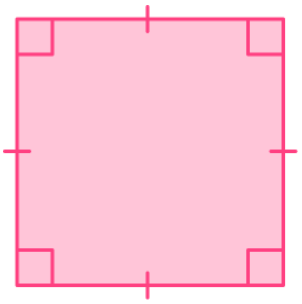
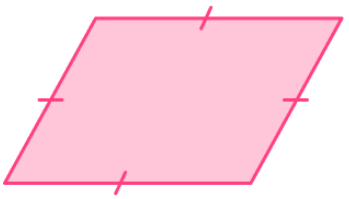
Types and properties of quadrilaterals - Worksheet

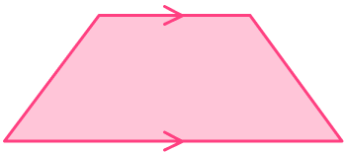
Skill

Group A - Identifying quadrilaterals

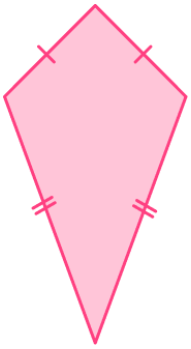
Name each of these quadrilaterals.

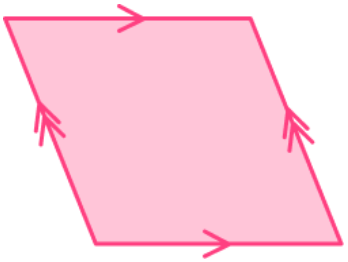
1) 

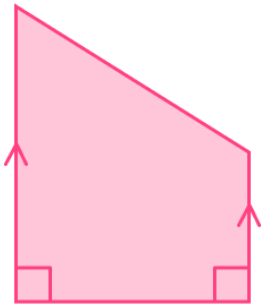
2) 

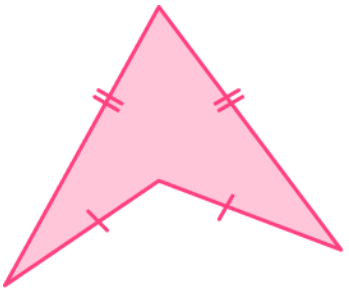
3) 

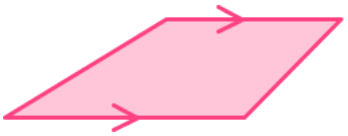
4) 

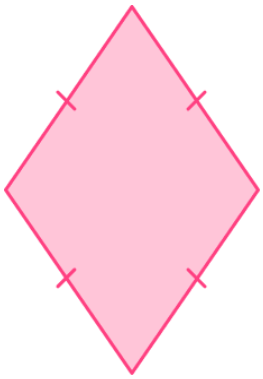
5) 

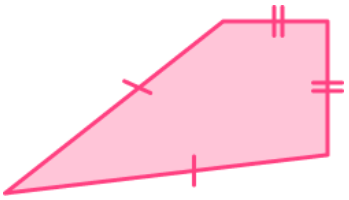
6) 

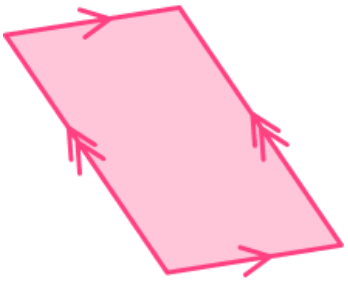
7) 

8) 

9) 

10) 

11) 

12) 

Types and properties of quadrilaterals - Worksheet

Group B - Properties of quadrilaterals

Identify each quadrilateral below from each description.

1) Two pairs of parallel sides of different lengths and no right angles.

2) Adjacent sides of equal length and no reflex angles.

3) All sides and angles are equal sizes.

4) One pair of parallel sides.

5) All sides are equal and opposite pairs of angles are equal.

6) Two pairs of parallel sides of different lengths and four right angles.

7) Adjacent sides of equal length and one reflex angle.

8) Four lines of symmetry.

9) Diagonal lines bisect and are perpendicular and do not have right angles.

10) Two lines of symmetry and four right angles.

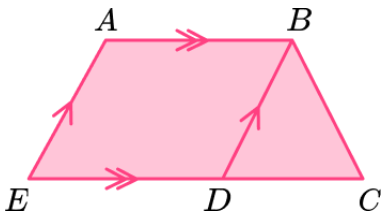
11) Exactly two right angles.

12) Two lines of symmetry and no right angles.

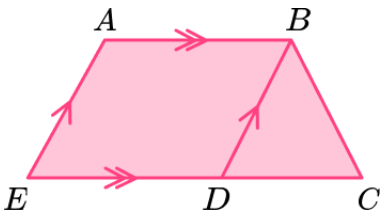
Group C - Embedded quadrilaterals

Identify each quadrilateral

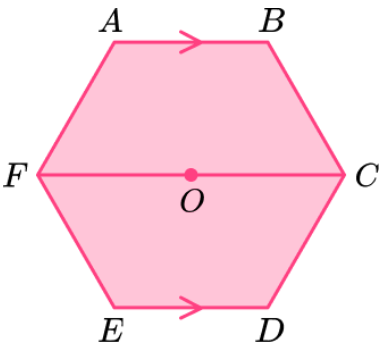
1) Quadrilateral $ABCE$



2) Quadrilateral $ABDE$

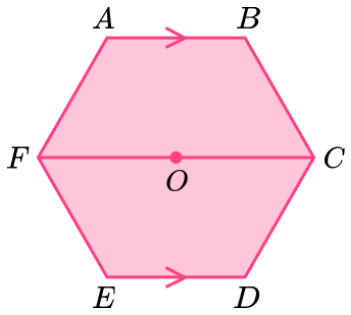


3) Quadrilateral $ABCF$

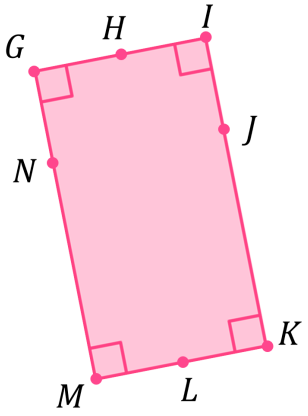


Types and properties of quadrilaterals - Worksheet

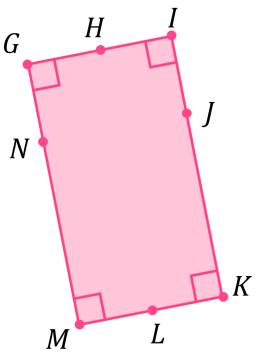
4) Quadrilateral $ABDE$



5) Quadrilateral $GIKM$

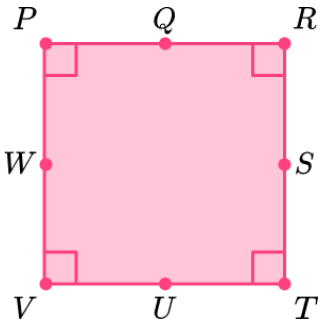


6) Quadrilateral $HJLN$ where H is the midpoint of GI, L is the midpoint of KM and line JN is parallel to GI.



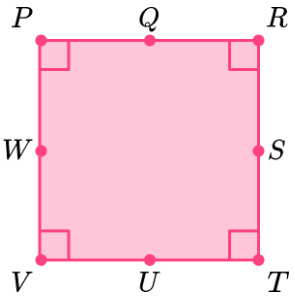
7) Quadrilateral $PRTV$ where

$PR = RT = TV = PV$

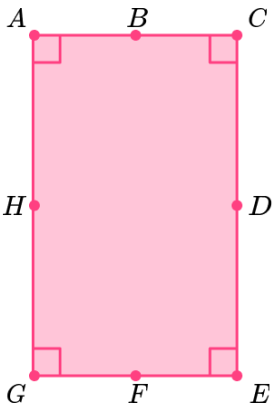


8) Quadrilateral $QSUW$ points Q, S, U and W are midpoints of each side length and

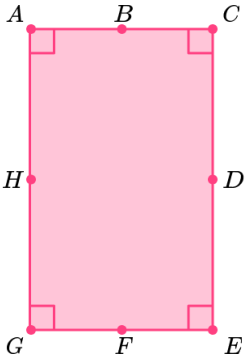
$PR = RT = RV = PV$



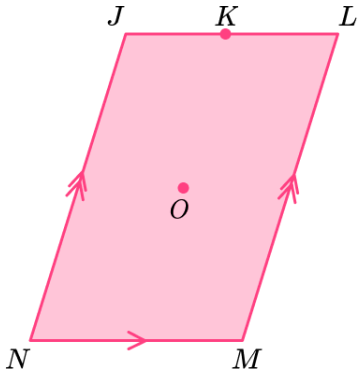
9) Quadrilateral $ACEG$



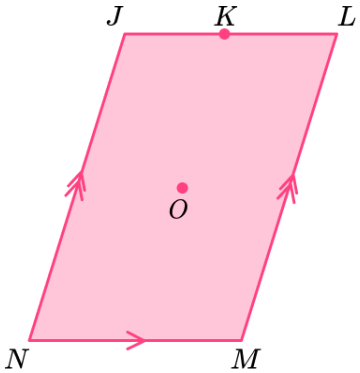
10) Quadrilateral $BDFH$ where points B, D F and H are the midpoints of each side.



11) Quadrilateral $JLMN$



12) Quadrilateral $KMON$



Types and properties of quadrilaterals - Worksheet

Applied

1) **(a)** If two equilateral triangles are placed with two sides touching, what is the name of the quadrilateral that is formed?

(b) If two isosceles triangles are placed with two sides touching, what are the names of the quadrilaterals that are formed?

2) Here is Jack's description of a quadrilateral.

'It has two pairs of parallel sides of different lengths and 4 lines of symmetry'

(a) Jack has made an error. Identify and explain the error.

Here is Faye's description of a trapezium she has drawn.

'It has three right angles'

(b) Faye has made an error. Identify and explain the error.

3) Decide if each statement is always true, sometimes true or never true. Justify your answer.

(a) A parallelogram has 2 lines of symmetry.

(b) A trapezium has an obtuse angle.

(c) The angles in a kite are all different.

4) **(a)** Draw a square and mark the midpoints of each side.
Join the midpoints together.

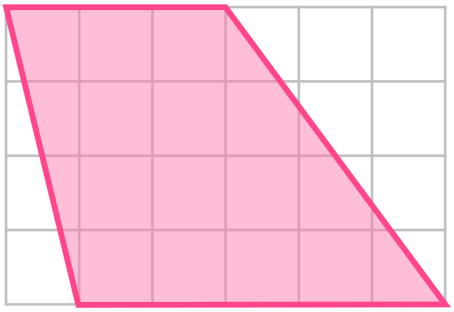
What shape is now inside the square?
What would happen if you repeated this process?

(b) Draw a rectangle and mark the midpoints of each side.
Join the midpoints together.

What shape is now inside the rectangle?
What would happen if you repeated this process?

Types and properties of quadrilaterals - Worksheet

1) **(a)** This quadrilateral is drawn on a centimetre square grid.



Name the quadrilateral.

.....

(1)

(b) Work out the area of the quadrilateral. You must give the correct units for your answer.

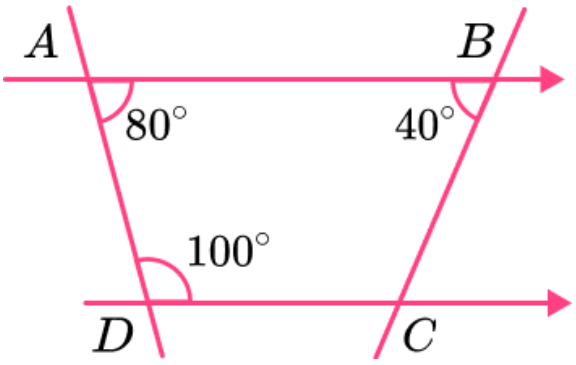
.....

(3)

(4 marks)

---

2) AB and DC are parallel lines.



(a) Name quadrilateral $ABCD$.

.....

(1)

(b) Calculate angle BCD.

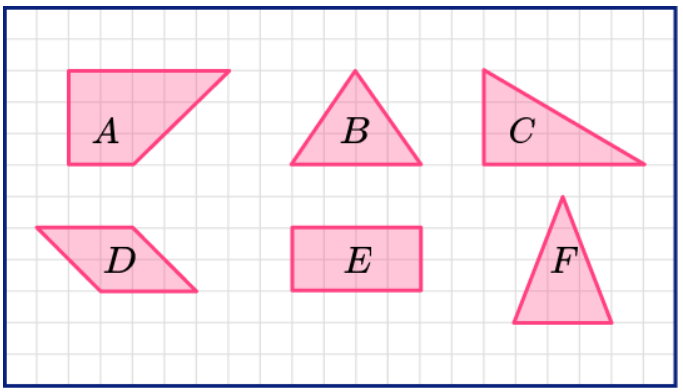
.....

(2)

(3 marks)

Types and properties of quadrilaterals - Worksheet

3) This diagram shows six shapes on a centimetre grid.



(a) Name shape *A*.

.....

(1)

(b) Name shape *D*.

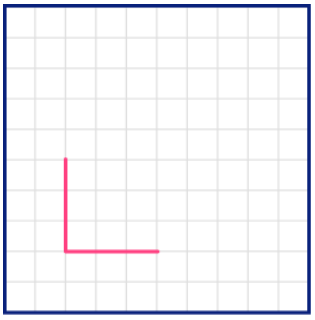
.....

(1)

(2 marks)

---

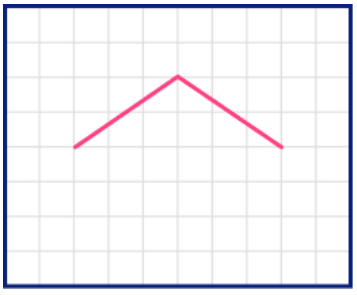
4) **(a)** Here are two lines drawn on a centimetre grid.



Draw two more lines to draw a kite.

(1)

(b) Here are two lines drawn on a centimetre grid.

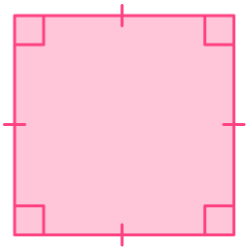
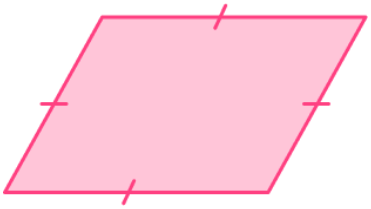
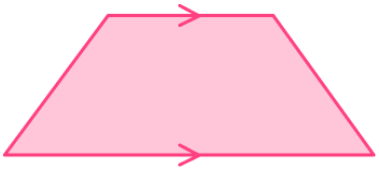
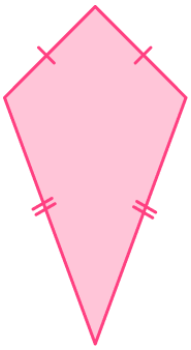
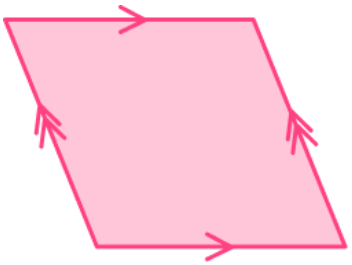


Draw two more lines to draw a rhombus.

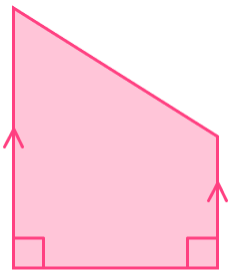
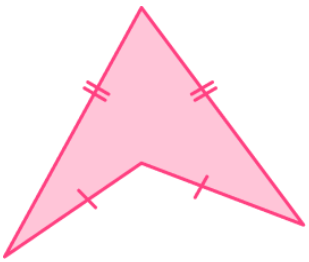
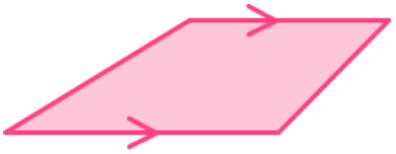
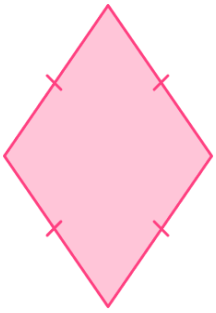
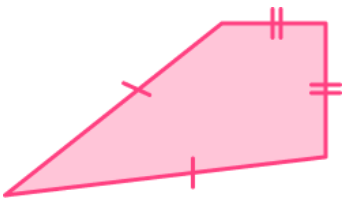
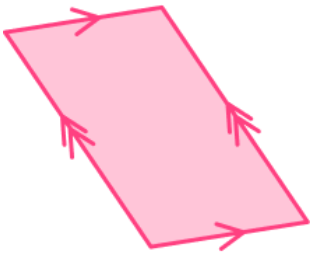
(1)

(2 marks)

Types and properties of quadrilaterals - Answers

	Question	Answer
	Skill Questions	
Group A	**1)** 	**1)** Square
	2) 	**2)** Rhombus
	3) 	**3)** Trapezium
	4) 	**4)** Rectangle
	5) 	**5)** Kite
	6) 	**6)** Parallelogram

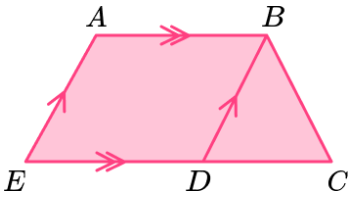
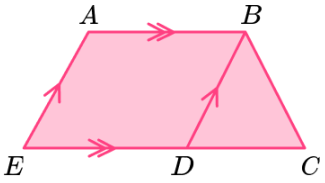
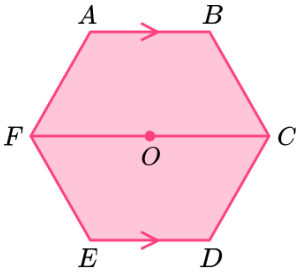
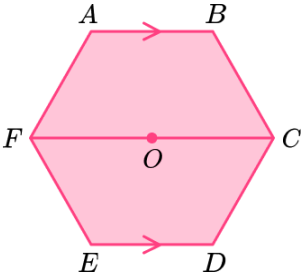
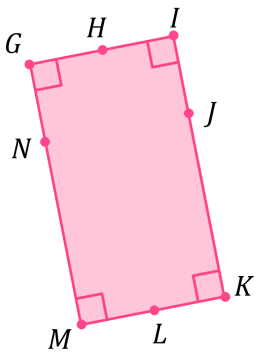
Types and properties of quadrilaterals - Answers

Group A contd	**7)** 	**7)** Trapezium
	8) 	**8)** Arrowhead
	9) 	**9)** Trapezium
	10) 	**10)** Rhombus
	11) 	**11)** Kite
	12) 	**12)** Parallelogram

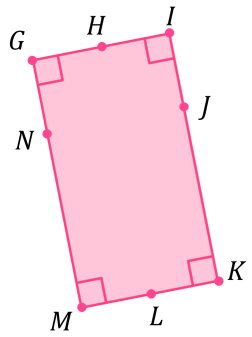
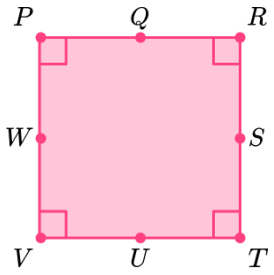
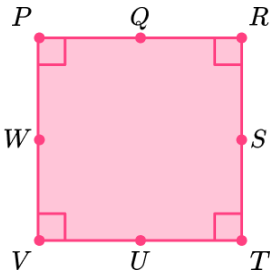
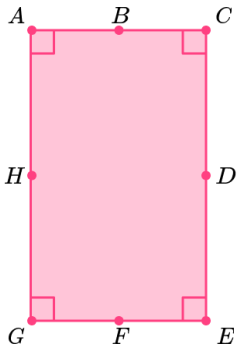
Types and properties of quadrilaterals - Answers

Group B	Identify each quadrilateral below from each description	
	1) Two pairs of parallel sides of different lengths and no right angles.	**1)** Parallelogram
	2) Adjacent sides of equal length and no reflex angles.	**2)** Kite
	3) All sides and angles are equal sizes.	**3)** Square
	4) One pair of parallel sides.	**4)** Trapezium
	5) All sides are equal and opposite pairs of angles are equal.	**5)** Rhombus
	6) Two pairs of parallel sides of different lengths and four right angles.	**6)** Rectangle
	7) Adjacent sides of equal length and one reflex angle.	**7)** Arrowhead
	8) Four lines of symmetry.	**8)** Square
	9) Diagonal lines bisect and are perpendicular and do not have right angles.	**9)** Rhombus
	10) Two lines of symmetry and four right angles.	**10)** Rectangle
	11) Exactly two right angles.	**11)** Trapezium
	12) Two lines of symmetry and no right angles.	**12)** Rhombus

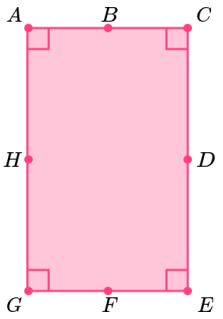
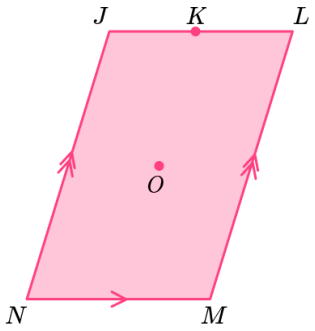
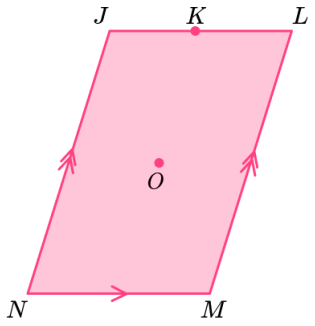
Types and properties of quadrilaterals - Answers

Group C	Identify the quadrilaterals	
	1) Quadrilateral $ABCE$ 	**1)** Trapezium
	2) Quadrilateral $ABDE$ 	**2)** Parallelogram
	3) Quadrilateral $ABCF$ 	**3)** Trapezium
	4) Quadrilateral $ABDE$ 	**4)** Parallelogram
	5) Quadrilateral $GIKM$ 	**5)** Rectangle

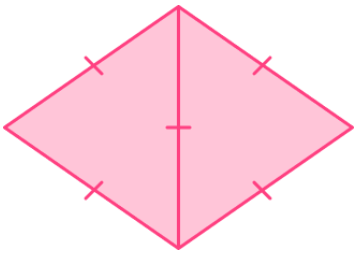
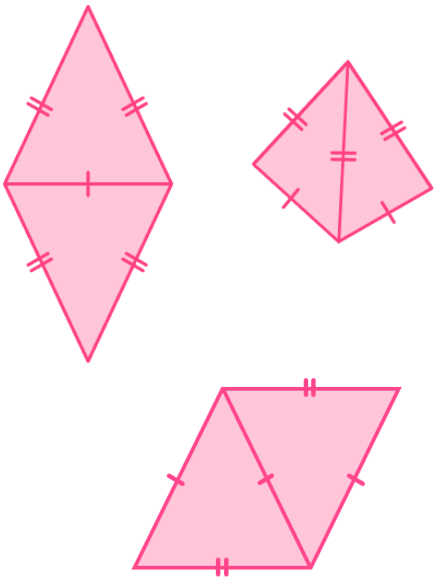
Types and properties of quadrilaterals - Answers

Group C contd	**6)** Quadrilateral $HJLN$ where H is the midpoint of GI, L is the midpoint of KM and line JN is parallel to GI.  	**6)** Kite
	7) Quadrilateral $PRTV$ where $PR = RT = TV = PV$  	**7)** Square
	8) Quadrilateral $QSUW$ points Q, S, U and W are midpoints of each side length and $PR = RT = RV = PV$  	**8)** Square
	9) Quadrilateral $ACEG$  	**9)** Rectangle

Types and properties of quadrilaterals - Answers

Group C contd	**10)** Quadrilateral $BDFH$ where points B, D F and H are the midpoints of each side.  	**10)** Rhombus
	11) Quadrilateral $JLMN$  	**11)** Parallelogram
	12) Quadrilateral $KMON$  	**12)** Arrowhead

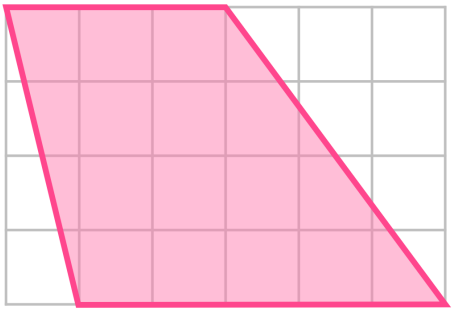
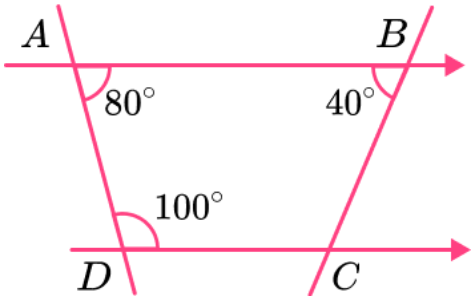
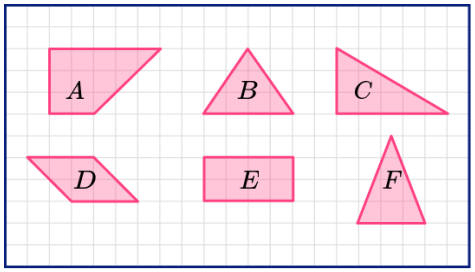
Types and properties of quadrilaterals - Answers

	Question	Answer
	Applied Questions	
1)	**a)** If two equilateral triangles are placed with two sides touching, what is the name of the quadrilateral this forms?	**a)** Rhombus 
	b) If two isosceles triangles are placed with two sides touching, what are the names of the quadrilateral these form?	**b)** Rhombus, parallelogram or kite 
2)	**a)** Here is Jack's description of a quadrilateral. 'It has two pairs of parallel sides of different lengths and 4 lines of symmetry.' Jack has made an error. Identify and explain the error.	**a)** A square has four lines of symmetry and the sides of a square are all equal. A rectangle has two pairs of parallel sides of different lengths, but only has 2 lines of symmetry.
	b) Here is Faye's description of a trapezium she has drawn. 'It has three right angles.' Faye has made an error. Identify and explain the error.	**b)** If there are three right angles then the fourth angle will also be a right angle as all angles in a quadrilateral sum to 360. This would therefore mean that the quadrilateral is a square or a rectangle. A trapezium only has one pair of parallel sides.

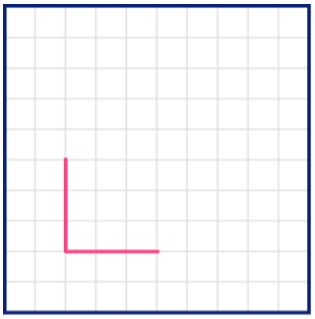
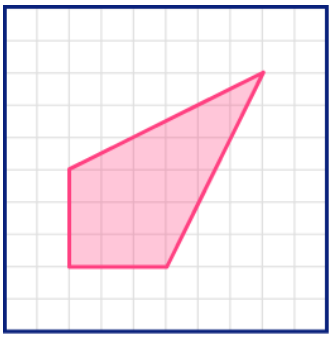
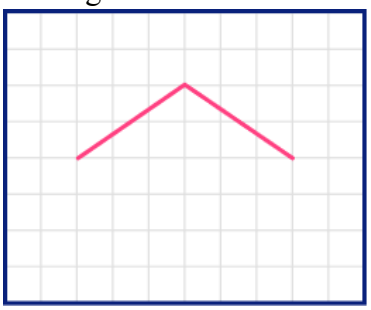
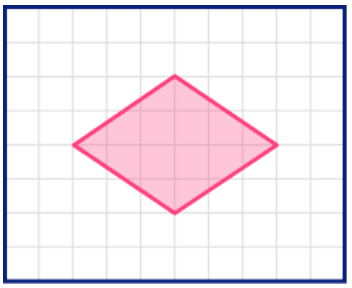
Types and properties of quadrilaterals - Answers

3)	Decide if each statement is always true, sometimes true or never true. Justify your answer.	
	a) A parallelogram has 2 lines of symmetry.	**a)** Sometimes. A parallelogram usually have 0 lines of symmetry. But if the parallelogram had right angles, this would make it have 2 lines of symmetry and be a rectangle. A rectangle is a type of parallelogram.
	b) A trapezium has an obtuse angle.	**b)** Always true. A quadrilateral cannot have 4 acute angles as these would sum to less than 360. At least one angle has to be obtuse in order to not be a rectangle or square which has 4 right angles.
	c) The angles in a kite are all different.	**c)** Never true. A kite has one pair of opposite, equal angles.
4)	**a)** Draw a square and mark the midpoints of each side. Join the midpoints together. What shape is now inside the square? What would happen if you repeated this process?	**a)** This would be a square and if you repeated the process you would continue drawing squares of decreasing size.
	b) Draw a rectangle and mark the midpoints of each side. Join the midpoints together. What shape is now inside the rectangle? What would happen if you repeated this process?	**b)** This would be a rhombus. If you repeated the process you would alternate between drawing rectangles and rhombi (or rhombuses).

Types and properties of quadrilaterals - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	This quadrilateral is drawn on a centimetre square grid.  Name the quadrilateral.	**(a)** Trapezium	**(1)**
(b)	Work out the area of the quadrilateral. You must give the correct units for your answer.	**(b)** $\frac{1}{2} \times (3 + 5) \times 4$ 16 cm^2	**(1)** **(1)** **(1)**
2)	AB and DC are parallel lines.  		
(a)	Name quadrilateral $ABCD$.	**(a)** Trapezium	**(1)**
(b)	Calculate the size of angle BCD.	**(b)** $360 - 80 - 100 - 40$ 140^o	**(1)** **(1)**
3) (a)	This diagram shows six shapes on a centimetre grid.  Name shape A	**(a)** Trapezium	**(1)**
(b)	Name shape D.	**(b)** Parallelogram	**(1)**

Types and properties of quadrilaterals - Mark Scheme

4) (a)	Here are two lines drawn on a centimetre grid.  Draw two more lines to draw a kite.	**(a)** Two lines of equal length resulting in a quadrilateral with only one line of symmetry **and** where the diagonals meet at 90 degrees 	**(1)**
(b)	Here are two lines drawn on a centimetre grid.  Draw two more lines to draw a rhombus.	One unique solution: 	**(1)**