

# Practice Booklet

## MYP 1 · Year 7 Mathematics

### Unit 7.7 · Shape and Measure

Name: \_\_\_\_\_

|                      |                                                    |
|----------------------|----------------------------------------------------|
| <b>7.7.1 · 7.7.2</b> | Choosing units · Converting units · Questions 1–13 |
| <b>7.7.3</b>         | Perimeter · Questions 14–26                        |
| <b>7.7.4</b>         | Area · Questions 27–39                             |
| <b>7.7.5</b>         | Compound shapes · Questions 40–52                  |
| <b>Homework</b>      | Homework page and checking record                  |
| <b>Answers</b>       | For checking and correcting in green pen           |



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## Choosing your level

Every part of the unit has four levels. Start where you feel comfortable and move between them freely. Most questions ask you to explain as well as answer, because being able to say *why* is what makes a method stick.

### Learning

Small numbers, with counters or a diagram beside you.

### Practising

The standard question, with your reasoning written out.

### Challenging

Working backwards, and finding what is wrong with someone else's thinking.

### Mastery

Explaining why a rule must be true, and testing it on new cases.

## Working on your homework

### Pens and setting out

- Answers in blue or black non-erasable pen, or in pencil.
- Colour and highlighters are for annotating your work and showing the steps of a method.
- Never erase a mistake. Rework it underneath so you can see what changed.

**Green pen is for checking.** When you finish, use the answers at the back to check your work.

- **Got it wrong?** Circle the question number, then make your correction and write your error analysis in green pen.
- **Still can't work out how to solve it?** Put a star ★ next to the question number, so we know to go over it in class.

### Each sheet

- Your name goes on every sheet, because they are handed in one at a time.
- Each question is worth up to 3 marks. If a question has parts (a, b, c...), each part is marked out of 3. At the end of each level, write your score out of the total for that level.
- Questions are numbered 1, 2, 3... all the way through the booklet, so we can say exactly which ones to do.
- If you are stuck after trying, ask for help. Showing me what you tried is a good start.

## 7.7.1 Choosing units · 7.7.2 Converting units

LEARNING · PRACTISING

Name: \_\_\_\_\_

### Key vocabulary

| Word           | Meaning                                     | Example         |
|----------------|---------------------------------------------|-----------------|
| <b>unit</b>    | a standard amount used to measure           | cm, kg, litre   |
| <b>convert</b> | change the unit without changing the amount | 1 m = 100 cm    |
| <b>metric</b>  | units based on powers of 10                 | mm, cm, m, km   |
| <b>area</b>    | the space inside a shape, in square units   | cm <sup>2</sup> |

The value does not change but how it is written does: 1 m = 100 cm.

### ● Learning

- 1 Choose the best unit (mm, cm, m or km): a) length of a pencil b) distance between two towns c) thickness of a coin

- 2 Choose the best unit (g, kg or tonne): a) a bag of sugar b) a lorry c) a pin

- 3 Complete: a) 100 cm = \_\_\_\_ m b) 3 m = \_\_\_\_ cm c) 2 kg = \_\_\_\_ g

- 4 Complete: a) 1 litre = \_\_\_\_ ml b) 10 mm = \_\_\_\_ cm

Learning score \_\_\_\_\_ / 33

### ● Practising

- 5 Convert: a) 4.5 m to cm b) 3200 m to km c) 75 mm to cm

- 6 Convert: a) 2.4 kg to g b) 850 g to kg c) 3.2 tonnes to kg

- 7 Convert: a) 3 litres to ml b) 450 ml to litres c) 2.5 litres to cl

- 8 Put in order, smallest first: 0.8 m, 75 cm, 900 mm

Practising score \_\_\_\_\_ / 30

Parent / guardian signature: \_\_\_\_\_

## 7.7.1 Choosing units · 7.7.2 Converting units

CHALLENGING · MASTERY

Name: \_\_\_\_\_

### ● Challenging

- 9 A square is 100 cm by 100 cm. What is its area in  $\text{cm}^2$ , and what is  $1 \text{ m}^2$  in  $\text{cm}^2$ ?

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- 10 A tank holds 2.5 litres. How many 250 ml glasses can be filled from it?

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.....

- 11 **Find and describe the mistake.** Sam says that  $3 \text{ m}^2$  is  $300 \text{ cm}^2$ , because  $1 \text{ m} = 100 \text{ cm}$

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Challenging score \_\_\_\_\_ / 9

### ● Mastery

- 12 Why is  $1 \text{ m}^2$  a much bigger number of  $\text{cm}^2$  than 1 m is of cm? Use a diagram or words

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- 13 Estimate, then pick a sensible unit: the mass of a Year 7 student, the volume of a cup, the length of your classroom

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Mastery score \_\_\_\_\_ / 6

Parent / guardian signature: \_\_\_\_\_



## 7.7.3 Perimeter

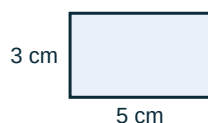
Name: \_\_\_\_\_

### Key vocabulary

| Word               | Meaning                                                 | Example                 |
|--------------------|---------------------------------------------------------|-------------------------|
| <b>perimeter</b>   | the distance all the way round a shape                  | $5 + 3 + 5 + 3 = 16$ cm |
| <b>rectangle</b>   | a shape with four right angles and opposite sides equal | 5 cm by 3 cm            |
| <b>isosceles</b>   | a triangle with two equal sides                         | 7.5 cm, 7.5 cm, 4 cm    |
| <b>equilateral</b> | a triangle with three equal sides                       | 9 cm, 9 cm, 9 cm        |

### ● Learning

- 14 Find the perimeter of the rectangle



- 15 Find the perimeter of a square with side 6 m

- 16 Find the perimeter of a triangle with sides 4 cm, 5 cm and 6 cm

- 17 A square has a perimeter of 20 cm. How long is each side?

Learning score \_\_\_\_\_ / 12

### ● Practising

- 18 Find the perimeter of a rectangle 12.5 cm by 4.2 cm

- 19 An isosceles triangle has two sides of 7.5 cm and a base of 4 cm. Find its perimeter

- 20 A rectangle has a perimeter of 30 cm and a length of 9 cm. Find its width

- 21 Find the perimeter of a rectangle 2.4 m by 85 cm. Give your answer in metres

Practising score \_\_\_\_\_ / 12

Parent / guardian signature: \_\_\_\_\_

Name: \_\_\_\_\_

## ● Challenging

- 22** An equilateral triangle has a perimeter of 27 cm. An isosceles triangle has a perimeter of 30 cm and a base of 8 cm. Find the side of the first triangle and the two equal sides of the second

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- 23** A rectangle has a perimeter of 24 cm. List every rectangle with whole-number sides

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- 24** **Find and describe the mistake.** Ivy finds the perimeter of a 6 cm by 4 cm rectangle as  $6 \times 4 = 24$  cm

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Challenging score \_\_\_\_\_ / 9

## ● Mastery

- 25** Double the side of a square. What happens to its perimeter? Test with sides 3 and 6 and explain

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- 26** A rectangle has sides  $x$  and  $x + 3$ . Write an expression for its perimeter

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Mastery score \_\_\_\_\_ / 6

Parent / guardian signature: \_\_\_\_\_

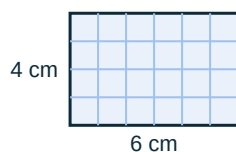
Name: \_\_\_\_\_

## Key vocabulary

| Word            | Meaning                                             | Example                 |
|-----------------|-----------------------------------------------------|-------------------------|
| area            | the space inside a shape, in square units           | $24 \text{ cm}^2$       |
| base and height | the base and the height at right angles to it       | triangle: 6 cm and 4 cm |
| parallelogram   | a four-sided shape with two pairs of parallel sides | base 8 cm, height 5 cm  |
| trapezium       | a four-sided shape with one pair of parallel sides  | sides 6 cm and 10 cm    |

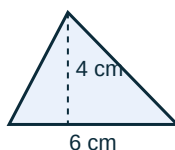
## Learning

27 Find the area of the rectangle. The grid shows 1 cm squares



28 Find the area of a square with side 5 m

29 Find the area of the triangle



30 What do the units  $\text{cm}^2$  tell you about area?

Learning score \_\_\_\_\_ / 12

## Practising

31 Find the area of a triangle with base 10 cm and height 7 cm

32 Find the area of a parallelogram with base 8 cm and perpendicular height 5 cm

33 Find the area of a trapezium with parallel sides 6 cm and 10 cm and height 4 cm

34 A rectangle has an area of  $48 \text{ cm}^2$  and a width of 6 cm. Find its length

Practising score \_\_\_\_\_ / 12

Parent / guardian signature: \_\_\_\_\_

Name: \_\_\_\_\_

## ● Challenging

**35** A triangle has an area of  $30 \text{ cm}^2$  and a base of 12 cm. Find its height

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.....

**36** A trapezium has parallel sides of 5 m and 9 m and an area of  $56 \text{ m}^2$ . Find its height

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.....

**37** **Find and describe the mistake.** Dev finds the area of a triangle with base 8 cm and height 6 cm as  $8 \times 6 = 48 \text{ cm}^2$

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Challenging score \_\_\_\_\_ / 9

## ● Mastery

**38** Explain why the area of a parallelogram is base  $\times$  perpendicular height. Use a rectangle in your answer

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**39** A triangle and a rectangle have the same base of 8 cm and the same area. How do their heights compare?

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Mastery score \_\_\_\_\_ / 6

Parent / guardian signature: \_\_\_\_\_

## 7.7.5 Compound shapes

LEARNING · PRACTISING

Name: \_\_\_\_\_

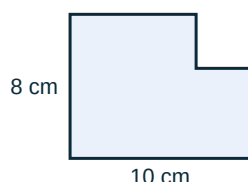
### Key vocabulary

| Word           | Meaning                                | Example            |
|----------------|----------------------------------------|--------------------|
| compound shape | a shape made by joining simpler shapes | an L-shape         |
| rectilinear    | a shape with only right angles         | an L-shape         |
| perimeter      | the distance all the way round         | 36 cm              |
| area           | the space inside, in square units      | 71 cm <sup>2</sup> |

### ● Learning

- 40 An L-shape is made by joining a 5 cm by 3 cm rectangle and a 2 cm by 2 cm rectangle. Find its area

- 41 A 10 cm by 8 cm rectangle has a 3 cm by 3 cm square cut out of one corner. Find the area of what is left



- 42 Find the perimeter of the same shape: a 10 cm by 8 cm rectangle with a 3 cm by 3 cm square cut out of one corner

- 43 Draw an L-shape and split it into two rectangles

Learning score \_\_\_\_\_ / 12

### ● Practising

- 44 A shape is a 12 cm by 9 cm rectangle with a 5 cm by 4 cm rectangle cut out of a corner. Find its area

- 45 Find the perimeter of the shape in the last question

- 46 An L-shaped room is made of a 6 m by 4 m part and a 3 m by 2 m part. Find its area. Carpet costs CHF 20 per m<sup>2</sup>. How much will it cost to carpet the room?

- 47 The top edge of a compound shape is 14 cm long. It is made of a 9 cm part and a part x cm wide. Find x

Practising score \_\_\_\_\_ / 12

Parent / guardian signature: \_\_\_\_\_

## 7.7.5 Compound shapes

CHALLENGING · MASTERY

Name: \_\_\_\_\_

### ● Challenging

- 48** A garden is a 15 m by 10 m rectangle with a pond of 4 m by 3 m inside it. Find the area of grass

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- 49** A farmer has 40 m of fence. Try rectangles with whole-number sides. Which gives the largest area?

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- 50** **Find and describe the mistake.** Hal finds the area of a 12 cm by 9 cm rectangle with a 5 cm by 4 cm rectangle cut out of a corner as  $12 \times 9 = 108 \text{ cm}^2$

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Challenging score \_\_\_\_\_ / 9

### ● Mastery

- 51** Explain why, for a fixed perimeter, a square gives the largest area among rectangles

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- 52** Design an L-shape with an area of  $50 \text{ cm}^2$ . Give its measurements

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Mastery score \_\_\_\_\_ / 6

Parent / guardian signature: \_\_\_\_\_

Name: \_\_\_\_\_

Your teacher will tell you which sheet and questions to do. Choose your level, set out your work in pen or pencil, then check it with the answers at the back using a **green pen**: circle wrong question numbers, and star ★ any you still cannot solve.

| Sheet                                         | Questions | Which ones I did | Checked in green ✓ | Teacher |
|-----------------------------------------------|-----------|------------------|--------------------|---------|
| 7.7.1 Choosing units · 7.7.2 Converting units | Q1–13     |                  |                    |         |
| 7.7.3 Perimeter                               | Q14–26    |                  |                    |         |
| 7.7.4 Area                                    | Q27–39    |                  |                    |         |
| 7.7.5 Compound shapes                         | Q40–52    |                  |                    |         |

Error analysis

Circle the number of any question you got wrong. Star ★ it if you still cannot solve it after correcting. Then write the questions you need to rework, and what you will do differently:

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One thing I understand better now

.....

.....

Score: \_\_\_\_\_

Parent / guardian signature: \_\_\_\_\_

## 7.7.1 Choosing units · 7.7.2 Converting units

|             |    |                                                                                                                                  |
|-------------|----|----------------------------------------------------------------------------------------------------------------------------------|
| Learning    | 1  | a) cm b) km c) mm                                                                                                                |
|             | 2  | a) kg b) tonne c) g                                                                                                              |
|             | 3  | a) 1 m b) 300 cm c) 2000 g                                                                                                       |
|             | 4  | a) 1000 ml b) 1 cm                                                                                                               |
| Practising  | 5  | a) 450 cm b) 3.2 km c) 7.5 cm                                                                                                    |
|             | 6  | a) 2400 g b) 0.85 kg c) 3200 kg                                                                                                  |
|             | 7  | a) 3000 ml b) 0.45 litres c) 250 cl                                                                                              |
|             | 8  | Write all in cm: 80 cm, 75 cm, 90 cm. Order: 75 cm, 0.8 m, 900 mm                                                                |
| Challenging | 9  | $100 \times 100 = 10\,000\text{ cm}^2$ , so $1\text{ m}^2 = 10\,000\text{ cm}^2$                                                 |
|             | 10 | 2.5 litres = 2500 ml. $2500 \div 250 = 10$ glasses                                                                               |
|             | 11 | That works for length, not area. $1\text{ m}^2 = 100 \times 100 = 10\,000\text{ cm}^2$ , so $3\text{ m}^2 = 30\,000\text{ cm}^2$ |
| Mastery     | 12 | Area has two dimensions, so the 100 is used twice ( $100 \times 100$ ). Length only uses it once                                 |
|             | 13 | Open answer, such as about 45 kg, about 250 ml, about 9 m                                                                        |

## 7.7.3 Perimeter

|             |    |                                                                                                        |
|-------------|----|--------------------------------------------------------------------------------------------------------|
| Learning    | 14 | $5 + 3 + 5 + 3 = 16\text{ cm}$                                                                         |
|             | 15 | $4 \times 6 = 24\text{ m}$                                                                             |
|             | 16 | $4 + 5 + 6 = 15\text{ cm}$                                                                             |
|             | 17 | $20 \div 4 = 5\text{ cm}$                                                                              |
| Practising  | 18 | $2 \times (12.5 + 4.2) = 33.4\text{ cm}$                                                               |
|             | 19 | $7.5 + 7.5 + 4 = 19\text{ cm}$                                                                         |
|             | 20 | $30 \div 2 = 15$ , and $15 - 9 = 6\text{ cm}$                                                          |
|             | 21 | $85\text{ cm} = 0.85\text{ m}$ . $2 \times (2.4 + 0.85) = 6.5\text{ m}$                                |
| Challenging | 22 | First: $27 \div 3 = 9\text{ cm}$ . Second: $(30 - 8) \div 2 = 11\text{ cm}$ each                       |
|             | 23 | 1 by 11, 2 by 10, 3 by 9, 4 by 8, 5 by 7, 6 by 6                                                       |
|             | 24 | $6 \times 4$ is the area. The perimeter is the distance round the edge: $6 + 4 + 6 + 4 = 20\text{ cm}$ |
| Mastery     | 25 | It doubles: 12 becomes 24. Each of the four sides is twice as long                                     |
|             | 26 | $2x + 2(x + 3) = 4x + 6$                                                                               |

## 7.7.4 Area

|             |    |                                                                                                                              |
|-------------|----|------------------------------------------------------------------------------------------------------------------------------|
| Learning    | 27 | $6 \times 4 = 24\text{ cm}^2$                                                                                                |
|             | 28 | $5 \times 5 = 25\text{ m}^2$                                                                                                 |
|             | 29 | $\frac{1}{2} \times 6 \times 4 = 12\text{ cm}^2$                                                                             |
|             | 30 | The number of squares, each 1 cm by 1 cm, that fit inside the shape                                                          |
| Practising  | 31 | $\frac{1}{2} \times 10 \times 7 = 35\text{ cm}^2$                                                                            |
|             | 32 | $8 \times 5 = 40\text{ cm}^2$                                                                                                |
|             | 33 | $\frac{1}{2} \times (6 + 10) \times 4 = 32\text{ cm}^2$                                                                      |
|             | 34 | $48 \div 6 = 8\text{ cm}$                                                                                                    |
| Challenging | 35 | $\frac{1}{2} \times 12 \times h = 30$ , so $6h = 30$ and $h = 5\text{ cm}$                                                   |
|             | 36 | $\frac{1}{2} \times 14 \times h = 56$ , so $7h = 56$ and $h = 8\text{ m}$                                                    |
|             | 37 | He forgot to halve. The area of a triangle is $\frac{1}{2} \times \text{base} \times \text{height} = 24\text{ cm}^2$         |
| Mastery     | 38 | Cut a triangle off one end and move it to the other end. The parallelogram becomes a rectangle with the same base and height |
|             | 39 | The rectangle is $8 \times h$ and the triangle is $\frac{1}{2} \times 8 \times h$ , so the triangle must be twice as tall    |

### 7.7.5 Compound shapes

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|             |    |                                                                                                                                                      |
|-------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Learning    | 40 | $5 \times 3 = 15$ and $2 \times 2 = 4$ , so $15 + 4 = 19 \text{ cm}^2$                                                                               |
|             | 41 | $80 - 9 = 71 \text{ cm}^2$                                                                                                                           |
|             | 42 | $2 \times (10 + 8) = 36 \text{ cm}$ . Cutting a square out of a corner does not change the perimeter                                                 |
|             | 43 | Open answer: a line splits the L into two rectangles                                                                                                 |
| Practising  | 44 | $12 \times 9 - 5 \times 4 = 108 - 20 = 88 \text{ cm}^2$                                                                                              |
|             | 45 | $2 \times (12 + 9) = 42 \text{ cm}$ . The perimeter is the same as the full rectangle                                                                |
|             | 46 | Area $24 + 6 = 30 \text{ m}^2$ . Cost $30 \times 20 = \text{CHF } 600$                                                                               |
|             | 47 | $x = 14 - 9 = 5 \text{ cm}$                                                                                                                          |
| Challenging | 48 | $150 - 12 = 138 \text{ m}^2$                                                                                                                         |
|             | 49 | A 10 m by 10 m square gives $100 \text{ m}^2$ . For example 5 by 15 gives $75 \text{ m}^2$ and 8 by 12 gives $96 \text{ m}^2$                        |
|             | 50 | That is the area of the whole rectangle. He must take off the cut-out part: $108 - 20 = 88 \text{ cm}^2$                                             |
|             | 51 | The more equal the sides, the bigger the product. For a perimeter of 40: $10 \times 10 = 100$ is more than $9 \times 11 = 99$ and $8 \times 12 = 96$ |
| Mastery     | 52 | Open answer. For example an 8 cm by 5 cm rectangle with a 5 cm by 2 cm rectangle joined on ( $40 + 10 = 50$ )                                        |