

Practice Book *UNIT 15 Polygons*Answers

15.1 Angle Facts

1. (a) 127° (b) 163° (c) 141° (d) 50°
2. (a) 36° (b) 61° (c) 47° (d) 49°
3. (a) 131° (b) 67° (c) 34° (d) 50°
4. $a = b = 70^\circ$
5. $a = 37^\circ$, $b = 70^\circ$
6. $b = 47^\circ$, $a = c = 133^\circ$ (a and c are equal - vertically opposite)
7. $a = 106^\circ$, $b = 74^\circ$, $c = 53^\circ$
8. $a = 89^\circ$, $b = 91^\circ$, $c = 66^\circ$
9. $a = 80^\circ$, $b = 9^\circ$, $c = 86^\circ$
10. $a = 57^\circ$, $b = 86^\circ$, $c = 123^\circ$, $d = 57^\circ$, $e = 110^\circ$

15.2 Angle Properties of Polygons

1. (a) 30° (b) 5° (c) 18° (d) 6°
2. (a) Exterior = 45° , Interior = 135°
(b) Exterior = 36° , Interior = 144°
3. (a) 150° (b) 1800°
4. (a) 162° (b) 3240°
5. 72°
6. 30 sides
7. (a) (i) 12 (ii) 72 (iii) 20 (iv) 60
(b) Interior angle = 123° , Exterior angle = 57°

No. of sides = $\frac{360}{57}$ which is not an exact integer, so a regular polygon not possible.

15.2

Answers

8. (a)

<i>Number of Sides</i>	<i>Exterior Angles</i>	<i>Interior Angles</i>	<i>Sum of Interior Angles</i>
4	90°	90°	360°
5	72°	108°	540°
6	60°	120°	720°
7	$51\frac{3}{7}^\circ$	$128\frac{4}{7}^\circ$	900°
8	45°	135°	1080°
9	40°	140°	1260°
10	36°	144°	1440°
12	30°	150°	1800°

(b) If n = no. of sides of regular polygon, $\text{sum} = (n - 2) \times 180^\circ$.

(c) Sum of interior angles.

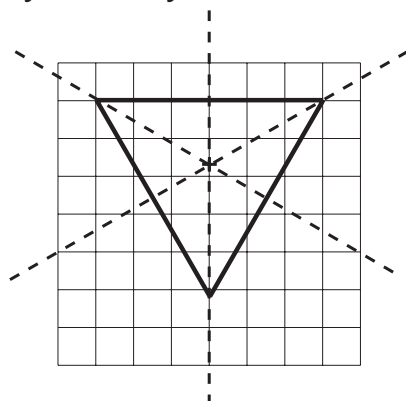
9. (a) 90 (b) $(90 - 2) \times 180 = 15840^\circ$

10. (a) $\frac{360^\circ}{\text{no. of sides}}$ (b) Interior angle $= 180^\circ - \text{exterior angle}$
 $= 180^\circ - \frac{360^\circ}{n}$

(c) $\text{sum} = 180^\circ(n - 2)$

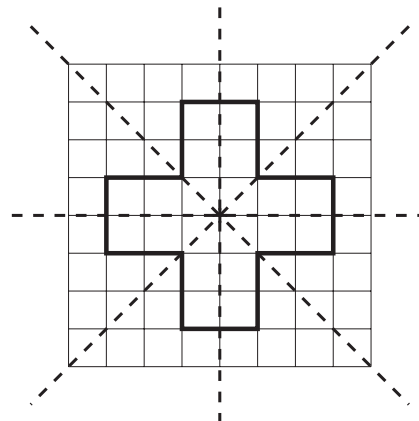
15.3 Symmetry

1. (a)



Order of rotational symmetry 3

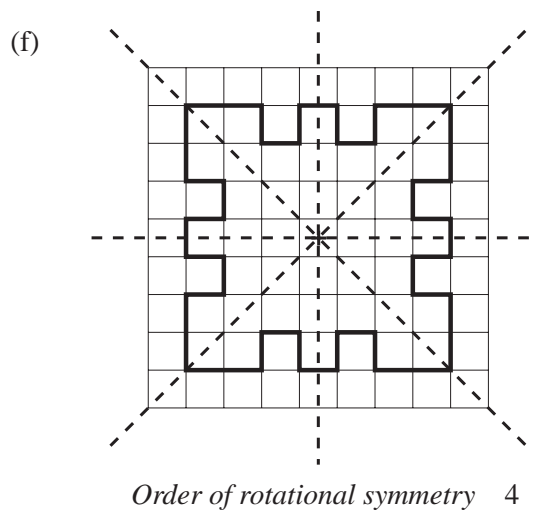
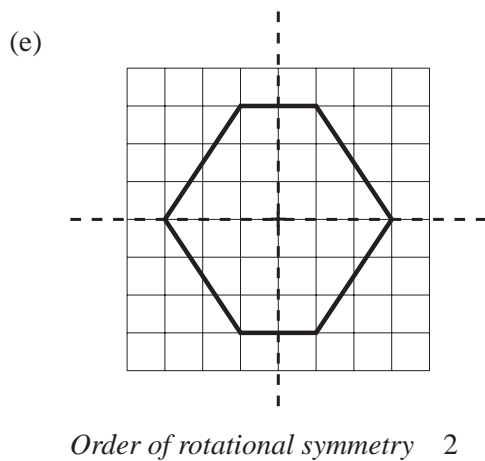
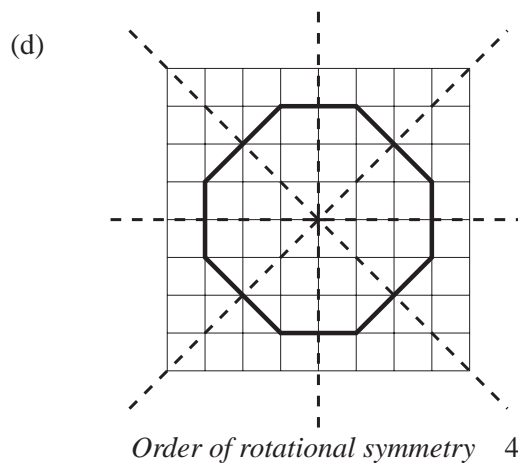
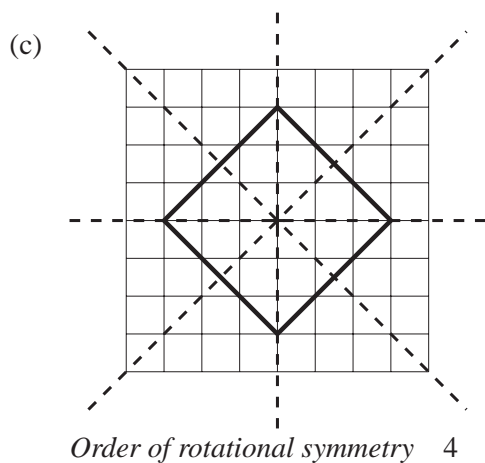
(b)



Order of rotational symmetry 4

15.3

Answers



2.	<i>Order of Rotational Symmetry</i>	<i>No. of Lines of Symmetry</i>
(a)	4	4
(b)	1	1
(c)	2	2
(d)	2	2
(e)	2	2
(f)	1	1

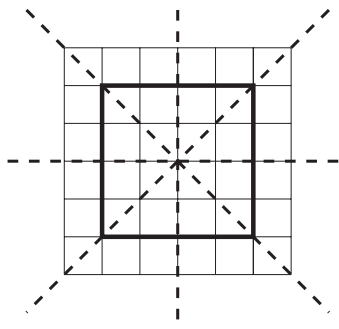
3.	<i>Order of Rotational Symmetry</i>	<i>No. of Lines of Symmetry</i>
(a)	6	0
(b)	3	3

15.3

Answers

	<i>Order of Rotational Symmetry</i>	<i>No. of Lines of Symmetry</i>
Equilateral	3	3
Isosceles	1	1
Scalene	1	0

5. (a) 4 (b) 4



6. (a)

<i>Shape</i>	<i>Order of Rotational Symmetry</i>	<i>Number of Lines of Symmetry</i>
<i>Equilateral triangle</i>	3	3
<i>Square</i>	4	4
<i>Regular pentagon</i>	5	5
<i>Regular hexagon</i>	6	6
<i>Regular heptagon (7 sides)</i>	7	7
<i>Regular octagon</i>	8	8
<i>Regular nonagon (9 sides)</i>	9	9
<i>Regular decagon (10 sides)</i>	10	10
<i>Regular dodecagon (12 sides)</i>	12	12

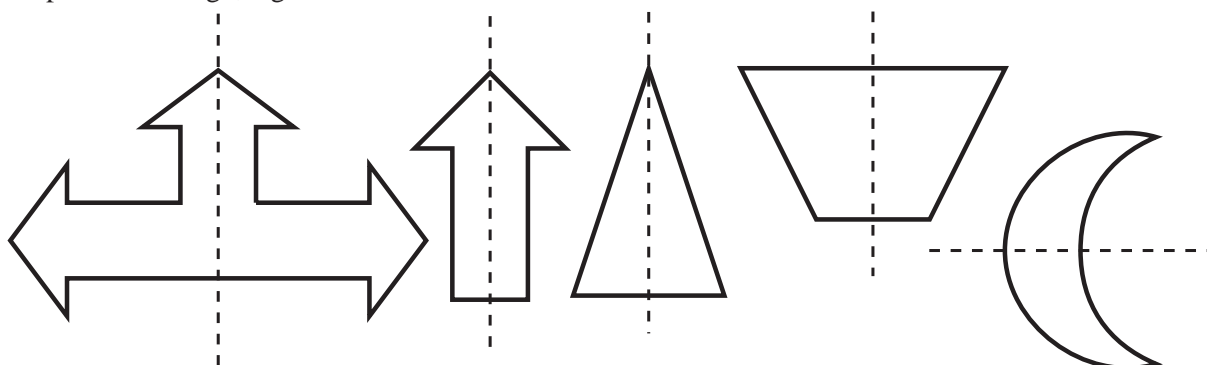
(b) The number of lines of symmetry = order of rotational symmetry for a regular polygon.

7. Pupil's own design.

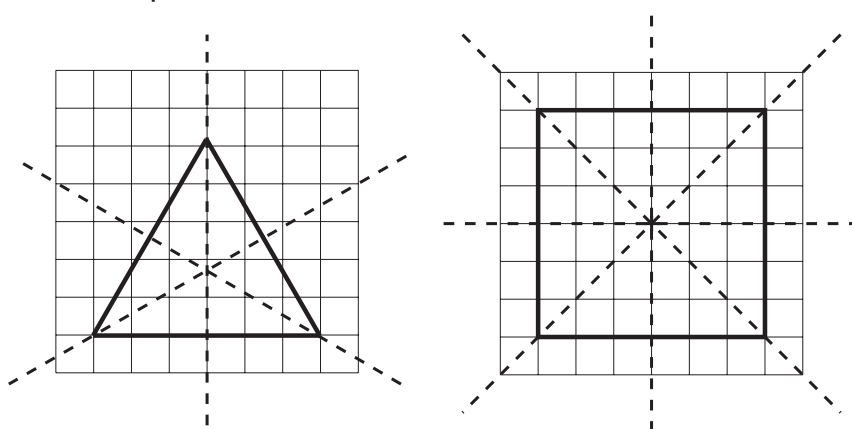
15.3

Answers

8. Pupil's own design, e.g.



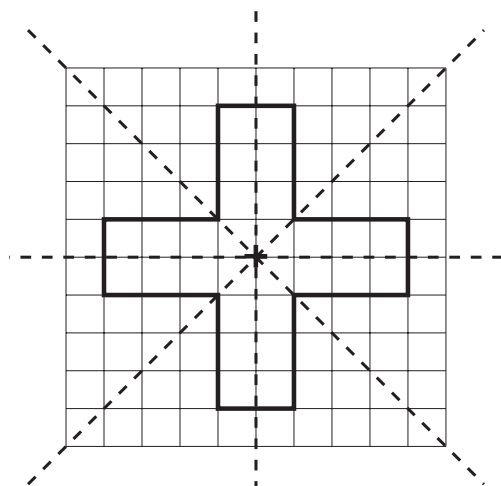
9. E.g:



Odd number of sides – lines of symmetry through vertex and middle of opposite side.

Even number of sides – lines of symmetry through middle of opposite sides, or diagonal vertices.

10.



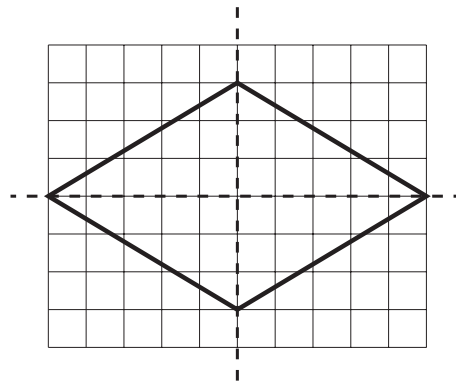
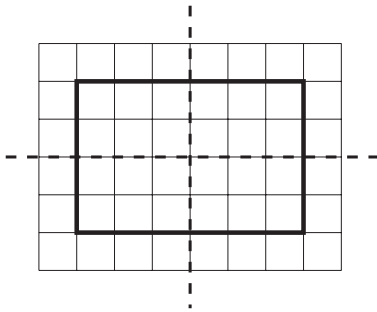
Order of rotational symmetry = 4

Answers

15.4. Quadrilaterals

1. Rectangle, Square
2. (a) Rectangle (but not square), Rhombus (but not square)

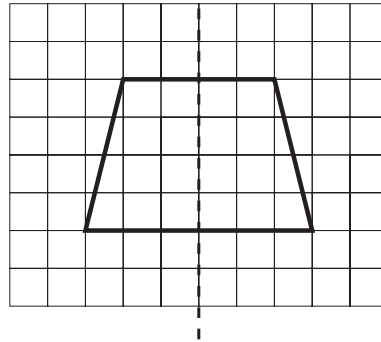
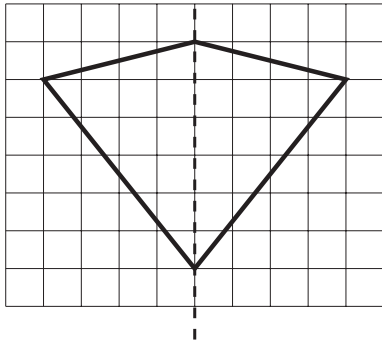
(b)



3. Rectangle, Rhombus, Parallelogram

4. (a) Kite and Isosceles Trapezium

(b)



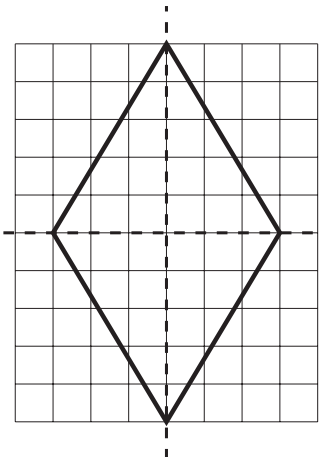
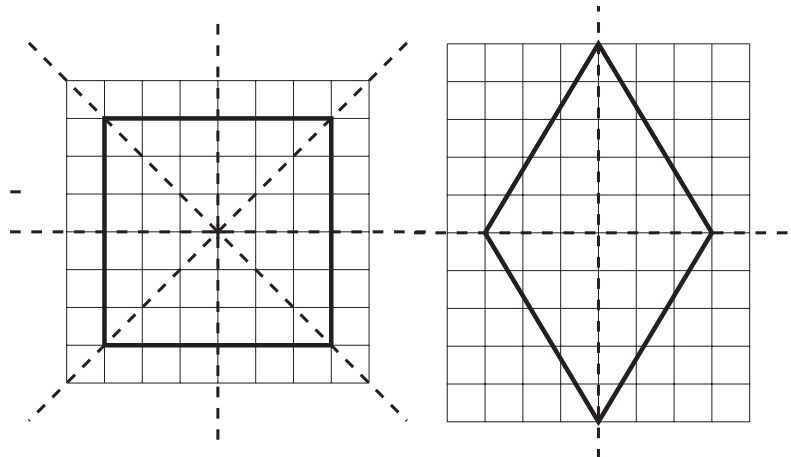
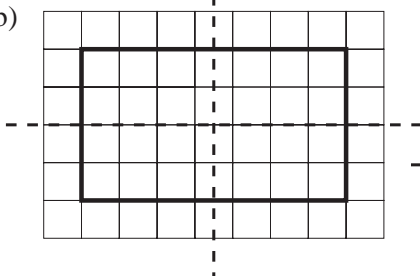
5. (a) Trapezium (b) Kite (c) Rectangle
(d) Rhombus (e) Trapezium (f) Parallelogram

6. Parallelogram (unless it is a rectangle), Rhombus (unless it is a square), Kite, Trapezium (unless it is isosceles)

7. (a) The quadrilateral must be a rhombus.
(b) The quadrilateral could be a square if it contains 4 right angles.

8. (a) Rectangle, Square, Rhombus

(b)



15.4

Answers

(c) *Name* *Order of Rotational Symmetry*

Rectangle 2

Square 4

Parallelogram 2

Rhombus 2

9. A Square B Rectangle C Rhombus D Parallelogram
 E Trapezium F Kite G General quadrilateral

10. A variety of acceptable solutions, e.g.

