Assessing pupils' progress in mathematics at Key Stage 3

Year 7 assessment package
Number

Examples of pupils' work

Year 7 (Spring)

Number

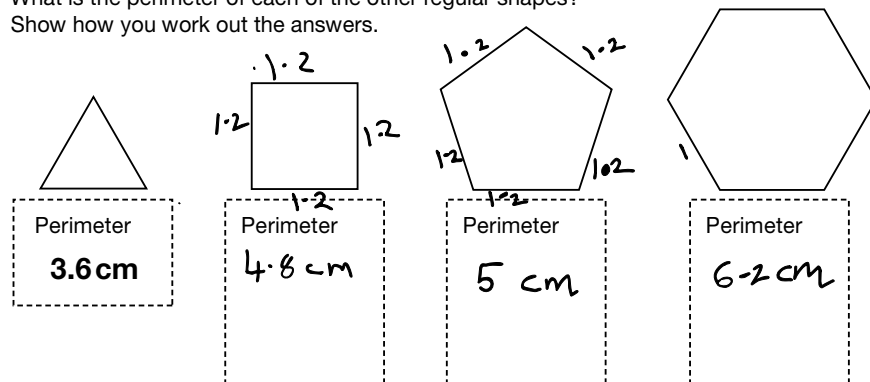# LESSON 1: *Shape expectations*

Perimeter sheet 1
Level 3

The perimeter of the equilateral **triangle** is **3.6 cm**.
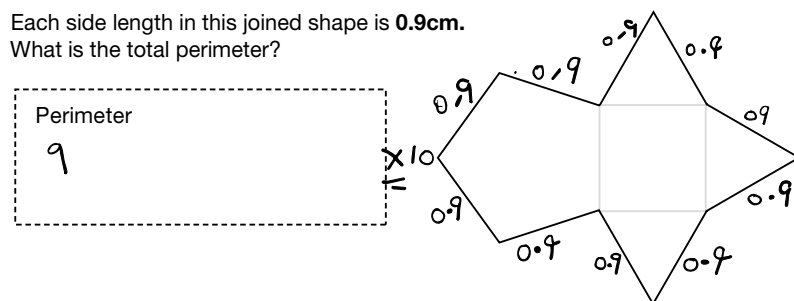The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

Perimeter
3.6 cm

Perimeter
4.8 cm

Perimeter
5 cm

Perimeter
6·2 cm

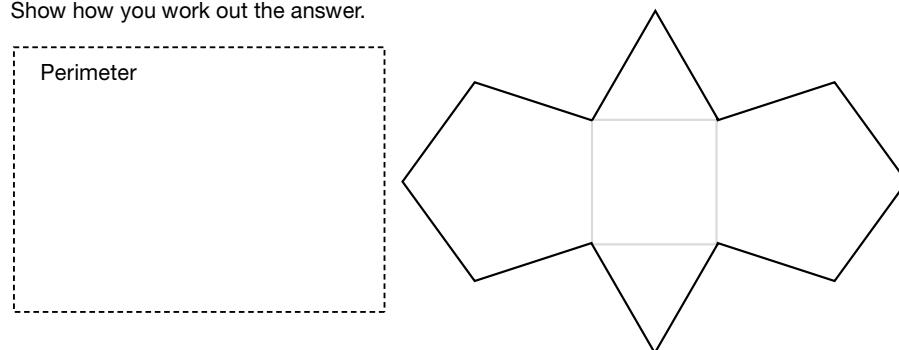Each side length in this joined shape is **0.9cm.**
What is the total perimeter?

Perimeter
9

×10 = 1

Each side length in this bigger joined shape is **1.5cm**.
What is the total perimeter?
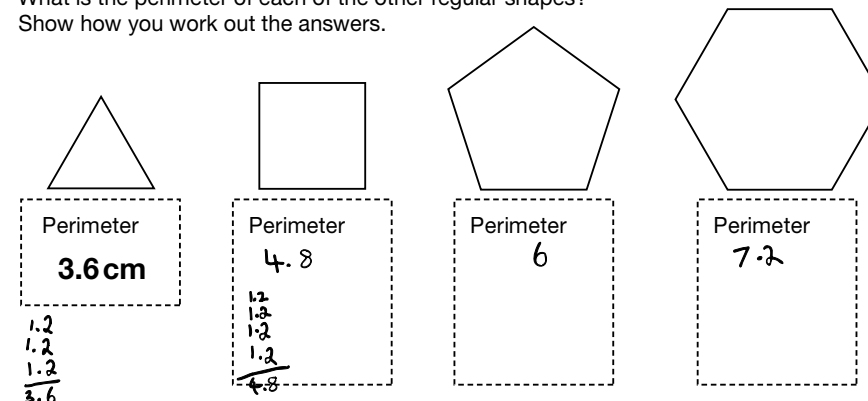Show how you work out the answer.

Perimeter

The perimeter of the equilateral **triangle** is **3.6 cm**.
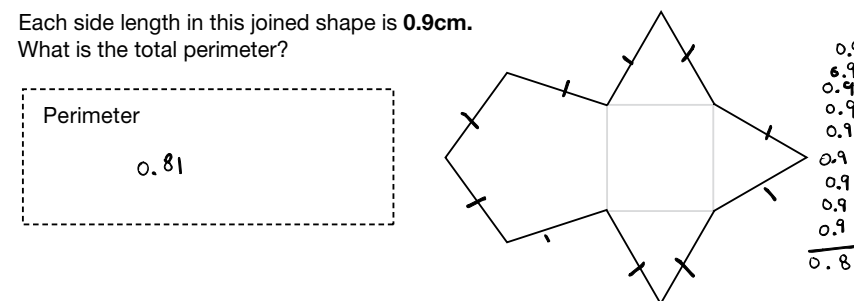The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

Perimeter
3.6 cm

Perimeter
4.8

1.2
1.2
1.2
____
3.6

Perimeter
6

1.2
1.2
1.2
1.2
____
4.8

Perimeter
7.2

Each side length in this joined shape is **0.9cm.**
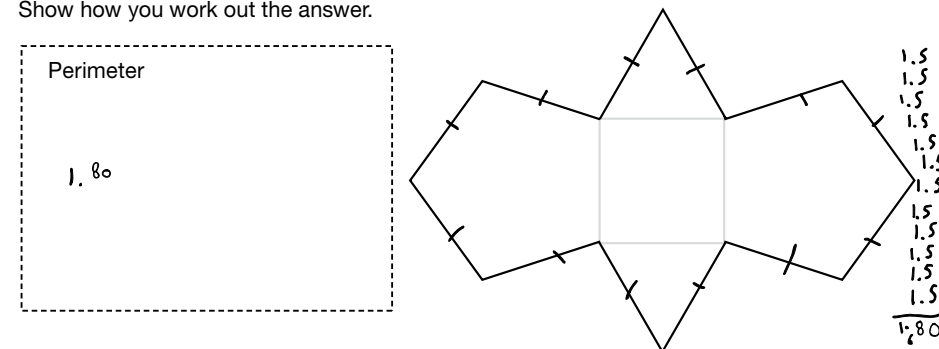What is the total perimeter?

Perimeter
0.81

0.9
0.9
0.9
0.9
0.9
0.9
0.9
0.9
0.9
____
0.81

Each side length in this bigger joined shape is **1.5cm**.
What is the total perimeter?
Show how you work out the answer.

Perimeter
1.80

1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
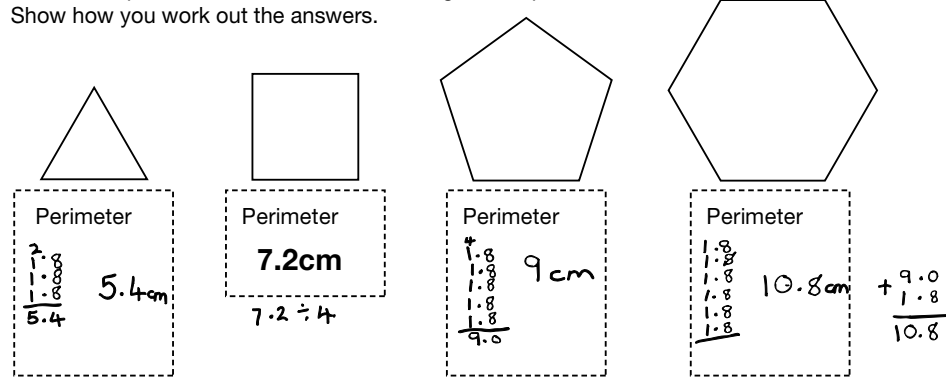____
1.80

Perimeter sheet 2
Level 3

The perimeter of the **square** is **7.2 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

(handwritten: 1.8, 1.8, 1.8, 1.8 around shapes; 1.8×4; 1.8 repeated beside hexagon; 11.0 5)

Perimeter	Perimeter	Perimeter	Perimeter
5.7	**7.2 cm**	9.2	11.0

(handwritten beside triangle: 1.8, 1.8, 1.8, 25/7)

Each side length in this joined shape is **1.5 cm**.
What is the total perimeter?
Show how you work out the answer.

(handwritten column: 1.5, 1.5, 1.5, 1.5, 1.5, 1.5, 1.5, 1.5, 1.5, 1.5, 1.5, 1.5 and 18)

Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the shapes is **13.5 cm**.
How many sides does the group of shapes have? Show how you work out the answer.

No shapes in the group are joined.
Could the shapes **all** be **squares**? Explain your answer.
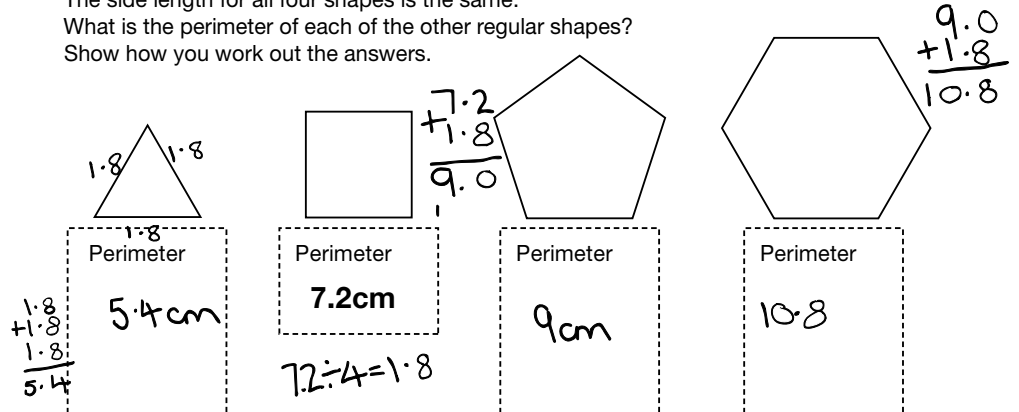

Perimeter sheet 2
Level 4

Perimeter	Perimeter	Perimeter	Perimeter
5.4 cm	**7.2 cm**	7.6 cm	10.8 cm

(handwritten: 4) 7.³2 = 1.8)

$$1.8 + 1.8 + 1.8 = 5.4$$

(handwritten: 1.8 + 1.8 = 3.6, ×, 3.6 + 5.4 = 7.6)

(handwritten: 5.4 + 5.4 = 10.8)

(handwritten: 9.0, 9.0 = 18.0; 1.5 + 1.5 + 1.5 + 1.5 = 4.5; 4.5, 4.5 = 9.0; ×)

18.0 cm

(handwritten: NO,)

Perimeter sheet 2
Level 4

The perimeter of the **square** is **7.2 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

1.8

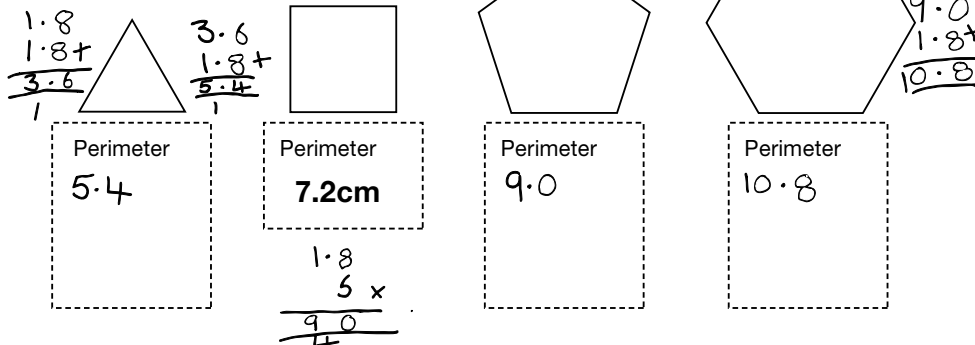| Perimeter	Perimeter	Perimeter	Perimeter

2.
1.8
1.8
1.8
5.4   5.4 cm
	7.2 cm
	
	7.2 ÷ 4
		1.8
		1.8
		1.8
		1.8
		1.8
		9.0 9 cm
			1.8
			1.8
			1.8
			1.8
			1.8
			1.8 10.8 cm + 9.0
			                1.8
			              10.8

The perimeter of the **square** is **7.2 cm**.
The side length for all four shapes is the same.
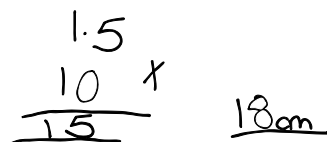What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

1.8   1.8
1.8

+7.2
 1.8
 9.0

9.0
+1.8
10.8

Perimeter	Perimeter	Perimeter	Perimeter
1.8 +1.8 1.8 5.4 5.4 cm 7.2÷4=1.8	**7.2 cm**	9 cm	10.8

Each side length in this joined shape is **1.5 cm**.
What is the total perimeter?
Show how you work out the answer.

1.5 × 12 =
2
1.5   1.5
1.5   1.5
1.5   3.0
1.5
1.5
7.5 ×2   15.0 + 3.0
15.0   18.0

18
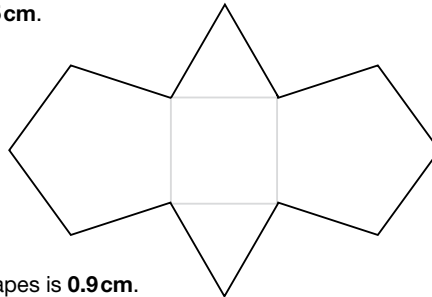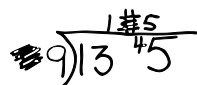
Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the shapes is **13.5 cm**.
How many sides does the group of shapes have? Show how you work out the answer.

13.5 ÷ 0.9 =
0.9
0.9
0.9

Each side length in this joined shape is **1.5 cm**.
What is the total perimeter?
Show how you work out the answer.

18 cm

x 9.0
  2
18.0 cm

3.0

6.0 cm   6.0

3.0

Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the shapes is **13.5 cm**.
How many sides does the group of shapes have? Show how you work out the answer.

No shapes in the group are joined.
Could the shapes **all** be **squares**? Explain your answer.

No shapes in the group are joined.
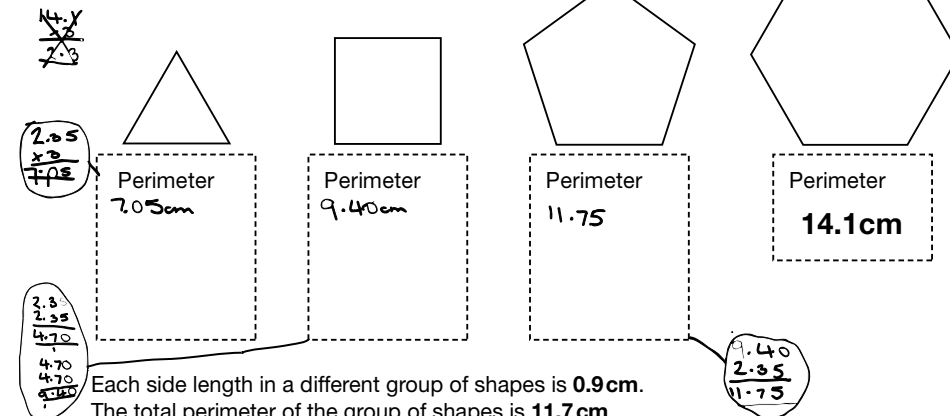Could the shapes **all** be **squares**? Explain your answer.

5

Perimeter sheet 2
Level 5

The perimeter of the **square** is **7.2 cm**.
The side length for all four shapes is the same.
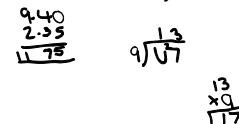What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

1·8

1·8
1·8+
3·6
—
1

3·6
1·8+
5·4
—
1

9·0
1·8+
10·8
—

Perimeter	Perimeter	Perimeter	Perimeter
5·4	**7.2cm**	9·0	10·8

1·8
5 x
—
9·0
4

Each side length in this joined shape is **1.5 cm**.
What is the total perimeter?
Show how you work out the answer.

1·5
10 x
—
15

18cm

15
3+
—
18

Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the shapes is **13.5 cm**.
How many sides does the group of shapes have? Show how you work out the answer.

1 5
9)13 45

15 sides

No shapes in the group are joined.
Could the shapes **all** be **squares**? Explain your answer.

no, one of the shapes could be
a triangle but they can't all
be squares because 4 does
not divide equally into 15.

Perimeter sheet 3
Level 5

2 35
6)14.10

The perimeter of the regular **hexagon** is **14.1 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

14·Y
x3
7·5

2·05
x3
7·05

The perimeter of the square is... (shown)

Perimeter	Perimeter	Perimeter	Perimeter
7·05cm	9·40cm	11·75	**14.1cm**

2·3
2·35
4·70

4·70
4·70
9·40

Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the group of shapes is **11.7 cm**.
How many sides does the group of shapes have? Show how you work out the answer. 13

9·40
2·35
11·75

9)17
13

13
x9
117

9·40
2·35
11·75

If **no shapes** in the group are **joined**, could the shapes all be regular hexagons?
Explain your answer. No, because 2 hexagons is 12 and there
are 13 sides

If the shapes in the group **are** joined, could the shapes all be equilateral triangles?
Explain your answer.

If the shapes in the group **are** joined, could the shapes all be squares?
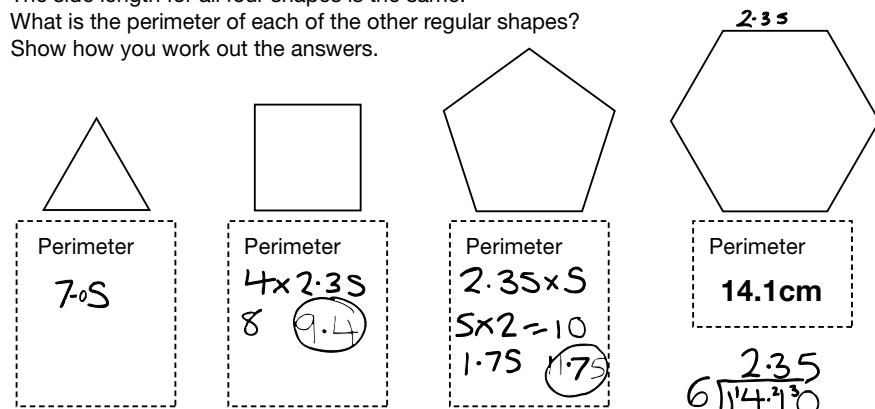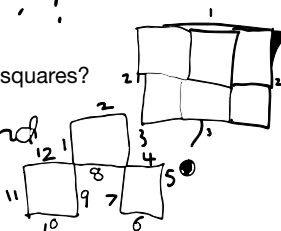Explain your answer. (You may need extra paper.)

Perimeter sheet 3
**Level 5**

The perimeter of the regular **hexagon** is **14.1 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

2.35

Perimeter

7.0S

Perimeter

4 × 2.35
8 (9.4)

Perimeter

2.35 × S
S × 2 = 10
1.7S (1.7S)

Perimeter

14.1 cm

$$6\overline{)14.^27^30}\quad \begin{array}{r}2.35\end{array}$$

Each side length in a different group of shapes is **0.9 cm**. 9
The total perimeter of the group of shapes is **11.7 cm**. 117
How many sides does the group of shapes have? Show how you work out the answer.

13 sides

$$9\overline{)11.^17}\quad \begin{array}{r}13\end{array}$$

If **no shapes** in the group are **joined**, could the shapes all be regular hexagons?
Explain your answer.

no because they would have 1 side leftover.

If the shapes in the group **are** joined, could the shapes all be equilateral triangles?
Explain your answer.

Yes (don't know how to explain) ??

If the shapes in the group **are** joined, could the shapes all be squares?
Explain your answer. (You may need extra paper.)

no because you'll always end up with an even number.

The perimeter of the regular **hexagon** is **14.1 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

Perimeter

7.0S cm

Perimeter

9.4 cm

Perimeter

11.75 cm

Perimeter

14.1 cm
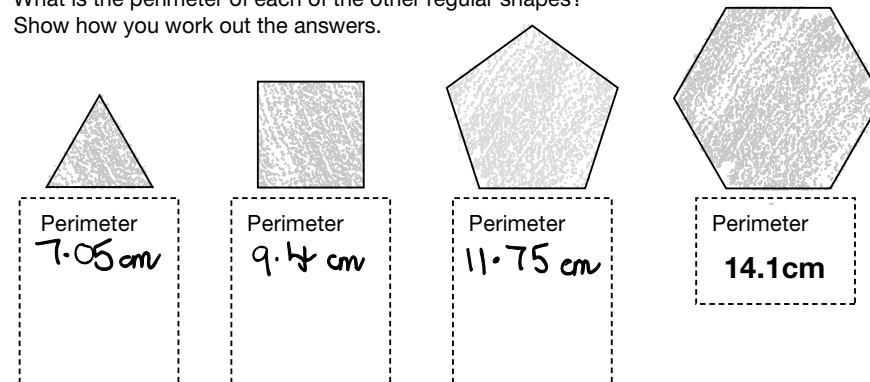
Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the group of shapes is **11.7 cm**.
How many sides does the group of shapes have? Show how you work out the answer.

0.9 × 10 = 9
11.7 × 10 = 117

$$9\overline{)11.^17}\quad \begin{array}{r}.13\end{array}$$

13

If **no shapes** in the group are **joined**, could the shapes all be regular hexagons?
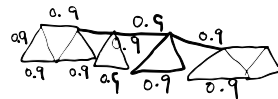Explain your answer.

No. Because if all the hexagons are not joined there would be an extra side.

If the shapes in the group **are** joined, could the shapes all be equilateral triangles?
Explain your answer.

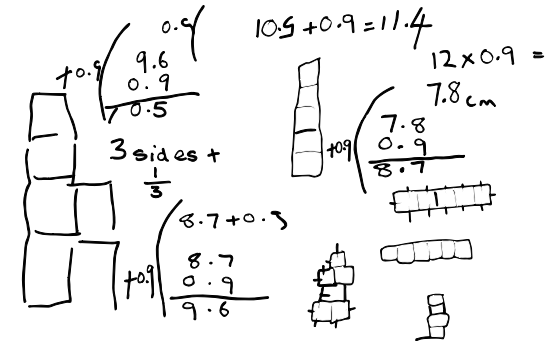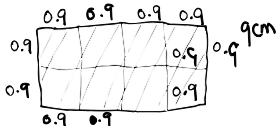Yes because if you put them all in a line with 6 sides on top and 5 sides on the bottom and 2 for the side you would have 13 sides (see diagram)

If the shapes in the group **are** joined, could the shapes all be squares?
Explain your answer. (You may need extra paper.)
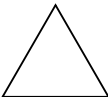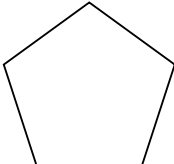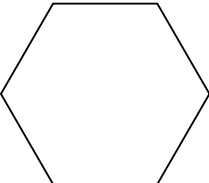
Perimeter sheet 3
Above level 5

The perimeter of the regular **hexagon** is **14.1 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

Perimeter = 9.4

Perimeter = 11.75

Perimeter = 7.05

$$6\overline{)14.^210}\quad 02.35$$
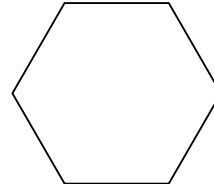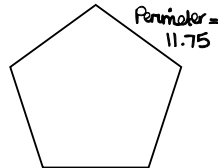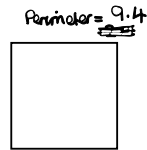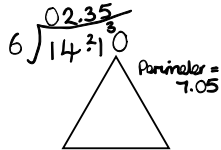
Perimeter
1 side = 2.35

3 × 2 = 6
3 × 0.3 = 0.9
3 × 0.05 = 0.15
―――――
7.05

Perimeter
2.35 × 4

4 × 2 = 8
4 × 0.3 = 1.2   4 × 0.05 = 0.2

8
1.2
0.2
―――
9.4

Perimeter
5 × 2.35

5 × 2 = 10
5 × 0.3 = 1.5
5 × 0.05 = 0.25
―――――
11.75

Perimeter

14.1 cm

Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the group of shapes is **11.7 cm**.
How many sides does the group of shapes have? Show how you work out the answer. __13__

$$0.9\overline{)11.7}$$

$$117 \div 9 \qquad 9\overline{)11^2 7}\quad 0\cancel{2}3$$

If **no shapes** in the group are **joined**, could the shapes all be regular hexagons?
Explain your answer.

No. Because 13 can't be divided by 6 (6 sides to a hexagon.)

If the shapes in the group **are** joined, could the shapes all be equilateral triangles?
Explain your answer.

0.9   0.9   0.9
0.9 0.9 0.9 0.9 0.9

Yes. Because they can be arranged in a way that gives 13 sides which come to 11.7

If the shapes in the group **are** joined, could the shapes all be squares?
Explain your answer. (You may need extra paper.)

0.9 0.9 0.9 0.9
0.9   0.9   9cm
0.9   0.9
0.9 0.9

No. Because no matter how many squares are joined on you can't make an odd number

0.9
9.6
0.9
――
0.5

3 sides + 1/3

+0.9   8.7
0.9
――
9.6

10.5 + 0.9 = 11.4

12 × 0.9 = 7.8 cm

7.8
0.9
――
8.7

8.7 + 0.3

8.7
0.9
――
9.6

Perimeter sheet 3
Above level 5

The perimeter of the regular **hexagon** is **14.1 cm**.
The side length for all four shapes is the same.
What is the perimeter of each of the other regular shapes?
Show how you work out the answers.

Perimeter	Perimeter	Perimeter	Perimeter
7.05	9.4	11.75	**14.1 cm**
3 x 2.35 = 7.05	4 x 2.35 = 9.40	5 x 2.35 = 11.75	$6\overline{)4.10}$ 2.35

Each side length in a different group of shapes is **0.9 cm**.
The total perimeter of the group of shapes is **11.7 cm**.
How many sides does the group of shapes have? Show how you work out the answer.

$0.9\overline{)11.7}$ 13   1 3

If **no shapes** in the group are **joined**, could the shapes all be regular hexagons?
Explain your answer. No, because 13 is not divisible by six and hexagons have 6 sides.

If the shapes in the group **are** joined, could the shapes all be equilateral triangles?
Explain your answer.

Yes

If the shapes in the group **are** joined, could the shapes all be squares?
Explain your answer. (You may need extra paper.)

No because when you add one square, it cancels another side out and gives an even number.

Year 7 (Spring)

Number

LESSON 2: *Polygon perimeters*

Polygon perimeters sheet 1
Level 3

Fill in the table to show the side lengths of regular polygons with perimeter **16cm**.

The first one is done for you.

Perimeter is 16cm			
Shape	Number of sides	Calculation	Side length (cm)
□	4	16 ÷ 4	4
⬡	8	16÷8	2
◯	10	16÷10	1.6
⬠	5	16÷5.	3.1
⬡	6	16 ÷ 6	2.4

Fill in the table to show the side lengths of regular polygons with perimeter **16cm**.

The first one is done for you.

Perimeter is 16cm			
Shape	Number of sides	Calculation	Side length (cm)
□	4	16 ÷ 4	4
⬡	8	16÷8	2
◯	10	16÷10	1.6
⬠	5	16÷5	3.1
⬡	6	16 ÷ 6	2.5

$2 \times 8 = 16$ $5\overline{)16}{}^{3=1}$

$3 \times 6 = 18$

$2.5 \times 6 = 16$

Polygon perimeters sheet 1
Level 4

Fill in the table to show the side lengths of regular polygons with perimeter **16cm**.

The first one is done for you.

Perimeter is 16cm			
Shape	Number of sides	Calculation	Side length (cm)
□	4	16 ÷ 4	4
⯃	8	16 ÷ 8	2
⬡	10	16 ÷ 10	1·6
⬠	5	16 ÷ 5	3·2
⬡	6	16 ÷ 6	2·5

Fill in the table to show the side lengths of regular polygons with perimeter **16cm**.

The first one is done for you.

Perimeter is 16cm			
Shape	Number of sides	Calculation	Side length (cm)
□	4	16 ÷ 4	4
⯃	8	16 ÷ 8	2
⬡	10	16 ÷ 10	1.6
⬠	5	16 ÷ 5	3.02
⬡	6	16 ÷ 6	2.66

Polygon perimeters sheet 2
Level 4

Fill in the table to show the side lengths of regular polygons with perimeter **15.6 cm**.

You will need to choose the number of sides in each shape.

If you wish, you can continue on a separate sheet of paper.

Perimeter is 15.6 cm		
Number of sides	Calculation	Side length (cm)
3	15.6 ÷ 3	5.2 cm
4	15.6 ÷ 4	3.9 cm
5	15.6 ÷ 5	3.12 cm
6	15.6 ÷ 6	2.6 cm
7	15.6 ÷ 7	2.2 cm
8	15.6 ÷ 8	1.95 cm
10	15.6 ÷ 10	2.1 cm
12	15.6 ÷ 12	1.3 cm
2	15.6 ÷ 2	7.8 cm

(handwritten working, left margin: 8, 16, 24, 32, 40, 48, 56, 64, 72)

(handwritten long divisions beside table)

Fill in the table to show the side lengths of regular polygons with perimeter **15.6 cm**.

You will need to choose the number of sides in each shape.

If you wish, you can continue on a separate sheet of paper.

Perimeter is 15.6 cm		
Number of sides	Calculation	Side length (cm)
3	3)15.6	5.2 cm
6	6)15.6	2.6 cm
4	4)15.6	3.9 cm
8	8)15.6	1.95 cm
10	10)15.6	1.56 cm
5	5)15.6	3.12 cm
12	12)15.6	1.3 cm
13	13)15.6	1.2 cm

Note that the pupil above was given a suggestion for a sensible order of calculations to attempt.

Polygon perimeters sheet 2
Level 4

Fill in the table to show the side lengths of regular polygons with perimeter **15.6 cm**.

You will need to choose the number of sides in each shape.

If you wish, you can continue on a separate sheet of paper.

Perimeter is 15.6 cm		
Number of sides	Calculation	Side length (cm)
3	15.6 ÷ 3 =	5.2 cm
6	15.6 ÷ 6 =	2.6 ~~2.2~~
4	15.6 ÷ 4 =	3.9
8	3.9 ÷ 2 =	1.95
10	15.6 ÷ 10 =	.1.56
5	1.56 × 2 = ~~15.6 ÷ 5 =~~	3.12
12	15.6 ÷ 12 =	~~4.05~~ 1.3
13	15.6 ÷ 13 =	1.2

> Note that the pupil above was given a suggestion for a sensible order of calculations to attempt.

Polygon perimeters sheet 2
Level 5

Fill in the table to show the side lengths of regular polygons with perimeter **15.6 cm**.

You will need to choose the number of sides in each shape.

If you wish, you can continue on a separate sheet of paper.

Perimeter is 15.6 cm		
Number of sides	Calculation	Side length (cm)
3	15.6 ÷ 3	5.2
4	15.6 ÷ 4	3.9
5	15.6 ÷ 5	3.12
6	15.6 ÷ 6	2.6
7	15.6 ÷ 7	2.2571428
8	15.6 ÷ 8	1.95
9	15.6 ÷ 9	1.7̇3̇
10	15.6 ÷ 10	1.56
11	15.6 ÷ 11	1.4̇8̇
12	15.6 ÷ 12	1.3

Polygon perimeters sheet 2
Level 5

Fill in the table to show the side lengths of regular polygons with perimeter **15.6 cm**.

You will need to choose the number of sides in each shape.

If you wish, you can continue on a separate sheet of paper.

Perimeter is 15.6 cm		
Number of sides	Calculation	Side length (cm)
10	15.6 ÷ 10	1.56
5	15.6 ÷ 5 or 1.56 × 2	3.12
3	15.6 ÷ 3	5.2
6	15.6 ÷ 3	2.6
12	15.6 ÷ 12 or 2.6 ÷ 2	1.3
20	15.6 ÷ 20 or 1.56 ÷ 2	0.78
24	15.6 ÷ 24 or 1.3 ÷ 2	0.65
40	15.6 ÷ 40 or 0.78 ÷ 2	0.39
9	15.6 ÷ 9	1.7̇3̇
15	15.6 ÷ 15.	1.04

$$0.5$$
$$0.25$$
$$0.03$$
$$\overline{0.78}$$

$$\frac{5.3}{3)\overline{15.6}}$$

$$0.5$$
$$0.15$$
$$\overline{0.65}$$

$$0.35$$
$$0.04$$
$$\overline{0.39}$$

$$9)\overline{15.6^60^30^30}$$ 01.73333

Polygon perimeters sheet 2
Above level 5

Fill in the table to show the side lengths of regular polygons with perimeter **15.6 cm**.

You will need to choose the number of sides in each shape.

If you wish, you can continue on a separate sheet of paper.

$$\frac{3.9}{4)\overline{15.36}}$$

Perimeter is 15.6 cm		
Number of sides	Calculation	Side length (cm)
3	15.6 ÷ 3	5.2
4	15.6 ÷ 4	3.9
5	(15.6 ÷ 10) × 2	3.12
6	(15.6 ÷ 3) ÷ 2	2.6
7	15.6 ÷ 7	2.2285714
8	(15.6 ÷ 4) ÷ 2	1.95
9	15.6 ÷ 9	1.7̇3̇
10	15.6 ÷ 10	1.56
11	15.6 ÷ 11	1.4̇1̇8̇
12	(15.6 ÷ 6) ÷ 2	1.3

$$\frac{1.95}{2)\overline{3.1̇90}}$$

$$\frac{2.6}{2)\overline{5.12}}$$

$$\frac{2.228}{7)\overline{15.6^20^60^40}}$$

$$\frac{5714}{7)\overline{40^50^10^30}}$$

$$\frac{1.733}{9)\overline{15.6^60^30}}$$

$$\frac{1.418}{11)\overline{15.6^40^60^70}}$$

Polygon perimeters sheet 3
Level 5

The perimeter of a **rectangle** is 15.6 cm.

If its length is 6.2 cm, explain why its width must be 1.6 cm.

$$\begin{array}{r} 6.2 \\ 6.2 \\ 1.6 \\ 1.6 \\ \hline 15.6 \end{array}$$ ✓

(diagram: rectangle with sides labelled 1.6, 6.2, 6.2, 1.6)
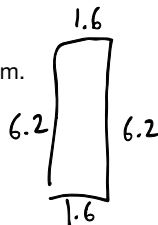
What else could the length and width of this rectangle be?

Give two different examples.

Perimeter is 15.6 cm	
Length (cm)	Width (cm)

The perimeter of a regular nonagon (a **9-sided** shape) is **16 cm**.

Alice said:

'The side length of this shape is exactly **1.7 cm**.'

Show that Alice is wrong.

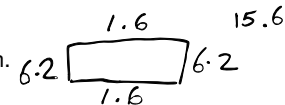$$\begin{array}{r} 1.7 \\ \times\ \ 9 \\ \hline 15.3_6 \end{array}$$ So not 16 cm

What is the exact side length of the regular nonagon?

$$9\overline{)16.^{7}0^{7}0}\ ^{1.77}$$ exact = 1.77.....

Polygon perimeters sheet 3
Above level 5

The perimeter of a **rectangle** is 15.6 cm.

If its length is 6.2 cm, explain why its width must be 1.6 cm.

(diagram: rectangle with 1.6, 15.6, 6.2, 6.2, 1.6)

Because if you double 6.2 it comes
to 12.4 15.6 − 12.4 = 3.2
3.2 ÷ 2 = 1.6 cm

What else could the length and width of this rectangle be?

Give two different examples.

6 cm (3 cm + 3 cm)
9.6 cm

$$2\overline{)9\,6}\ ^{4.8}$$

$$\begin{array}{r}4.^5{}_3 \\ 0._4^8 \\ \hline 4\end{array}$$

Perimeter is 15.6 cm	
Length (cm)	Width (cm)
~~5~~ 4.8	3 ~~8~~
5	2.8

(5 + 5) 10 cm

$$\begin{array}{r} 6.2 \\ 6.2 \\ 1.6 \\ 1.6 \\ 1.6 \\ \hline 14.0 \\ 15.6 \end{array}$$

$$2\overline{)5.6}$$

$$\begin{array}{r} 2.5 \\ 0.3 \\ \hline 2.8 \end{array}$$

The perimeter of a regular nonagon (a **9-sided** shape) is **16 cm**.

Alice said:

'The side length of this shape is exactly **1.7 cm**.'

Show that Alice is wrong.

16 ÷ 9 = 1.777 (a recurring decimal) therefore the side length isn't exactly 1.7 cm

$$9\overline{)16.^70^70}\ ^{1.77}$$

What is the exact side length of the regular nonagon?