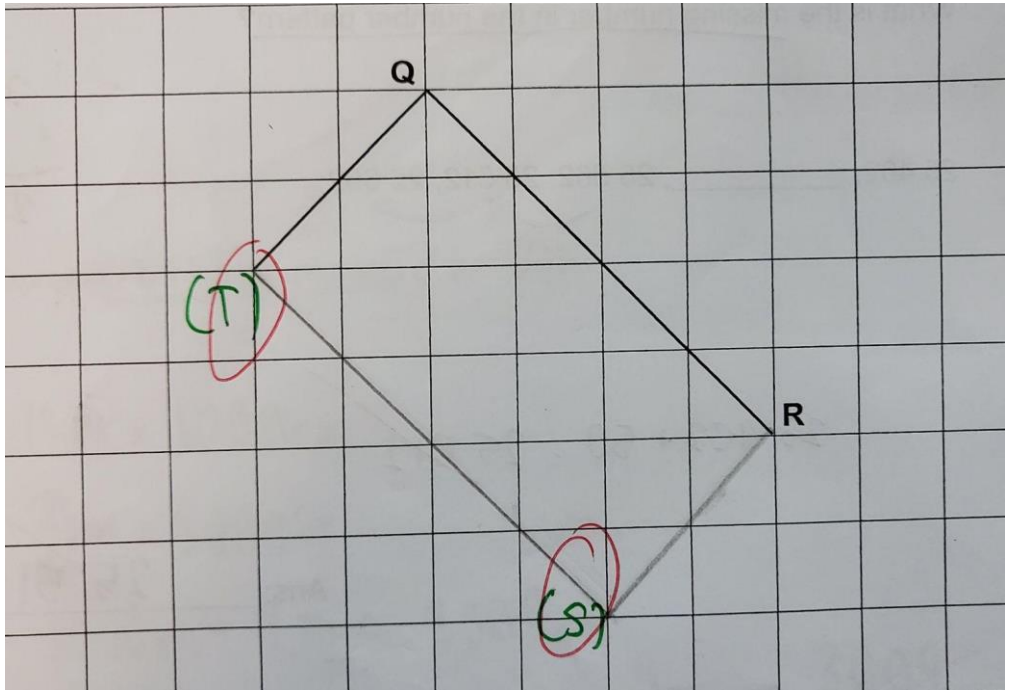
outer scale

Geometry


Draw the following angles using both the i
(a) 57°
Using Inner Scale
57°
(b) 126°
Using Inner Scale
126° is a much bigger angle.
2. Join the marked end point of each line to o


45°
Two questions to think about:
1) Does this angle look more than/ less than 90°?
2) Is 45° more than/ less than 90°?

Geometry



Common error:

Diagrams are not labelled accurately

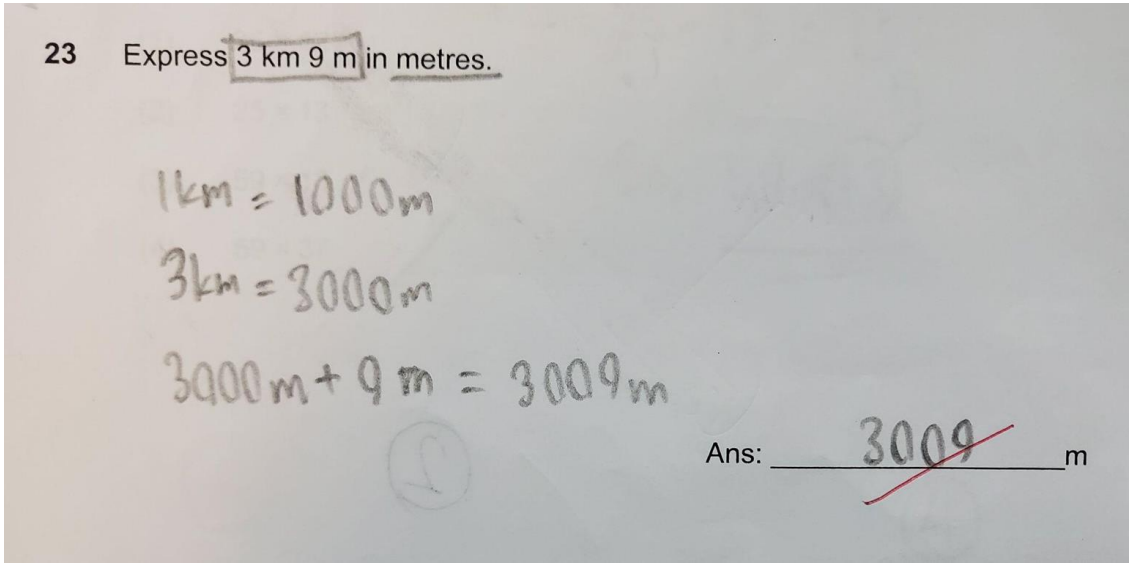
Measurements

- ✓ Conversion of units
  - Wrong or no units written
- ✓ Importance of using timeline
- ✓ Difference between area and perimeter

Length, Mass and Volume

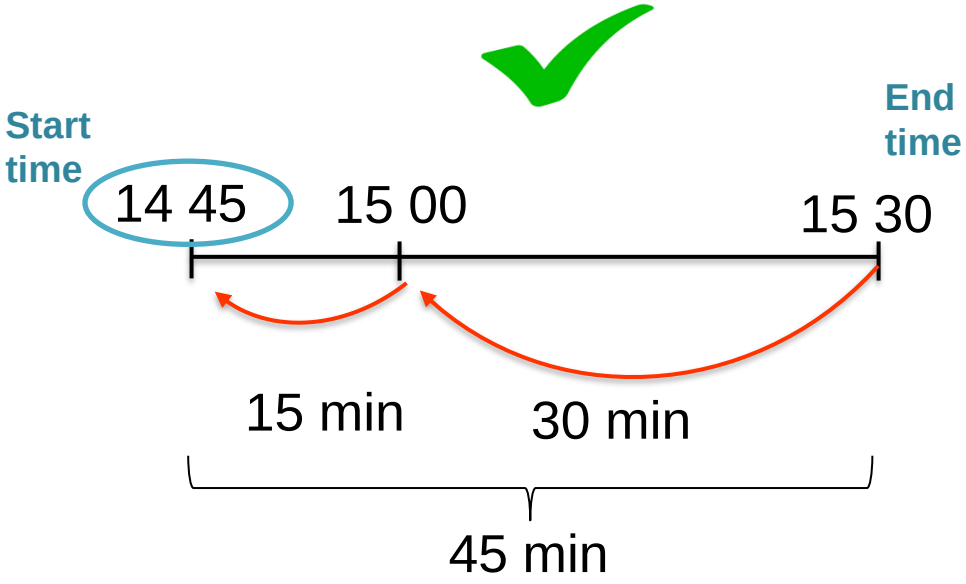
Conversion of units

- ✓ 100 cm = 1m
- ✓ 1000 m = 1km
- ✓ 1000 g = 1 kg
- ✓ 1000 mℓ = 1ℓ



Time

Cindy's piano lesson ended at 15 30. It lasted 45 minutes. What time did the piano lesson begin?



15 30 – 45 min = 14 45

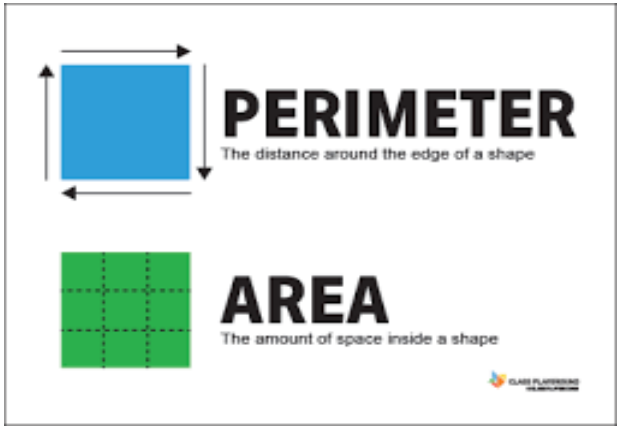
3.30pm – 45 min=2.45pm

Common error:

Presents incorrect mathematical statements

Area and Perimeter

- Wrong or no units written for perimeter (cm/m) and area (cm^2 or m^2)



Circles (Key Ideas)

- ✓ Formulae for area and circumference of a circle
- ✓ Area and Perimeter of a semicircle and a quarter circle
- ✓ Area and Perimeter of composite figures involving circles, semicircles and quarter circles, and other shapes

Errors & Misconceptions (Circles)

(2) The radius of a circle is 4 cm. Find the circumference of the circle O. Leave π in your answer.

$4 \times 4 \times \pi = 16\pi$

Ans: 16π cm

(2) The radius of a circle is 6 cm. Find the circumference of the circle O. Leave π in your answer.

$\pi \times 6 \times 6 = 36\pi$

Ans: ~~36π~~ cm

Confusion in the use of formula.

Errors & Misconceptions (Circles)

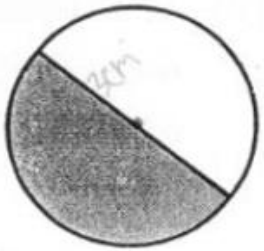
(5) The radius of a circle is 5 cm. Find the area of the circle. Leave π in your answer.

$2 \times 5 \times \pi$
$= 10\pi$

Confusion in the use of formula.

Ans: 10π cm^2

(8) The radius of the circle is 3 cm. Find the area of the semicircle. Leave π in your answer.

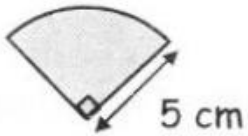


$2\pi r$
$= 2 \times \pi \times 3$
$= 6\pi$
$6\pi \times \frac{1}{2}$
$= 3\pi$

Ans: 3π cm^2

Errors & Misconceptions (Circles)

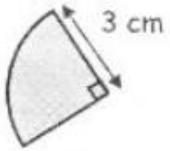
(8) Find the area of the shaded quarter circle as shown below. Leave π in your answer.



π × 5 × 5 = 25π

Ans: 25π cm²

(8) Find the area of the shaded quarter circle as shown below. Leave π in your answer.



π × 3 × 3 = 9π

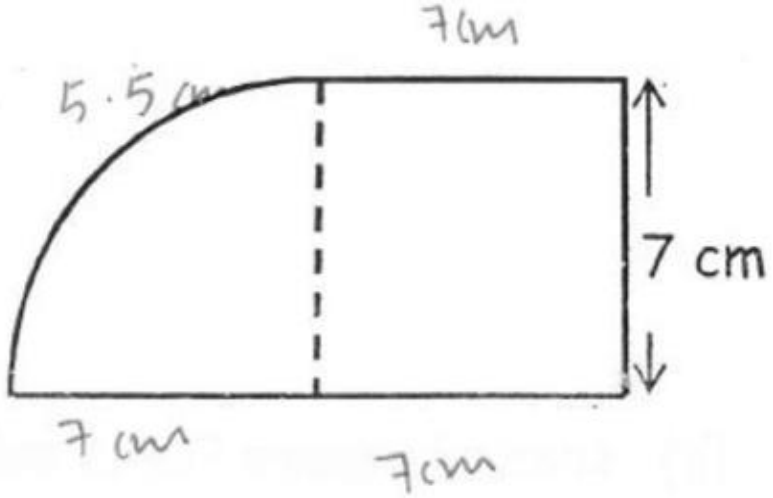
Ans: 9π cm²

Forgot to divide the area of a circle by 4.

Misconceptions (composite)

(6) The figure is made up of a square and a quarter circle.

Find its perimeter. Take $\pi = \frac{22}{7}$.



Circumference of a quater $= \frac{22}{7} \times 7 \times \frac{1}{4}$

$= 11 \times \frac{1}{4}$

$= 5.5$ cm

Perimeter of figure $= 7 + 7 + 7 + 5.5$

$= 26.5$ cm

Some Teaching Ideas for Parents

- Persevere in solving the questions.
- Please try all questions, especially MCQ and Short-Structured Questions.
- Seek alternative ways to solve a “difficult” task.
  ~ Break up the task into smaller “digestible” bits.

Some Teaching Ideas for Parents

- Read the questions before trying them.
- Please show all workings clearly.
  (Do not cancel your workings)
- If you have to cancel your workings, just use a pencil (a pen) to draw a line across the intended section.

Some Teaching Ideas for Parents

- Doing well in Paper 1 is important.
- Review what they have learnt in class – spending at least 15 – 30 minutes every day to revise their daily work or concepts
- Calculator is merely a tool. Most ‘calculator’ questions do not require the use of calculator. Questions would be based on concepts.

How can you help?

Monitor

- Ensure that homework is completed and presented with logic and accuracy.
- Persevere through challenges

Support

- Create a positive learning environment
- Get students to explain their solutions and reassure them of your unwavering support
- Let them know that you believe in their potential to succeed.

Partner

- Use correct mathematical language at home
- Practice Factual Fluency
- Use the STEP approach in problem solving
- Help us to Follow-up on the STAR Package

We want to hear from you

Thank you!

https://go.gov.sg/wrps2024pew

Please scan the QR Code to send us your feedback. Thank you.