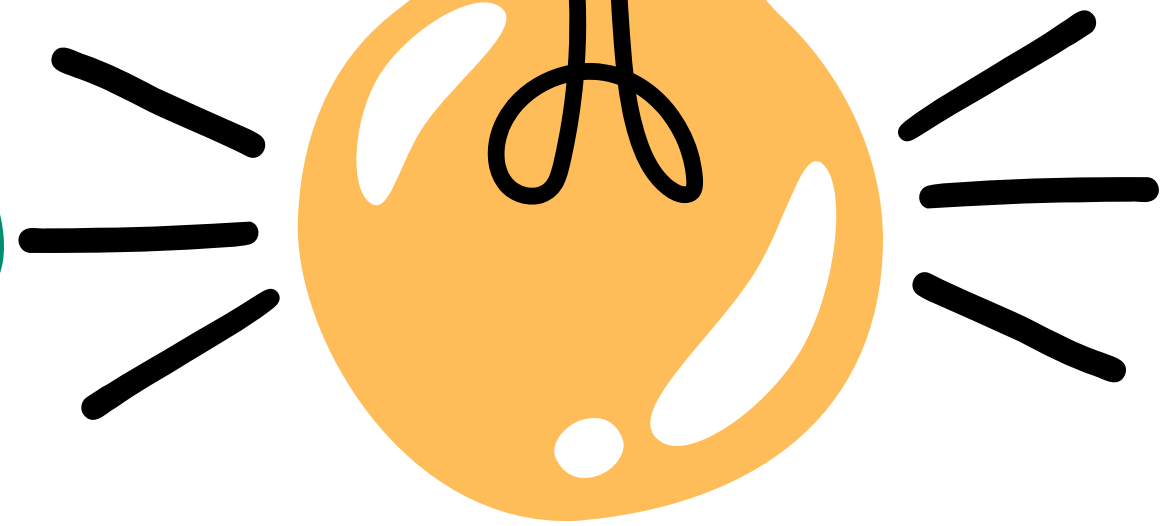
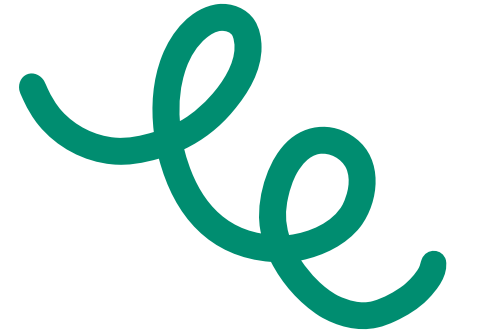
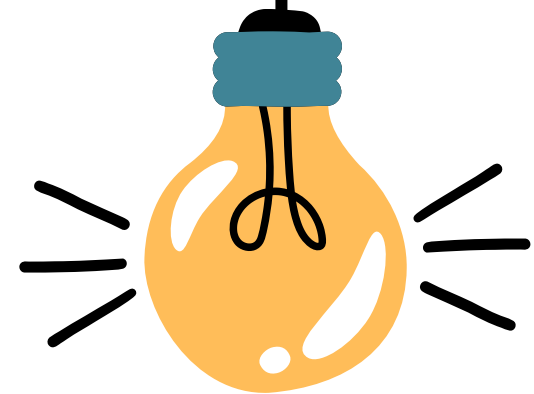


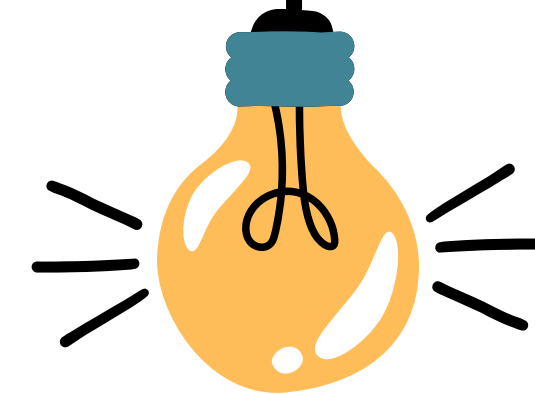
P5/6 Math Parent Workshop



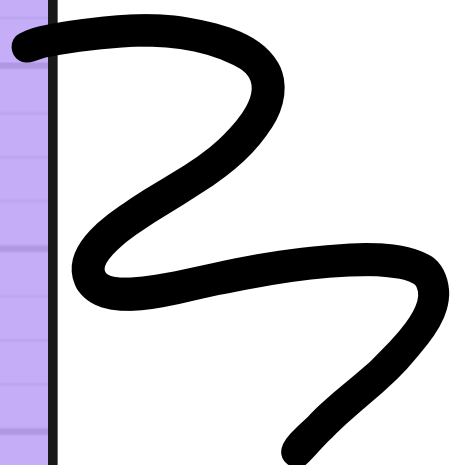
By : Ms Nicole Chee
Mdm Josephine Kee



CONTENTS



- 1 Objectives for today's sharing session**
- 2 Quick recap on heuristics skills**
- 3 Hands-on Session : Let's learn how to infer**
- 4 Summary and Q & A**



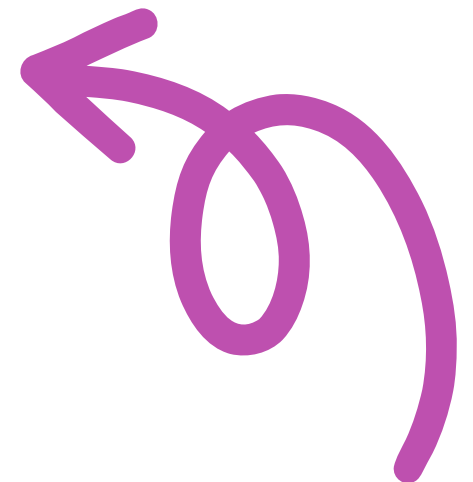


Objective

1) To make connections with problem-solving strategies (heuristics) to solve word problems that involve mathematical reasoning and spatial visualization.



2) To infer and solve word problems.



Types of

Heuristics Strategies

More Than / Less Than
Equal Concept
Constant Difference
Unchanged Total
Unchanged Quantity
Repeated Identity

Model
Drawing

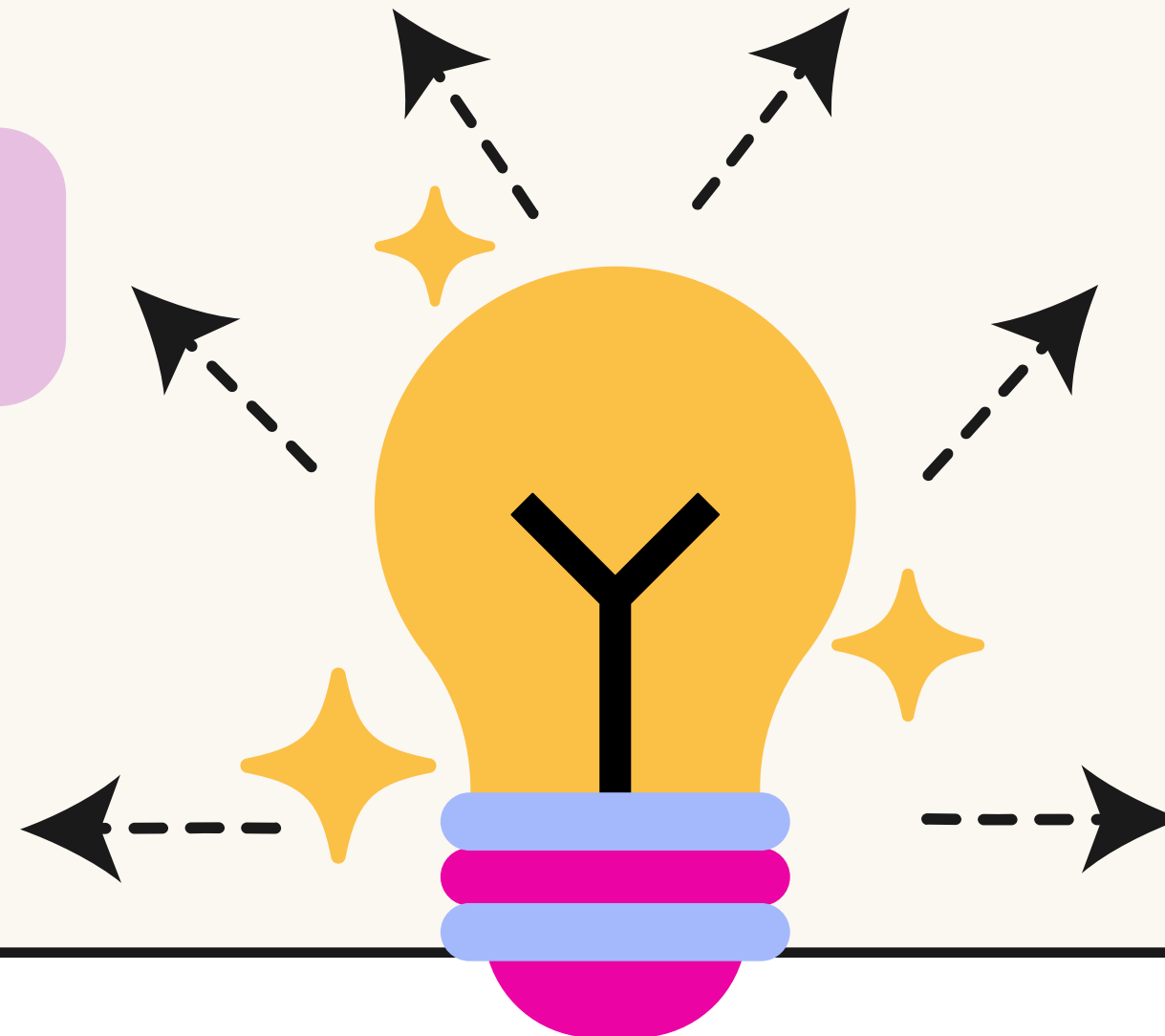
Working
Backwards

Elimination
Method

Make a List /
Tabulation

Guess and
Check

Make
Supposition



Students are encouraged to...



PROBLEM -SOLVING PROCESS

Read
Identify keywords
Get a plan
Have it done
Triple check

Model
Equation
Working
Answer
Statement

Number
Transfer
Units
Calculation

PSLE 2023 Paper 1 Q27



Mrs Lim took home 120 eggs.

She paid \$4.80 less with the special offer.

What was the price of 10 eggs without the special offer?

Grouping question / Find the number of sets

Infer that one group = 10 eggs + 2 eggs free = 12 eggs in total

$$\begin{aligned}\text{Number of groups} &= 120 \div (10 + 2) \\ &= 10\end{aligned}$$

$$\begin{aligned}\text{Total number of free eggs} &= 10 \times 2 \\ &= 20\end{aligned}$$

Infer that 20 eggs = \$4.80 paid lesser.

$$\begin{aligned}\text{Cost of 1 egg} &= \$4.80 \div 20 \\ &= \$0.24\end{aligned}$$

$$\begin{aligned}\text{Cost of 10 eggs} &= 10 \times \$0.24 \\ &= \$2.40\end{aligned}$$

Ans : \$2.40

PSLE 2023 Paper 1 Q29

Gopal had 3 identical tins of paint that were completely filled.

He poured 760 ml out from each tin.

The total amount of paint left in the 3 tins after pouring was equal to the amount of paint in 1 tin at first.

What was the amount of paint in each tin at first?

Equal Concept → Draw a model

	760 ml
	760 ml
	760 ml

Poured out 760ml from each tin

left
1 tin

	760 ml	

Hence,
2 units = 760
1 unit = $760 \div 2$
= 380

1 tin of paint (at first) = $380 + 760$
= 1140

or 1 tin of paint (at first) = 380×3
= 1140

Ans : 1140 ml



PSLE 2023 Paper 2 Q15

Meiyi had some books.

She donated $\frac{3}{8}$ of the books and gave away another 24 books.

She had $\frac{4}{7}$ of the books left and she packed them into 20 boxes.

Some boxes contained 10 books while the rest contained 18 books.

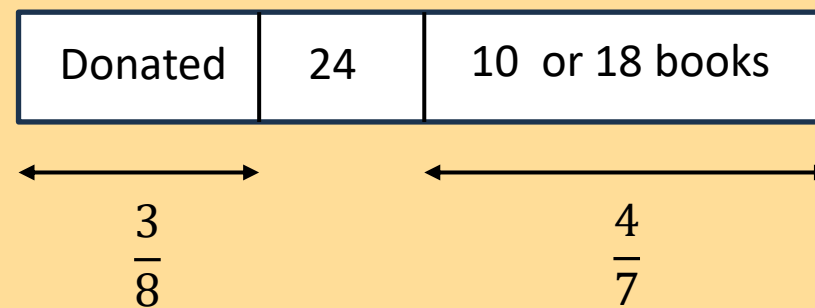
- (a) How many books were packed into the 20 boxes?
 (b) How many boxes contained 18 books?

Infer total 8 units

3 units
gave away

5 units
left

gave away
24 books



(a) Common multiples of 8 and 7 = 56

$$\text{Donated } \frac{3}{8} = \frac{21}{56}$$

$$\text{Left } \frac{4}{7} = \frac{32}{56}$$

$$24 \text{ books} = 56u - 32u - 21u$$

$$= 3u$$

$$3u = 24$$

$$1u = 24 \div 3$$

$$= 8$$

$$32u = 32 \times 8$$

$$= 256$$

(b) Assume all 20 boxes contained 10 books,

$$10 \times 20 = 200$$

$$\text{Total difference} = 256 - 200$$

$$= 56$$

$$\text{Each box difference} = 18 - 10$$

$$= 8$$

$$56 \div 8 = 7 \text{ boxes contained 18 books}$$

Ans : (a) 256 books (b) 7 boxes



SIMILAR QUESTION PSLE 2016 Paper 2 Q14

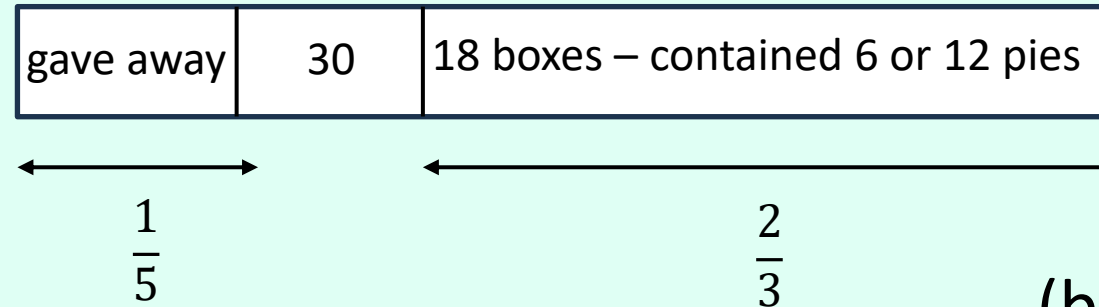
Suyin baked some pies. She gave $\frac{1}{5}$ of them to her relatives and 30 of them to her friends. She was left with $\frac{2}{3}$ of the pies. She packed these into 18 boxes. Some boxes contained 6 pies while the rest contained 12.

- (a) How many pies were packed into the 18 boxes?
 (b) How many boxes contained 6 pies?

Infer total 5 units

gave away
1 unit

gave away
30



(a) Common multiples of 3 and 5 = 15
 gave away $\frac{1}{5} = \frac{3}{15}$ Left $\frac{2}{3} = \frac{10}{15}$

$$30 \text{ pies} = 15u - 10u - 3u$$

$$= 2u$$

$$2u = 30$$

$$1u = 30 \div 2$$

$$= 15$$

$$10u = 10 \times 15$$

$$= 150$$

- (b) Assume all the pies are packed into boxes of 12,
 $18 \times 12 = 216$

$$\text{Total difference} = 216 - 150$$

$$= 66$$

$$\text{Each box difference} = 12 - 6$$

$$= 6$$

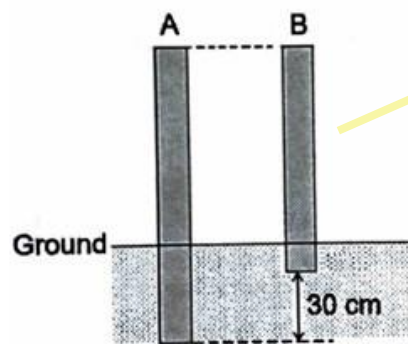
$$66 \div 6 = 11 \text{ boxes contained 6 pies}$$

Ans : (a) 150 pies (b) 11 boxes



PSLE 2022 Paper 1 Q15

Matthew pushes two sticks, A and B, straight into the ground until the length of each stick that is above the ground is the same.



$\frac{1}{3}$ of A and $\frac{1}{8}$ of B are in the ground.

The length of A in the ground is 30 cm longer than the length of B in the ground.

What is the total length of sticks A and B?

Infer sticks A and B have equal length above the ground.

Equal concept → Draw a model

Common multiples of 2 and 7 = 14

$$A \text{ (above ground)} = \frac{2}{3} = \frac{14}{21}$$

$$B \text{ (above ground)} = \frac{7}{8} = \frac{14}{16}$$

Total units (A) = 21u

Total units (B) = 16u

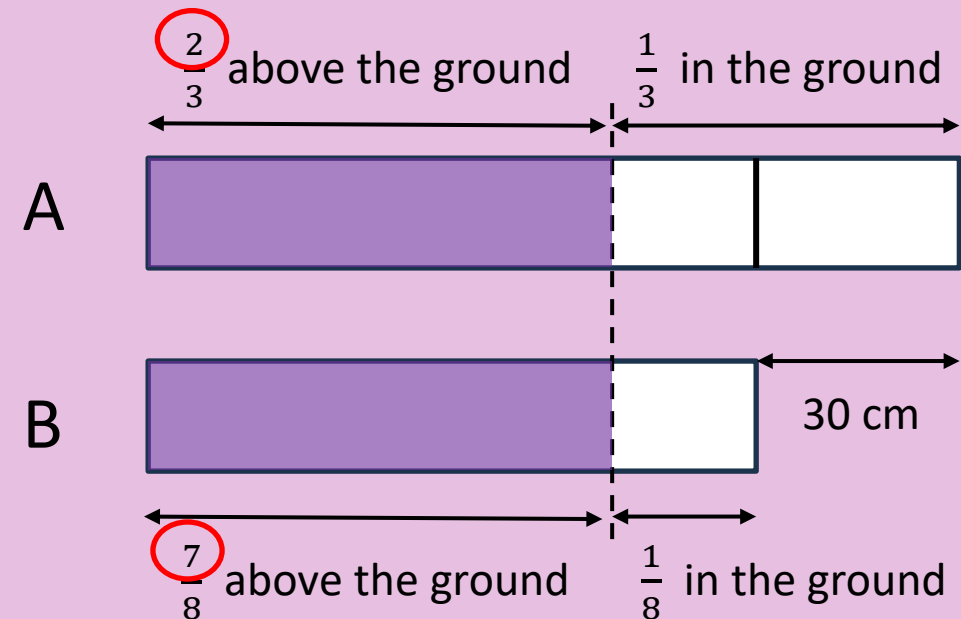
$$\begin{aligned} \text{Difference} &= 21u - 16u \\ &= 5u \end{aligned}$$

$$5u = 30$$

$$1u = 30 \div 5$$

$$= 6$$

$$\begin{aligned} \text{Total length (A + B)} &= 37 \times 6 \\ &= 222 \end{aligned}$$

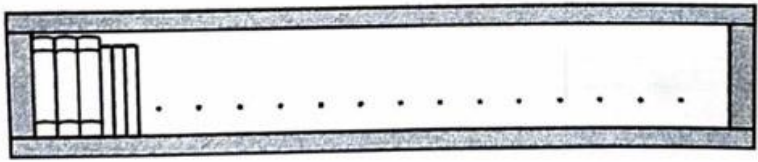


Ans : 222 cm



PSLE 2021 Paper 2 Q3

A shelf can be packed from end to end with 30 large books or 45 small books. Kevin already packed the shelf with 3 large books and 23 small books. At most, how many more large books can Kevin pack the shelf with?



Large books : Small books

$$30 : 45$$

$$= 2 : 3$$

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

$$= 15\frac{1}{3} : 23$$

Space already taken on shelf

$$= 15\frac{1}{3} + 3$$

$$= 18\frac{1}{3}$$

Number of more large books Kevin can

$$\text{pack the shelf with} = 30 - 18\frac{1}{3}$$

$$= 11\frac{2}{3}$$

$$\approx 11$$

Ans : 11 large books



PSLE 2023 Paper 1 Q24

The table shows the number of male and female members in a club in June. The number of female adults is not shown.

Age Group	Number of members in June	
	Male	Female
Youth (Below 20 years)	15	28
Adult (20 to 59 years)	15	?
Senior Citizen (60 years and above)	32	44

a) 50% of all the female members in the club were adults. How many female adults were there in the club?

Infer that all the female members are represented by 100%, so the other 50% of **the female members** are youths and senior citizens.

So,

Number of female adults = Number of female youths + Number of senior citizens

$$\begin{aligned}\text{Number of female adults} &= 28 + 44 \\ &= 72\end{aligned}$$

Ans: 72



PSLE 2023 Paper 1 Q24

The table shows the number of male and female members in a club in June. The number of female adults is not shown.

Age Group	Number of members in June	
	Male	Female
Youth (Below 20 years)	15	28
Adult (20 to 59 years)	15	?
Senior Citizen (60 years and above)	32	44

b) In July, some female adults left the club. There was no change in the number of members in the other 5 groups. Did the percentage of male members in the club increase, decrease or remain the same from June to July?

Infer the total number of all members is represented by 100%.

Infer that when the female adults left the club, the total number of female members decreased.

Based on the answer from part (a), there were 72 female adults at first.

Total number of males

$$= 15 + 15 + 32$$

$$= 62$$

Total number of members

$$= 144 + 62$$

$$= 206$$

Percentage of members that are males, at first

$$= \frac{62}{206} \times 100\%$$

$$\approx 30.1\%$$

Suppose 10 female members left:

Total number of members, after

$$= 206 - 10$$

$$= 196$$

Percentage of members that are males, after

$$= \frac{62}{196} \times 100\%$$

$$\approx 31.6\%$$

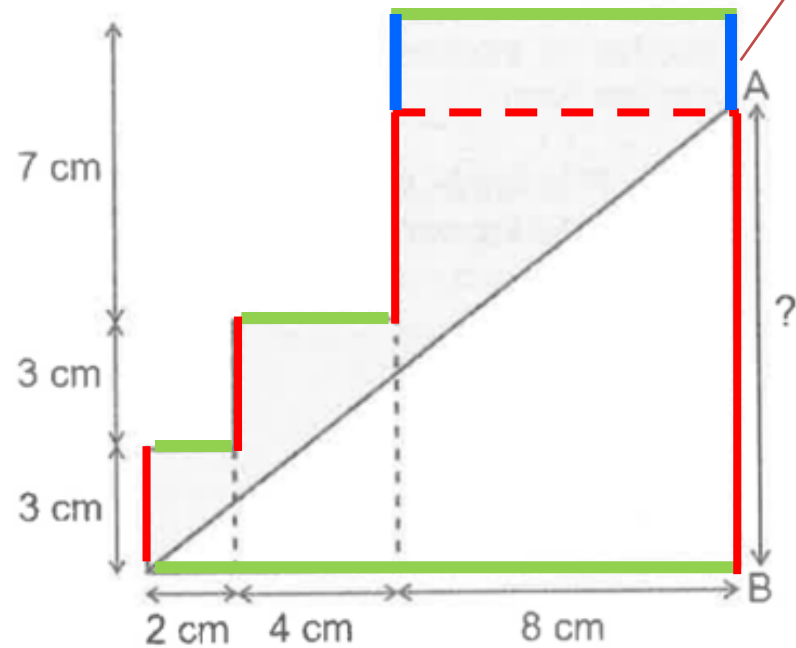
Ans: Increase



PSLE 2021 Paper 2 Q12

The figure is made up of three rectangles. A straight line drawn across the rectangles, divides the figure into two parts: shaded and unshaded.

a) The perimeter of the shaded part is 4 cm longer than the perimeter of the unshaded part. What is the length of AB?



Observe the diagram. Infer that there are some common lengths of the shaded and unshaded parts.

After comparing the common lengths of the shaded and unshaded parts, infer that the two **blue** sides add up to the difference of 4 cm.

$$\text{Length of one blue side} = 4 \div 2 = 2$$

$$\begin{aligned} \text{Length of AB} &= (7 + 3 + 3) - 2 \\ &= 11 \end{aligned}$$

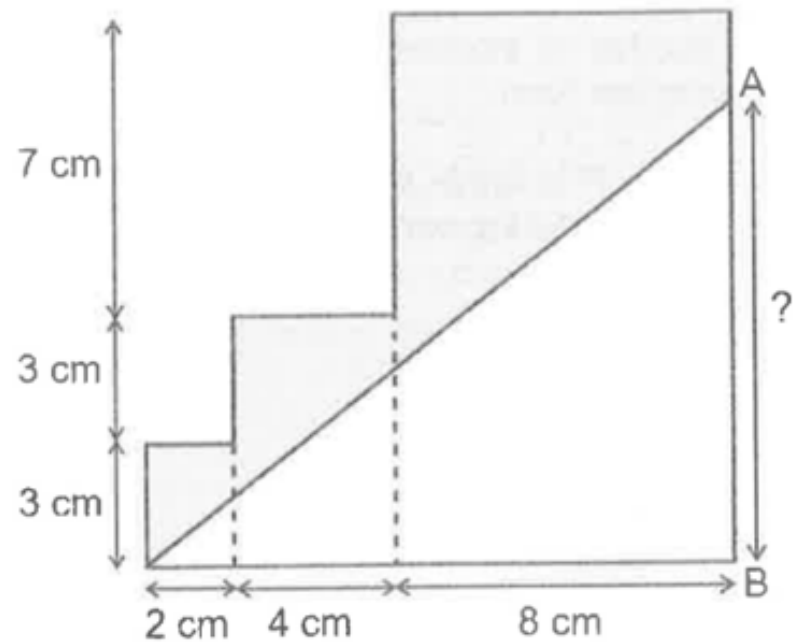
Ans: 11 cm



PSLE 2021 Paper 2 Q12

The figure is made up of three rectangles. A straight line drawn across the rectangles, divides the figure into two parts: shaded and unshaded.

b) What is the area of the shaded part?



Observe the diagram. Based on visualisation, infer that the area of the shaded part is obtained by subtracting the area of the unshaded triangle from the area of the three rectangles.

$$\begin{aligned}\text{Length of largest rectangle} &= 7 + 3 + 3 \\ &= 13\end{aligned}$$

$$\begin{aligned}\text{Length of medium rectangle} &= 3 + 3 \\ &= 6\end{aligned}$$

$$\begin{aligned}\text{Area of three rectangles} &= (3 \times 2) + (6 \times 4) + (13 \times 8) \\ &= 134\end{aligned}$$

$$\begin{aligned}\text{Area of unshaded triangle} &= \frac{1}{2} \times (2 + 4 + 8) \times 11 \\ &= 77\end{aligned}$$

$$\begin{aligned}\text{Area of shaded part} &= 134 - 77 \\ &= 57\end{aligned}$$

Ans: 57 cm²



PSLE 2023 Paper 2 Q16

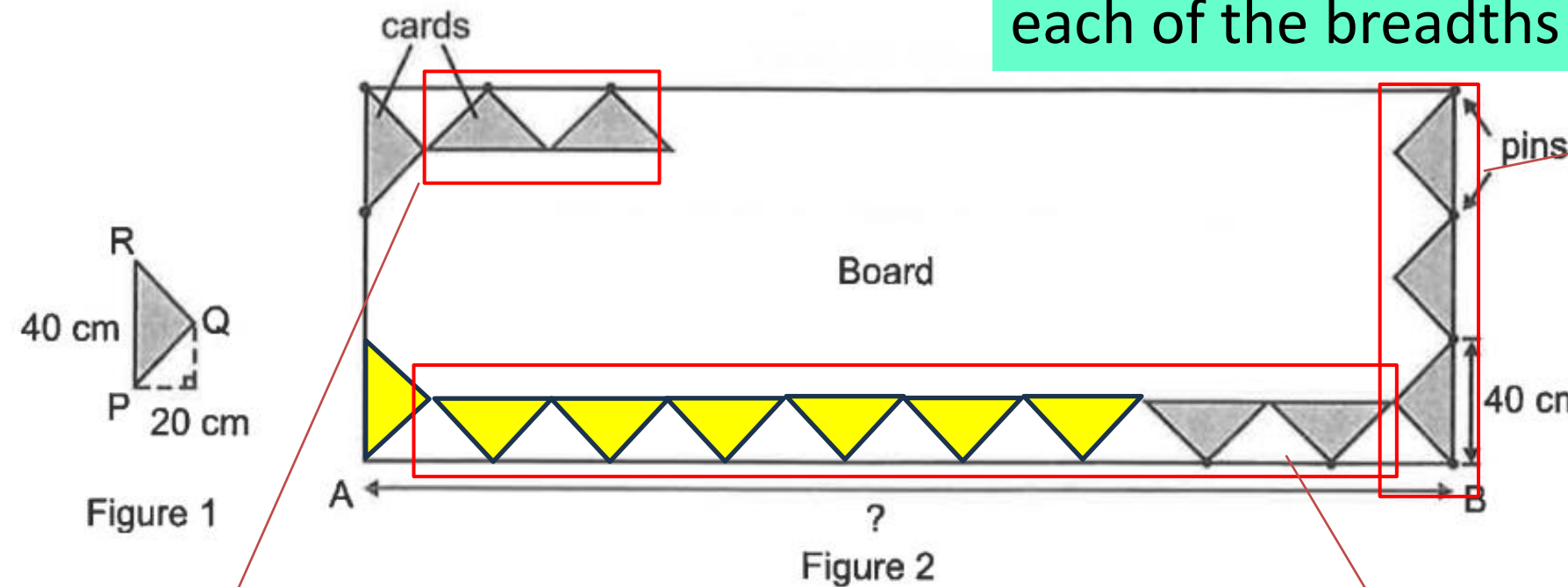
Figure 1 shows a triangular card PQR with $PQ = QR$. A number of such cards were arranged along the four sides of a rectangular board. Figure 2 shows part of the arrangement. A total of 24 pins were placed at an equal distance of 40 cm apart to hold the cards.

a) Find the length of AB.

Infer that the length of AB = length of the rectangle. Find the number of cards along the length.

Heuristics: Gaps and Differences

Infer that 3 pins can be used to hold 2 cards along the breadth, so 4 pins are needed for each of the breadths of the rectangle.



Number of remaining pins for two lengths of the rectangle
 $= 24 - 4 - 4$
 $= 16$

Infer that 1 pin is needed for each triangle along the lengths of the rectangle.

Number of pins used for one length = $16 \div 2$
 $= 8$

Infer that there are 8 cards along each length of the rectangle.

Length of AB = $(8 \times 40) + 20 + 20$
 $= 360$

Ans: 360 cm



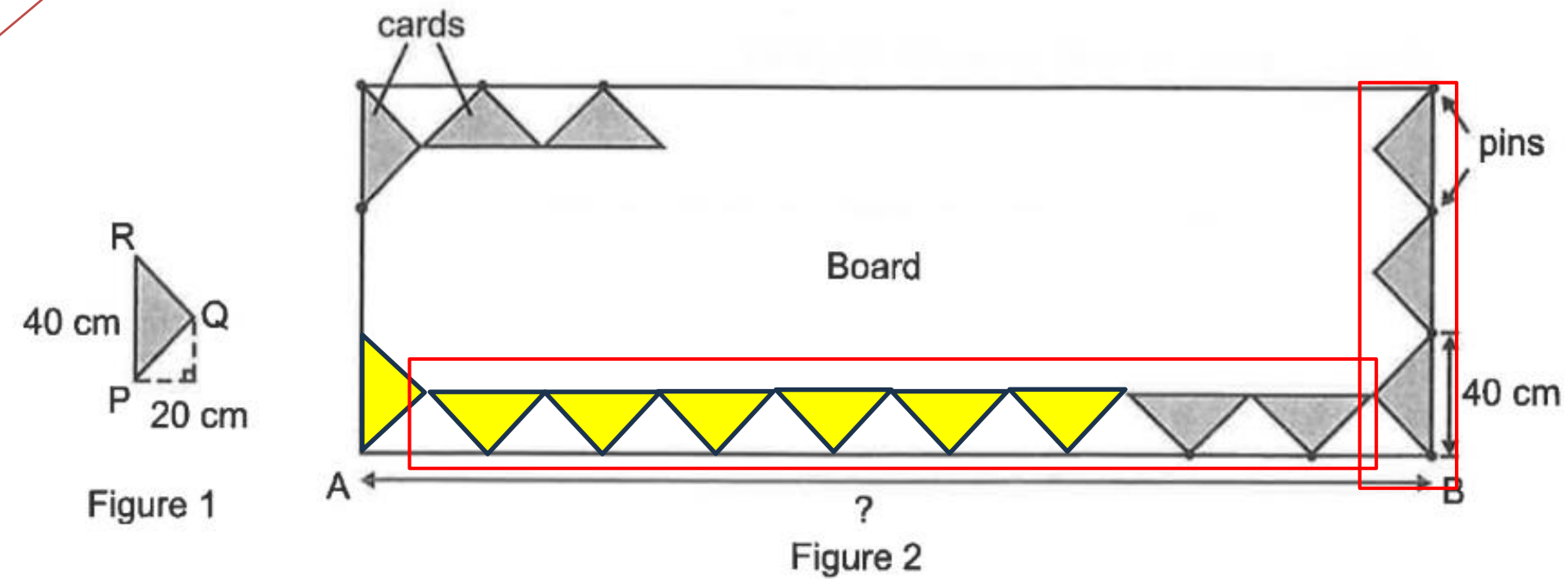
PSLE 2023 Paper 2 Q16

Figure 1 shows a triangular card PQR with $PQ = QR$. A number of such cards were arranged along the four sides of a rectangular board. Figure 2 shows part of the arrangement. A total of 24 pins were placed at an equal distance of 40 cm apart to hold the cards.

b) Find the total area of the cards used.

Heuristics: Gaps and Differences

Infer that the area of one card may be found using information from Figure 1.



Infer that the total number of cards used were placed along two lengths and two breadths of the rectangle.

$$\begin{aligned} \text{Total number of cards} &= 8 \times 2 + 3 \times 2 \\ &= 22 \end{aligned}$$

$$\begin{aligned} \text{Area of one card} &= \frac{1}{2} \times 40 \times 20 \\ &= 400 \end{aligned}$$

$$\begin{aligned} \text{Total area} &= 400 \times 22 \\ &= 8800 \end{aligned}$$

Ans: 8800 cm²



PSLE 2016 Paper 2 Q15



A total of 18 light bulbs are set up at an equal distance apart along three sides AB, BC and CD of a rectangular platform. The figure shows part of the set-up. The breadth of the platform is 260 cm. What is the length of the platform?

Infer that 1 length of the rectangular platform does not have light bulbs, so the 18 light bulbs only cover 1 length and 2 breadths.

Based on the diagram, 5 light bulbs cover the breadth of 260 cm. Infer that there are **4 gaps between 5 light bulbs** along the AB and CD. (Heuristics: Gaps and Differences)

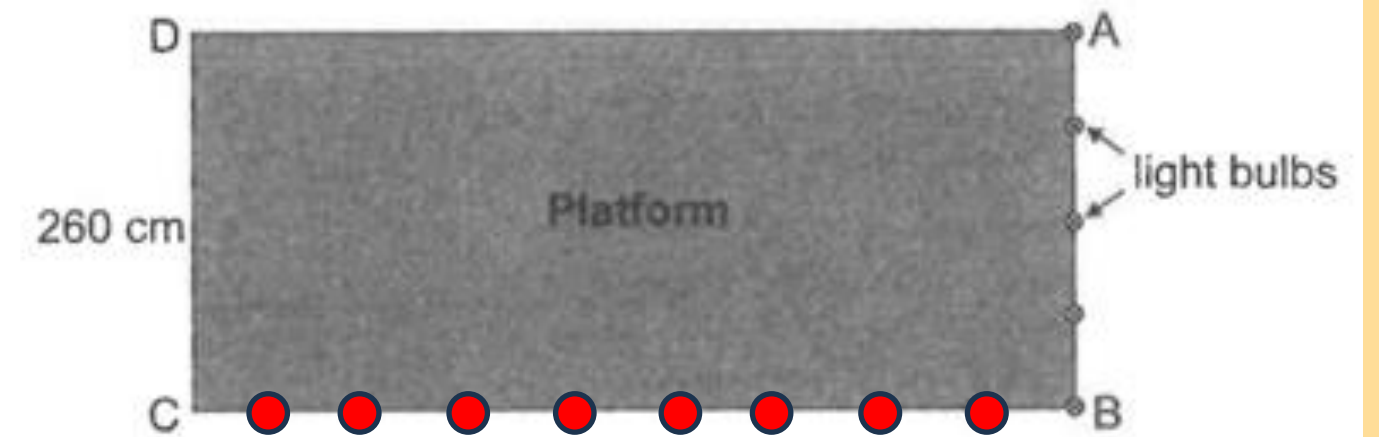
$$\begin{aligned}\text{So, the length of one gap} &= 260 \div 4 \\ &= 65\end{aligned}$$

$$\begin{aligned}\text{For AB and CD,} \\ \text{Number of light bulbs} &= 5 \times 2 \\ &= 10\end{aligned}$$

$$\begin{aligned}\text{Remaining light bulbs} &= 18 - 10 \\ &= 8\end{aligned}$$

$$\begin{aligned}\text{For BC,} \\ \text{Number of light bulbs} &= 8 + 1 + 1 \\ &= 10\end{aligned}$$

$$\begin{aligned}\text{Number of gaps along BC} &= 10 - 1 \\ &= 9\end{aligned}$$



$$\begin{aligned}\text{Length of platform} &= 9 \times 65 \\ &= 585\end{aligned}$$

Ans: 585 cm



PSLE 2020 Paper 1 Q13

Figure 1 shows a rectangular tile with a perimeter of 14 cm.

Figure 2 is formed using 5 such tiles.

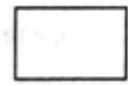


Figure 1

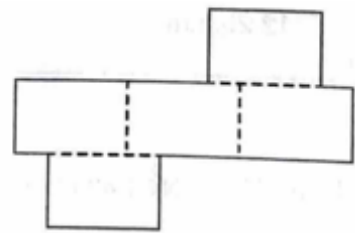
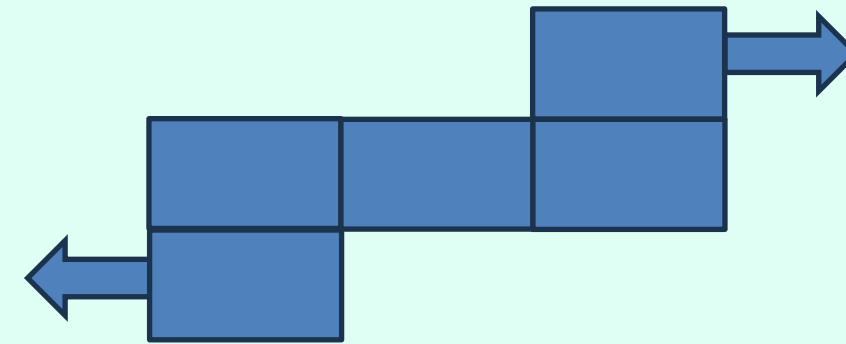
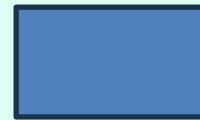


Figure 2

Find the perimeter of Figure 2.

Recall that the perimeter of a rectangle is the sum of 2 lengths and 2 breadths.



Visualisation: Shift the rectangles to find the total number of lengths and breadths that make up the outline of Figure 2.

$$2 \text{ lengths} + 2 \text{ breadths} = 14 \text{ cm}$$

$$\begin{aligned} 1 \text{ length} + 1 \text{ breadth} &= 14 \text{ cm} \div 2 \\ &= 7 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter of figure 2} &= 6 \text{ lengths} + 6 \text{ breadths} \\ &= 6 \times 7 \\ &= 42 \end{aligned}$$

(1) 42 cm

(2) 49 cm

(3) 56 cm

(4) 70 cm

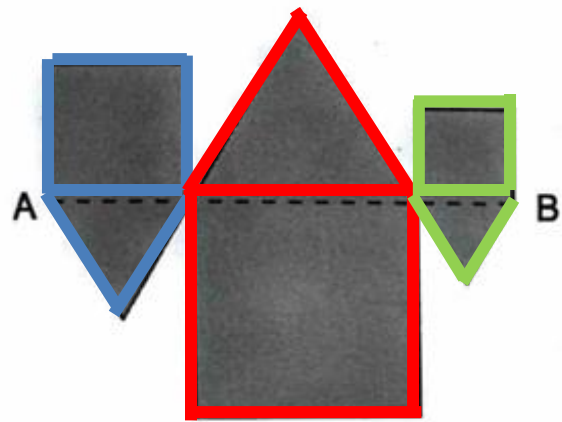
Ans: (1)



PSLE 2010 Paper 1 Q28

The shaded figure below is formed using 3 squares and 3 equilateral triangles.

The length of the straight line AB is 15 cm.



Find the perimeter of the shaded figure.

Recall that squares have 4 equal sides and equilateral triangles have 3 equal sides.

Infer that

Line AB = 1 "green" + 1 "red" + "1 blue"

Infer that

- Side of small square = Side of small triangle ("blue")
- Side of medium square = Side of medium triangle ("green")
- Side of large square = Side of large triangle ("red")

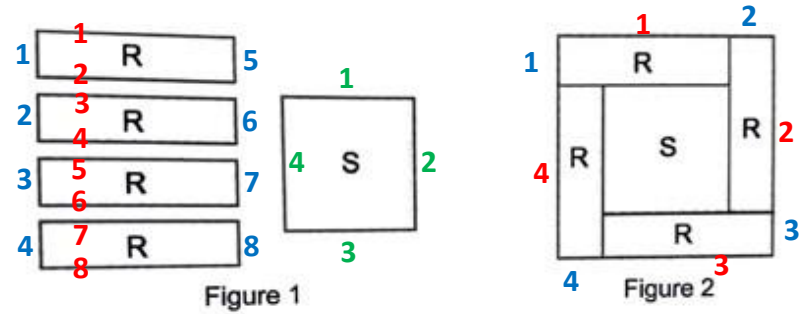
$$\begin{aligned}\text{Perimeter of shaded figure} &= 5 \text{ sets of blue, green and red sides} \\ &= 5 \times \text{Line AB} \\ &= 5 \times 15 \\ &= 75\end{aligned}$$

Ans: 75 cm



PSLE 2021 Paper 1 Q30

In Figure 1, the total perimeter of 4 rectangles R and square S is 144 cm. They are joined to form a large square in Figure 2 which has a perimeter of 56 cm.



Find the length of one side of square S.

From Figure 1,

There are 8 lengths of rectangle R, 8 breadths of rectangle R and 4 sides of square S.

From Figure 2,

4 lengths of R + 4 breadths of R = 56 cm
8 lengths of R + 8 breadths of R = 112 cm $\times 2$

By Elimination method

~~8 lengths of R + 8 breadths of R + 4 sides of square S = 144~~

~~8 lengths of R + 8 breadths of R = 112 cm~~

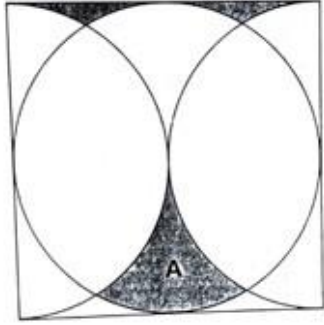
Length of 4 sides of square S = 144 cm - 112 cm
= 32 cm

Length of 1 side of square S = 32 cm \div 4
= 8 cm

Ans: 8 cm

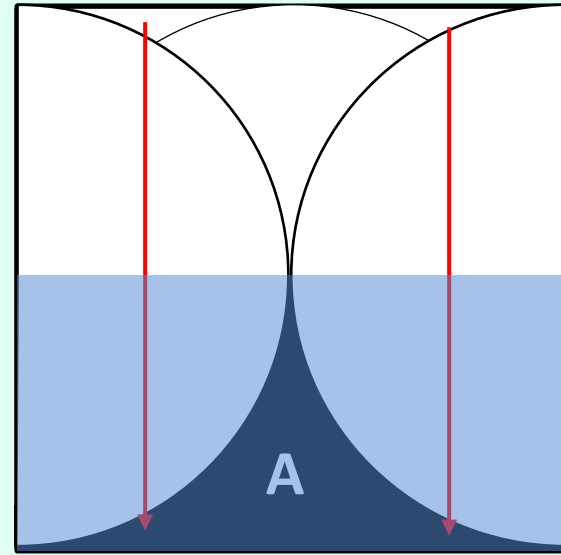
PSLE 2002 Paper 1

The figure shows a square of side 14 cm, two semi-circles and a circle.

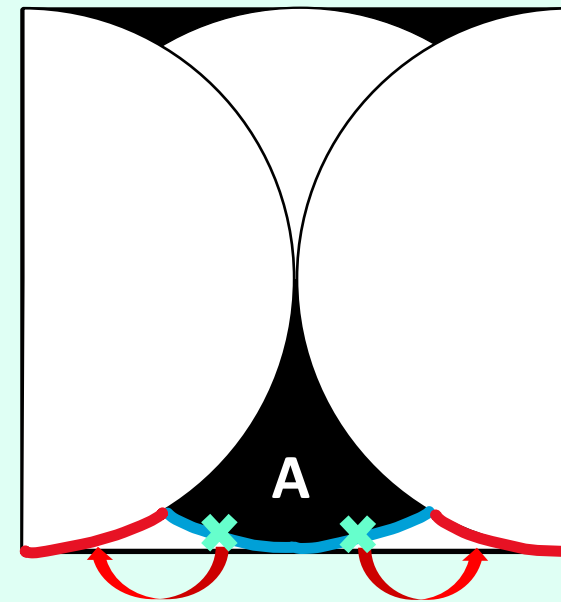


- (a) Find the area of the shaded portions.
(b) Find the perimeter of the shaded part labelled A.

(Take $\pi = \frac{22}{7}$)



(a) Area of shaded portions
= Area of half square – Area of 2 quarter circles
= $(14 \times 7) - (2 \times \frac{1}{4} \times \frac{22}{7} \times 7 \times 7)$
= $98 - 77$
= 21 cm^2



(b) Perimeter of shaded part A
= $2 \times \frac{1}{4} \times \frac{22}{7} \times 14$
= 22 cm

Ans : (a) 21 cm^2 (b) 22 cm





Partners in Education

Maths in play:

Provide opportunities for children to explore maths at home and in the environment

- Learn about shapes
- Discover space and develop metacognition through their five senses

Real-world math activities:

Using daily activities as problem-solving tasks for children to apply concepts learnt

- Cooking: units of measurements, divide food into equal portions, use of proportions when following recipes
- Organise spaces at home, packing (pattern awareness, ordering, understanding of sets, space and spatial awareness)



To achieve the 21st Century Competencies for Mathematics, we harness opportunities for students to make connections with heuristics strategies and problem solving. To do so, they need to practise the following:

CRITICAL AND INVENTIVE THINKING

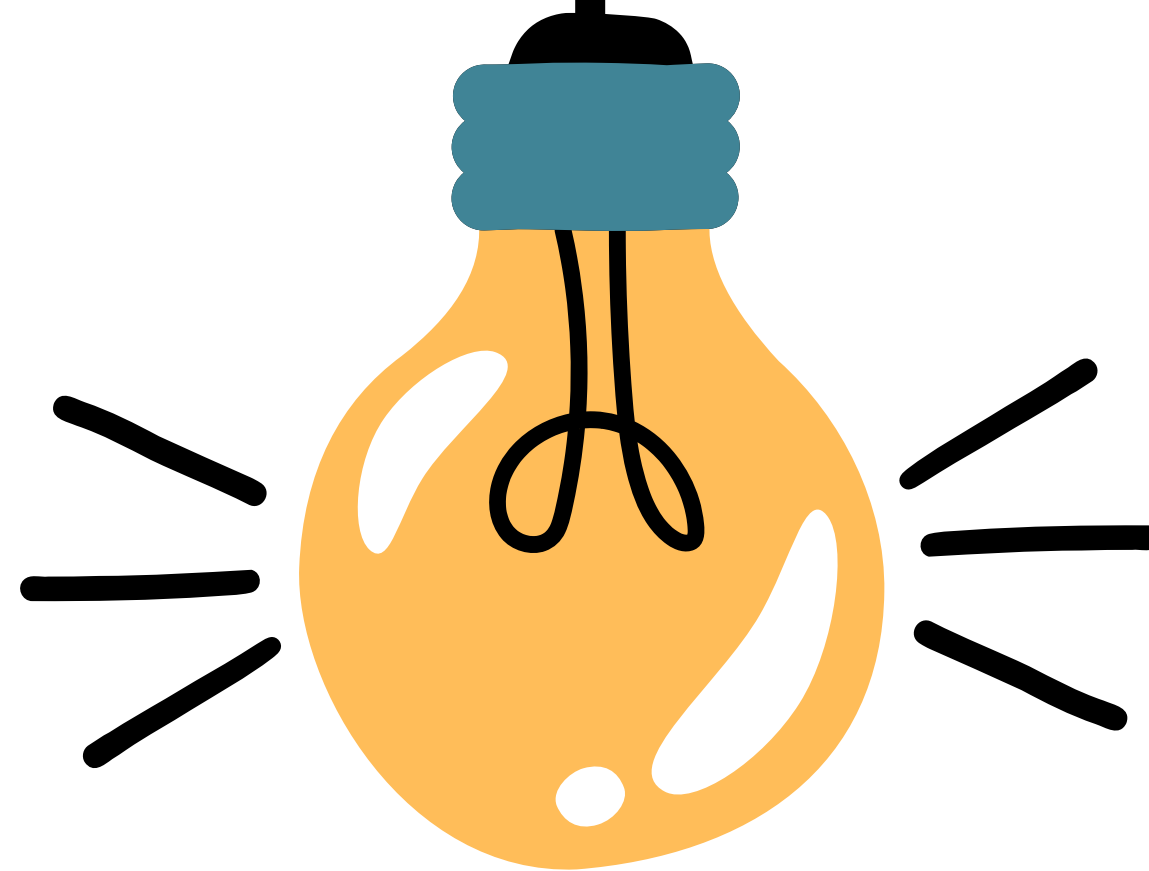
Use different strategies or formulate different mathematical models to solve open-ended or real-world problems.

ADAPTIVE THINKING

Use various approaches to solve **different but related** problems.



Q & A



**THANK
YOU**

