

# Y5/6 Shape Unit 1 (56356)

## Additional teacher instructions for practice sheets

These notes indicate which practice sheets are most appropriate for which groups.

### Day 1 Y5 Properties of polygons - quadrilaterals Sheet 1

Working towards ARE / Working at ARE / Greater Depth

All children attempt Q1-3

Greater Depth aim to complete the Challenge.

### Day 1 Y6 Quadrilateral sort Sheet 2

Working towards ARE / Working at ARE

### Day 1 Y6 Quadrilateral challenge Sheet 3

Greater Depth

### Day 2 Y5 Properties of 2-D shapes Sheet 1

Working towards ARE

### Day 2 Y5 Properties of polygons Sheet 2

Working at ARE / Greater Depth

### Day 2 Y6 Investigating circle relationships Sheets 3 and 4

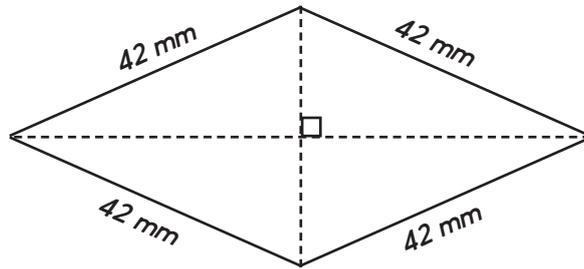
Working towards ARE / Working at ARE / Greater Depth

# Properties of polygons - quadrilaterals

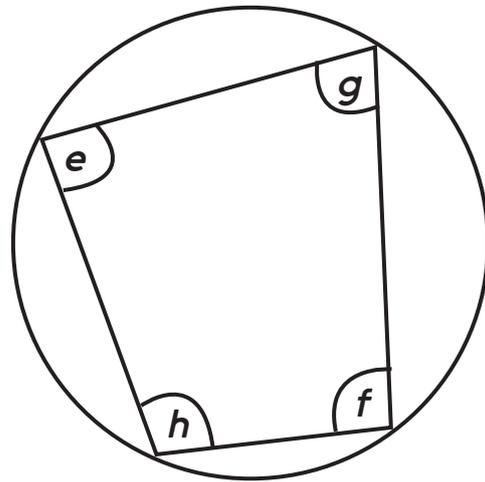
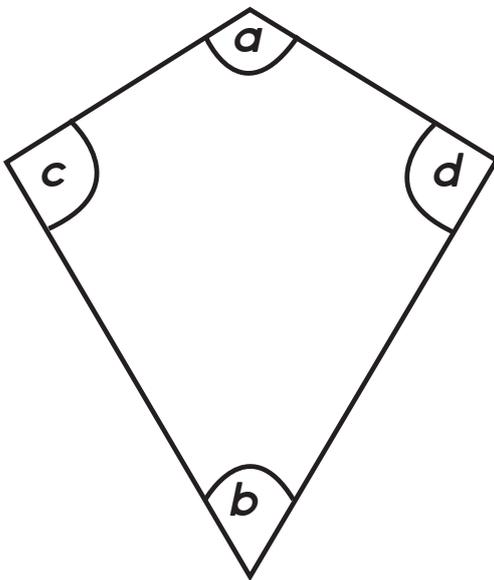
## Sheet 1

1.

What is this shape?  
How do you know?



2.



Use a protractor to measure the angles in these shapes.  
Write them down.

What do you notice about:

- $c$  and  $d$ ,
- the total of  $e$  and  $f$ ,
- the total of  $g$  and  $h$ ?

3. In your book or on the back of this sheet, draw a quadrilateral with one pair of perpendicular sides.

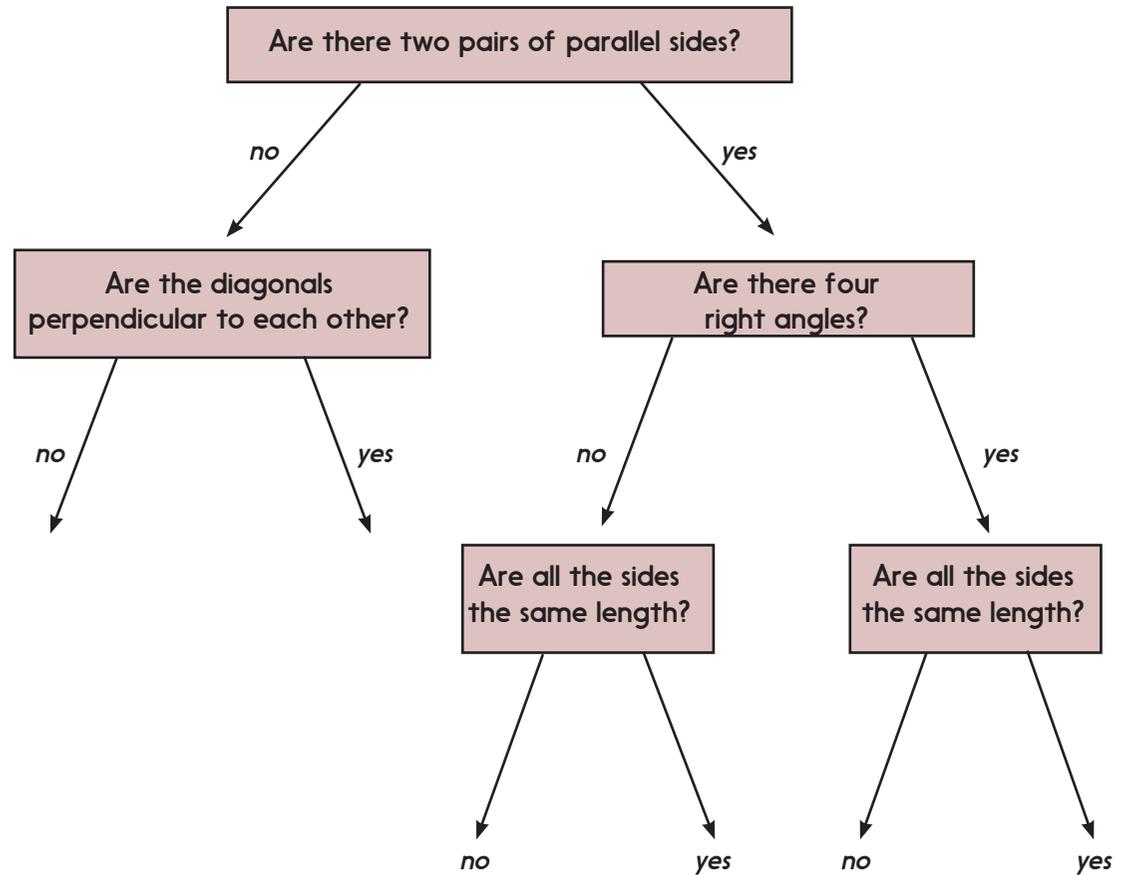
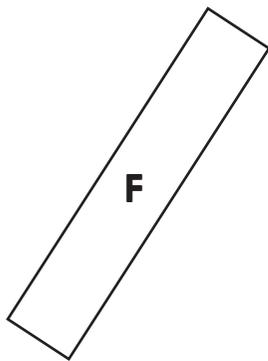
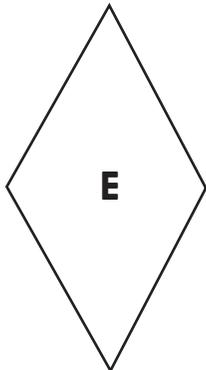
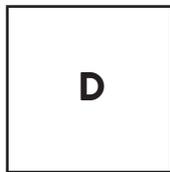
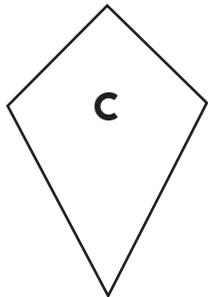
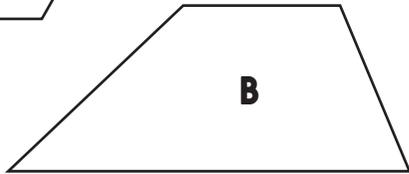
### Challenge

Draw two more quadrilaterals.  
Measure and add up the four angles in each shape. What do you notice?

# Quadrilateral sort

## Sheet 2

Sort each of the shapes using the diagram - what is the name of each?



# Quadrilateral challenge

## Sheet 3

Discuss the questions below with a partner.

Write your answers in your book, and use diagrams to illustrate your answers.



**Can you draw a...**

1. Quadrilateral with exactly 3 right angles? If so can you name it?
2. Quadrilateral with exactly 2 right angles? If so can you name it?
3. Symmetrical quadrilateral with exactly 1 right angle? If so can you name it?
4. Quadrilateral with exactly 3 equal sides? If so can you name it?
5. Quadrilateral with no right angles and two pairs of equal sides that are next to each other.  
If so, can you name it?
6. Quadrilateral with two pairs of opposite equal sides and no right angles. If so can you name it?
7. Trapezium with no lines of symmetry.
8. A quadrilateral with no equal sides or angles.

### Challenge

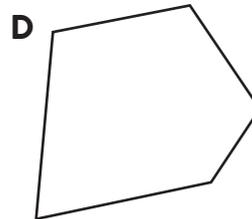
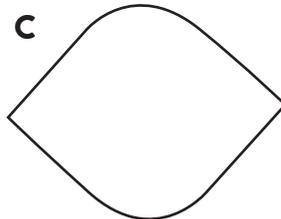
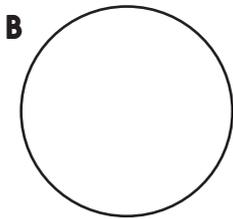
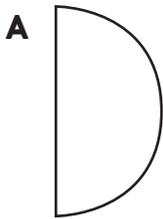
Does the quadrilateral you drew in (8) tessellate?

*Tessellate* means that repeated copies of it fit together with no gaps.

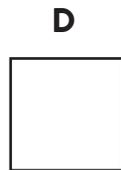
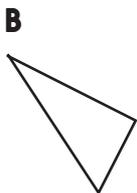
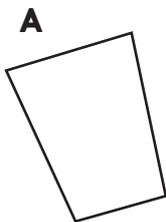
# Properties of 2-D shapes

## Sheet 1

1. i) Which of these is a polygon? \_\_\_\_\_  
ii) Why? \_\_\_\_\_



2. Look at these shapes.



Match the shapes to each description below:

A triangle: \_\_\_\_\_ and \_\_\_\_\_

A quadrilateral: \_\_\_\_\_ and \_\_\_\_\_

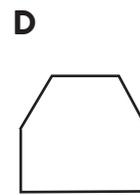
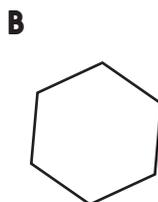
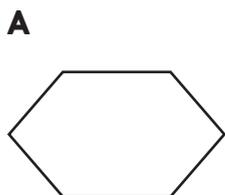
A pentagon: \_\_\_\_\_ and \_\_\_\_\_

A symmetrical polygon: \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_

A regular polygon: \_\_\_\_\_ and \_\_\_\_\_

An irregular polygon: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_

3. Which shape is not a hexagon? \_\_\_\_\_



### Challenge

Draw four polygons with different numbers of sides.  
Label them A, B, C and D.

Make up a quiz to test whether a partner can describe and identify each,

- e.g.
1. How many pairs of parallel sides does it have?
  2. Name three different types of this shape.
  3. How many of me do you need to build a square based pyramid?

# Properties of polygons

## Sheet 2

Complete this table by writing a tick in each box that is 'true'.

	square 	equilateral triangle 	irregular pentagon 	regular hexagon 	regular pentagon 	octagon 
all sides the same length						
one pair of parallel sides						
more than 1 pair of parallel sides						
5 sides						
more than 4 sides						
less than 5 vertices						
no perpendicular sides						

Was there a column that was difficult to complete? Why?

### Challenge

- Sometimes, always or never? A polygon with parallel sides also has perpendicular sides.
- Draw a polygon with three sets of parallel sides... And another, with two right angles... And another, with 7 sides.

# Investigating circle relationships

## Sheet 3

Some children have been drawing and measuring circles.

They measured the radius and diameter with a ruler, then the circumference as accurately as possible with a piece of string.

They recorded their measurements in the table below.

Kayleigh makes a good generalisation, saying, "*The circumference of the circles always gets bigger as the diameter gets bigger.*"

Jay has also spotted something interesting, saying, "*The circumference of the circle with a diameter of 10cm was almost exactly 30cm – that's neat because 30 is 3 times 10.*"

Was Jay's observation just a coincidence or is there a pattern here? Investigate the ratio of the circumference of each circle to its diameter, filling in the last column of the table. You can use a calculator - divide the circumference by the diameter to give an accurate ratio.

Circle radius (cm)	Diameter (cm)	Circumference (cm)	Ratio of circumference: diameter
3	6	19.2	
3.9	7.8	22.9	
6.5	13	40.5	
2.3	4.6	14.5	
5	10	30.1	
8.4	16.8	53.7	
7.5	15	47.8	
3.5	7	22.0	

Use this space to tell Jay whether he's really onto something, or if his observation was a coincidence after all:

# Investigating circle relationships - Challenge!

## Sheet 4

So, the ratio of the circumference to the diameter in any circle is always approximately 3.1. This 'constant' value is called 'Pi' – the Greek letter  $\pi$ . It is an *irrational* number – the decimal places go on and on without repeating. The value of Pi to 2 decimal places is 3.14.

We can write this relationship in words:

The circumference (C) of a circle is equal to Pi ( $\pi$ ) multiplied by the diameter (d).

Or we can write a formula using symbols:

$$C = \pi \times d$$

Taking a value of 3.1 for  $\pi$  (or 3.14 if you are happy multiplying with 2 decimal places), use this formula to answer these questions:

1. What is the circumference of a circle with diameter 10cm?
2. What is the circumference of a circle with diameter 100cm?
3. What is the circumference of a circle with diameter 3cm?
4. What is the circumference of a circle with radius 4cm?
5. What is the circumference of a circle with diameter 12cm?
6. The London Eye has a radius of 70m.  
Roughly how far do you travel when you go once round it?
7. A wheel is 1m round the edge and is used to measure distances.  
What is the distance from the edge to the middle?

# Shape

## Answers

### Day 1 Y5 Properties of polygons - quadrilaterals Sheet 1

1. **Rhombus**. It has four equal sides, the opposite sides are parallel and the diagonals bisect each other at right angles.
2.  $a = 116^\circ$        $b = 60^\circ$        $c = 92^\circ$        $d = 92^\circ$   
 $e = 86^\circ$        $f = 94^\circ$        $g = 76^\circ$        $h = 104^\circ$   
i)  $c$  and  $d$  are equal      ii)  $e$  and  $f$  add up to  $180^\circ$       iii)  $g$  and  $h$  add up to  $180^\circ$
3. Check that the children have drawn a four-sided shape with two sides perpendicular (at right angles) to one another.

#### Challenge

Check the children have drawn two more quadrilaterals and that they have noticed that all the internal angles always add up to  $360^\circ$ .

### Day 1 Y6 Quadrilateral sort Sheet 2

- A = Parallelogram
- B = Trapezoid
- C = Kite
- D = Square
- E = Rhombus
- F = Rectangle

### Day 1 Y6 Quadrilateral challenge Sheet 3

1. Square or rectangle
2. There are many possibilities, each one is a form of trapezium
3. Kite
4. Could be a square, rhombus or trapezium
5. Kite
6. Parallelogram
7. Yes, various examples may be drawn
8. Yes, various examples may be drawn

### Day 2 Y5 Properties of 2-D shapes Sheet 1

1. i) D  
ii) It has all straight sides
2. Match the shapes to each description:  
A triangle: B and C  
A quadrilateral: A and D  
A pentagon: E and F  
A symmetrical polygon: C, D and F  
A regular polygon: D and F  
An irregular polygon: A, B, C and E

3. C

#### Challenge

Children should draw four polygons with different numbers of sides and create a quiz to test whether their partner can identify and describe these shapes.

# Shape

## Answers

### Day 2 Y5 Properties of polygons Sheet 2

	square 	equilateral triangle 	irregular pentagon 	regular hexagon 	regular pentagon 	octagon 
all sides the same length	✓	✓		✓	✓	✓
one pair of parallel sides			✓			
more than 1 pair of parallel sides	✓			✓		✓
5 sides			✓		✓	
more than 4 sides			✓	✓	✓	✓
less than 5 vertices	✓	✓				
no perpendicular sides		✓		✓	✓	✓

#### Challenge

- A polygon with parallel sides **sometimes** has perpendicular sides. (For example rectangles have both parallel and perpendicular sides but the regular hexagon drawn on the grid has parallel sides but no perpendicular ones).
- Children's drawings will vary but a shape with 3 sets of parallel sides will be a regular hexagon.

### Day 2 Y6 Investigating circle relationships Sheet 3

Circle radius (cm)	Diameter (cm)	Circumference (cm)	Ratio of circumference: diameter
3	6	19.2	3.2
3.9	7.8	22.9	2.94
6.5	13	40.5	3.12
2.3	4.6	14.5	3.15
5	10	30.1	3.01
8.4	16.8	53.7	3.2
7.5	15	47.8	3.19
3.5	7	22.0	3.14

All the ratios of circumference to diameter round to 3, therefore Jay was onto something with his observation.

### Day 2 Y6 Investigating circle relationships - Challenge! Sheet 4

1.  $3.14 \times 10 = 31.4\text{cm}$  (or  $31\text{cm}$  if  $\pi$  is  $3.1$ ).
2.  $3.14 \times 100 = 314\text{cm}$  (or  $310\text{cm}$  if  $\pi$  is  $3.1$ ).
3.  $3.14 \times 3 = 9.42\text{cm}$  (or  $9.3\text{cm}$  if  $\pi$  is  $3.1$ ).
4. Diameter =  $2 \times 4$  therefore  $3.14 \times 8 = 25.12\text{cm}$  (or  $24.8\text{cm}$  if  $\pi$  is  $3.1$ ).
5.  $3.14 \times 12 = 37.68\text{cm}$  (or  $37.2\text{cm}$  if  $\pi$  is  $3.1$ ).
6. Distance once around London eye =  $3.14 \times 140 = 439.6\text{m}$  (or  $434\text{m}$  if  $\pi$  is  $3.1$ ).
7. The distance from the edge to the middle is roughly  $15.9\text{cm}$  (or  $16.1\text{cm}$  if  $\pi$  is  $3.1$ ).