Extended answers for 11+ Non-verbal Reasoning Practice and Test for GL Assessment Ages 10–11

Series (pages 6–8)

1	B	One line is added each time. Once added, lines do not move.
2	D	The shape rotates 45° anticlockwise each time.
3	E	The white circle moves between corners anticlockwise. The black circle moves between corners clockwise.
4	A	The black arrow moves 45° clockwise. The white arrow moves 90° clockwise.
5	C	The pattern moves between corners clockwise. Each time, one white circle and one white square is removed and one black circle and one black square is added.
6	B	The direction of the arrow alternates. The arrow indicates which direction the top shape rotates, and the angle of rotation increases by 45° each time: 45°, 90°, 135° and 180°.
7	C	The black segment rotates 120° anticlockwise each time. The small white circle rotates 60° anticlockwise each time.
8	B	The pattern rotates 90° clockwise each time, and circles become lines, lines become triangles, and triangles become circles.
9	D	Each time, triangles become squares, squares become circles, circles become triangles, and the colouring of each level alternates between black and white.
10	B	Each time, the line and black circle rotate 45° clockwise and the white circle moves 90° clockwise.
11	A	There are two separate shapes, each made of four squares. Each of the two shapes rotates 90° clockwise each time, centred on its black dot.
12	D	Each time, the black triangle alternates between top and bottom, and the white circle and line rotate 90° clockwise. The striped circle does not change.
13	A	Each time, two lines are added, and existing lines are unchanged.
14	B	One line rotates by 45° clockwise each time and the other line rotates by 90° clockwise. In each square, the parts of the circle the lines point to in the previous square change colour (black becomes white, white becomes black).
15	E	The pattern rotates 90° anticlockwise each time. Each line and shape move one place along to the left each time. So that the triangle replaces the square, the square replaces the circle and the circle replaces the triangle.
16	A	Each time, the bottom dot moves one space to the right and the top dot moves two to the right. The shapes move one place to the left.

Analogies (pages 9–11)

1	C	The whole shape is rotated 90° clockwise to make the second shape.
2	E	Going from the first to the second shape, the outer part of the shape is reflected vertically, but the direction of the arrowheads and the inner shape are unchanged.
3	A	The second shape is the first shape combined with a smaller version of it reflected vertically.
4	B	The first shape is rotated by 180° to give the second shape.
5	D	The second shape is the same as the first shape but with the right-hand half of the outer shape and the left-hand half of the inner shape removed.
6	C	The first shape is reflected vertically to give the second shape.
7	A	The second shape is a horizontal reflection of the inner part of the first shape.
8	C	Each small shape moves to the opposite corner.
9	E	The small shape with a dot is coloured black. The bottom shape becomes the outer shape, the middle shape is the middle shape and the top shape becomes the inner shape.
10	B	The four lines are made into a single shape, starting with the top line and rotating 90° clockwise each time.
11	D	The outer shape is repeated a number of times, in a concentric fashion equal to the number of dots.
12	A	Each of the two shapes are extended by adding a vertical reflection. The black shape changes to white and is placed on top of the other shape.
13	E	The first shape is rotated 90° anticlockwise and the line with an x becomes dotted.

Like Figures (Two) (pages 12–13)

1	B	One quarter of each shape is marked.
2	D	Each shape has one x for each side.
3	A	The spirals are anticlockwise.
4	B	The dot is at the midpoint of the longer of the two lines.
5	C	Each shape consists of two shapes that are vertical reflections of each other, with their intersection coloured black.
6	E	Each shape consists of a solid shape with a larger dashed version outside it and a U shape inside it.
7	A	Each shape has one quarter striped, with the direction of the stripes matching its outer edge.
8	D	Each shape has two horizontal lines, one vertical line and two diagonal lines.

Like Figures (Three) (pages 14–15)

1	D	Each shape consists of a semicircle and an arrow from the centre of the semicircle crossing a third of the way along it.
2	A	Each shape consists of a circle containing a black shape and a white shape, and has a quadrilateral that crosses the edge of the circle.
3	E	Each shape has a curve with crosses and circles on different sides.
4	D	Each 'plant pot' has the same shape, and there are four 'leaves' on alternating sides of the 'stem'.
5	C	Each shape has a line of symmetry.
6	A	The shape at the top and bottom are halves of a larger shape. The number of sides of the larger shape is equal to the number of lines in the middle.
7	B	Each overall shape consists of a large striped shape in between a small black or white circle and a small black or white square.
8	D	The outer shape has two more sides than the inner shape.

Codes (In a Box) (pages 16–17)

1	E	The upper letter indicates the size of the shape – F means large. The lower letter indicates the number of sides the shape has – Z means three.
2	A	The upper letter indicates the shading of the smaller rectangle – J means black. The lower letter indicates the position of the smaller rectangle – O means at the top.
3	B	The upper letter indicates the shading of the upper square – X means horizontal lines. The lower letter indicates the type of the lower shape – M is the shape in the middle box and the answer.
4	C	The upper letter indicates the direction of the arrow – W is clockwise. The lower letter indicates the number of lines – K is two.
5	D	The upper letter indicates the orientation of the three lines – U has a line pointing straight down. The lower letter indicates how many arrowheads – P indicates two.
6	E	The upper letter indicates the size of the lower curved shape – J indicates medium. The lower letter indicates the amount of shading of the upper rectangle – Y indicates the top half being shaded.
7	B	The upper letter indicates the shape of the bottom of the shield – M means curved sides ending in a point. The lower letter indicates the shape of the top of the shield – H means a curved top.
8	E	The upper letter indicates where the lines cross – R indicates crossing nearer the top than the bottom. The lower letter indicates the number of crosses – J means three.

Codes (Two and Three Letters) (pages 18–19)

1	C	The first letter indicates how the rectangle is divided – T is for diagonal lines. The second letter indicates the fraction that is shaded – L is one quarter.
2	E	The first letter indicates the direction of the line – P is diagonal. The second letter indicates the length of the line – X is long.
3	B	The first letter indicates the number of dots – J means two. The second letter indicates the direction of the shape – X means pointing up.
4	E	The first letter indicates the shape of the overlap – N means a triangle. The second letter indicates the colour of the overlap – Z means black.
5	C	The first letter indicates the outline shape – K means a square. The second letter indicates the centre shape – G means an x. The third letter indicates how many sides the outer shape has – S means two.
6	B	The first letter indicates the shading – J means striped. The second letter indicates the orientation of the shape – H means in an 'L' shape. The third letter indicates the presence or not of an arrow – Y means an arrow.
7	A	The first letter indicates the outer line – R means a thick line. The second letter indicates the type of circle – U means none. The third letter indicates the direction of the 'v' shape – V means the 'v' shape is pointing upwards.
8	D	The first letter indicates the shape on the line – G indicates a rectangle. The second letter indicates whether the shape is above or below the line – R indicates below. The third letter indicates the shading of the shape – T indicates black.

Odd One Out (pages 20–22)
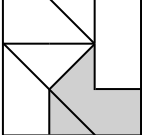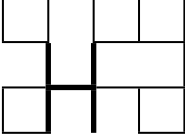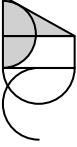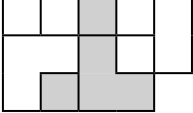
1	C	The shapes that belong have inner shapes a little smaller than the outer shapes. The odd one out has a much smaller inner shape.
2	D	The shapes that belong have a plus symbol nearest to the inner line. The odd one out has an x.
3	A	The shapes that belong have one circle, one square and one triangle. The odd one out has two circles.
4	E	The shapes that belong are divided into quarters. The odd one out has four parts of different sizes.
5	D	The shapes that belong have an arrow passing through the corners of the inner rectangle. The odd one out has an arrow passing through the sides of the inner rectangle.
6	B	The shapes that belong have four black lines in different orientations. The odd one out has two diagonal lines in the same orientation.
7	C	The shapes that belong have the black triangle near the centre of the hexagon. The odd one out has the black triangle towards the outer edge.
8	C	The shapes that belong have a circle on the shortest line. The odd one out has a square on the shortest line.

9	B	The shapes that belong are all rotations of each other, ignoring the detail of the arrowhead. The odd one out is a reflection of the others.
10	D	The shapes that belong have a curved 'handle' at the top. The odd one out has a pointy 'handle'.
11	A	The shapes that belong have the same number of sides and short lines. The odd one out has four sides but five short lines.
12	E	The shapes that belong have 180° rotational symmetry. The odd one out does not.
13	B	The shapes that belong have a hole in them. The odd one out does not.
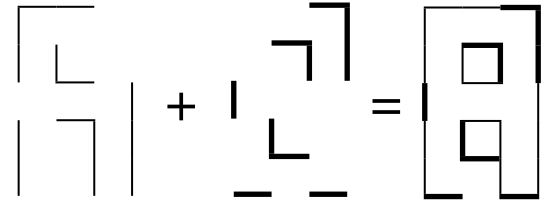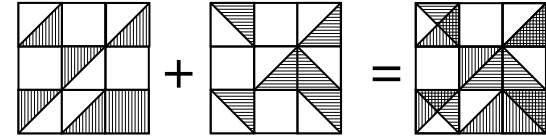
Matrices (pages 23–25)

1	D	Moving clockwise around the squares, the lines are rotated 90° clockwise and the numbers of circles and lines alternate between one and two.
2	B	In each column, the shapes are reflected vertically, but the colours do not change position.
3	A	In each row, the shapes are swapped, but the arrows and the single/double lines are unchanged.
4	B	In each row, the circles do not move, but the other shapes are reflected horizontally.
5	E	In each row, the lines are rotated 90°, the other shapes are reflected horizontally, and black and white are swapped.
6	D	In each row, the shape and its shading is rotated 90° clockwise.
7	E	Each row and column has one circle, one square and one triangle, and each row and column has one white, one dark and one striped shape.
8	A	In each row the third box is a combination of the first and second boxes. But if the same shape is in box 1 and box 2 in the same position then it cancels itself out so is not shown in the third square. So because the third box is a circle and a triangle with no boxes, we know that the first square must have a triangle in it and also two squares to cancel out the squares in the second box.
9	B	In each row the third square is a combination of the first and second. Each of the nine smaller squares in the third square is grey if the corresponding smaller square of the first or second square is grey.
10	C	Each row and column has one of each of the three orientations of the two lines, and each row and column has one black, one white and one striped circle.
11	B	Each row and column has one shape made of three lines, one made of four lines, and one made of five lines.
12	B	Each column is vertically symmetrical.
13	E	Each column has a shape that is one square across, two squares across and three squares across. And, every column has a shape that is one square high, two squares high and three squares high.
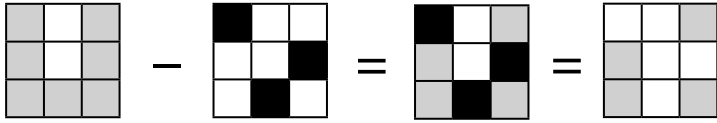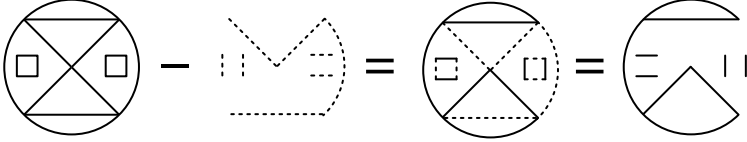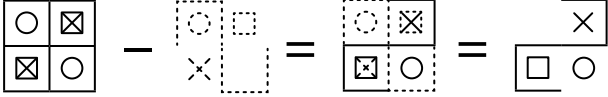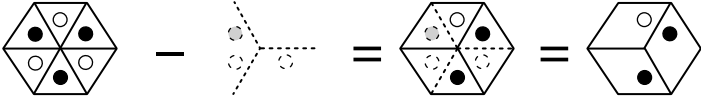
Merge Shapes (Hidden) (page 26)

1	D	The hidden shape is shaded in the answer diagram.
2	E	The hidden shape is shown with a thick line in the answer diagram.
3	B	The hidden shape is shaded in the answer diagram.
4	C	The hidden shape is shaded in the answer diagram.

Merge Shapes (Addition) (page 27)

1	C	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image or overlapping lines.
2	A	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image or overlapping lines.
3	B	The answer diagram uses vertical shading for the left-hand image and horizontal shading for the right-hand image.
4	D	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image or overlapping lines.

Merge Shapes (Subtraction) (page 28)

1	A	The answer diagram uses a grey fill for the starting image and a black fill for what was subtracted.
2	D	The answer diagram uses solid lines for the starting image and dotted lines for what was subtracted.
3	E	The answer diagram uses solid lines for the starting image and dotted lines for what was subtracted.
4	B	The answer diagram uses solid lines and a black fill for the starting image and dotted lines and a shaded fill for what was subtracted.

Cubes (Which Net?) (pages 29–30)

1	A	Neither the black triangle nor the black rectangle sit on the join of the two faces. This is only the case for A.
2	D	The K and C faces must touch in the correct orientation, ruling out A, B and C. The vertical of the T points to the K, ruling out E.
3	C	The three dots must point towards the triangle, ruling out A, B and E. In D, if the triangle and circle were as in the made-up cube, the three dots would be to the left of the circle.
4	B	The triangle must point towards the black face, ruling out C, D and E. In A, if the black square were on top then the segmented circle would be to the right of the triangle.
5	E	The arrow must point towards the diagonal line, ruling out A and D. The orientation of the diagonal line relative to the arrow is incorrect in B and C.
6	A	The rhombus must be next to the black square, ruling out E. The sets of three dots in the six dots must point towards the black square, ruling out B. In C, the dots and black square are on opposite faces. If D was arranged with the rhombus and the six dots like the made-up cube then the black square would be on the bottom.
7	E	The full arrow must point to a corner of the black circle face, ruling out A, B and D. If C was arranged with the arrow and black circle like the made-up cube then the rhombus would point the wrong way.
8	B	A line drawn through the dots of the division symbol must point to the x, and these faces must touch, ruling out A, C, D and E.

Cubes (Which Cube?) (page 31–32)
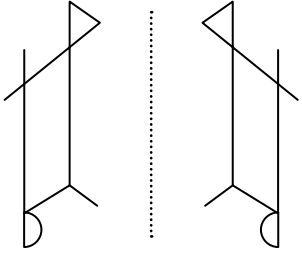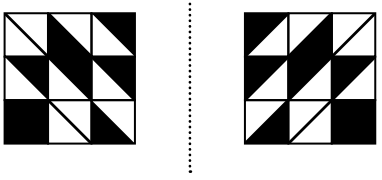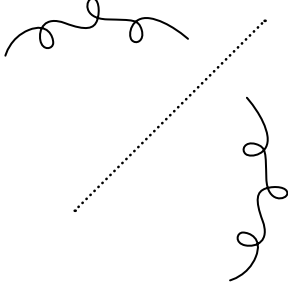
1	C	In C, the zig-zag facing the square is the wrong way round.
2	A	In A, the arrow points to the circles, not the diagonal lines.
3	D	The pair of lines would point towards the 8 as in A, not towards the triangle as in D.
4	B	In B, the diagonal line on top points the wrong way.
5	E	The point of the quadrilateral cannot point towards the x, so E is incorrect.
6	C	The plus symbol must be next to the head of the arrow, not its tail, so C is incorrect.
7	A	In A, the orientation of the two semicircles is incorrect.
8	B	The line of the 1 should be directed towards the 4, so B is incorrect.

Folding and Punching (pages 33–34)
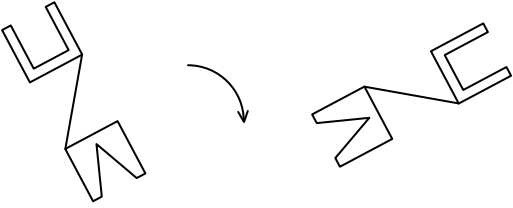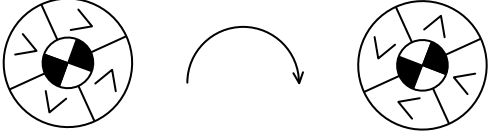
The diagrams show the position of the holes as the paper is unfolded.

1	D	
2	B	
3	D	
4	B	
5	E	
6	C	
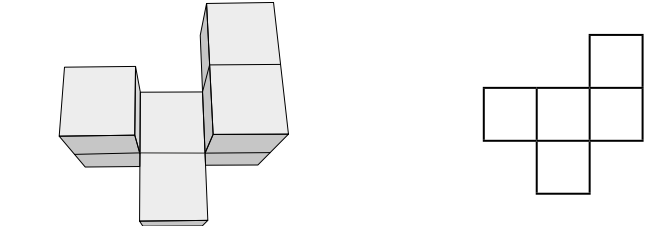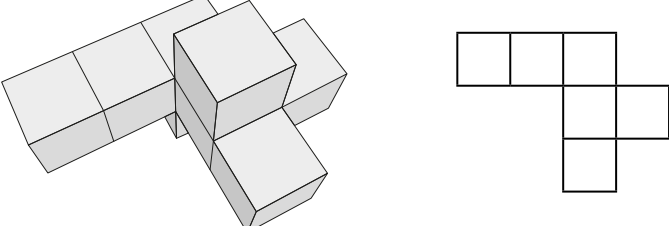
Reflections (page 35)
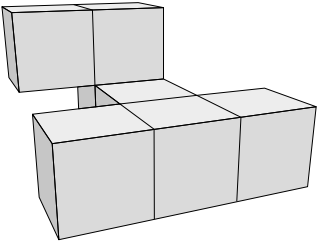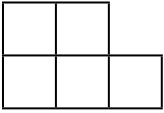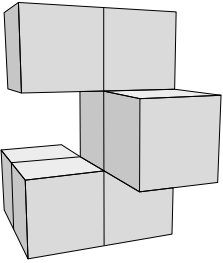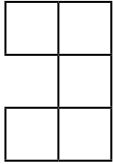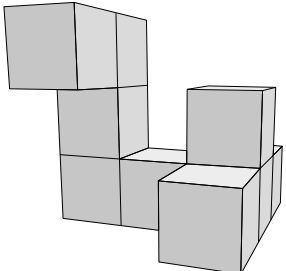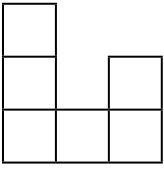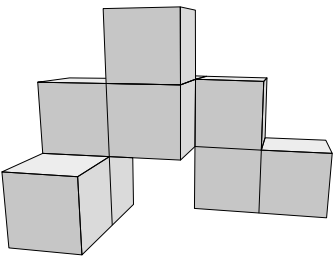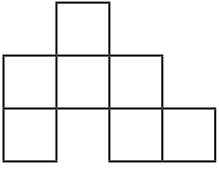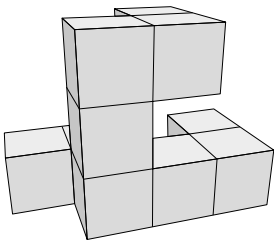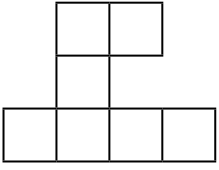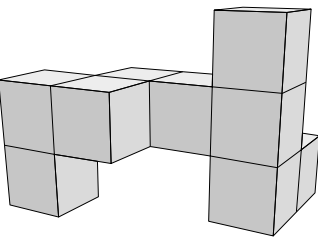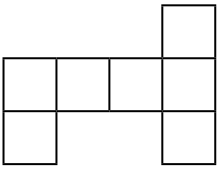
1	C	
2	E	
3	B	

Rotations (page 36)
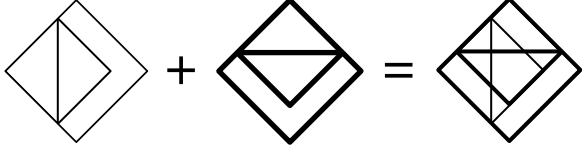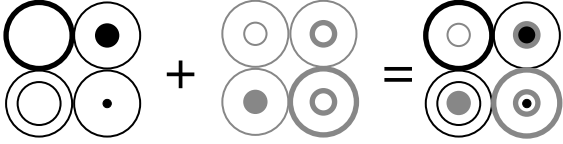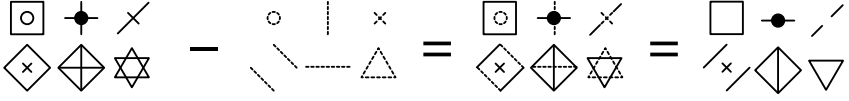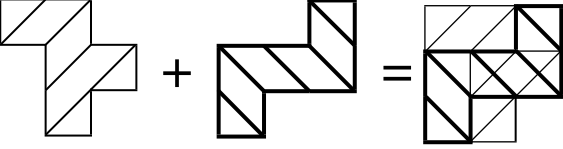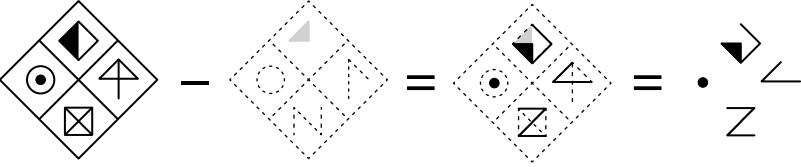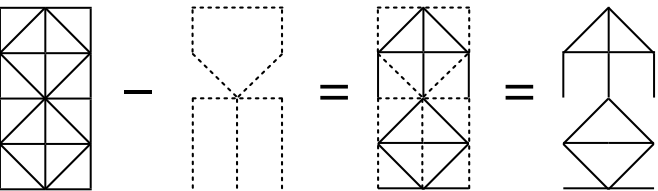
1	E	
2	C	
3	A	
4	E	
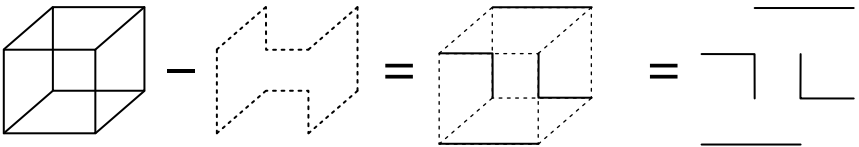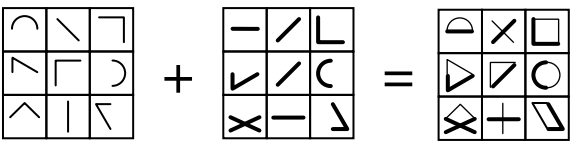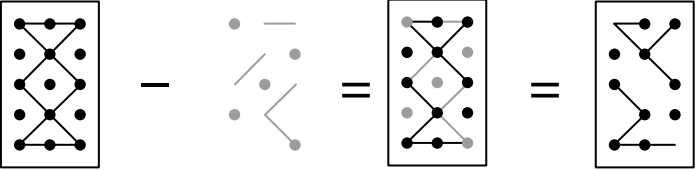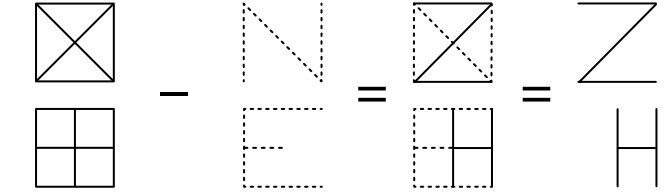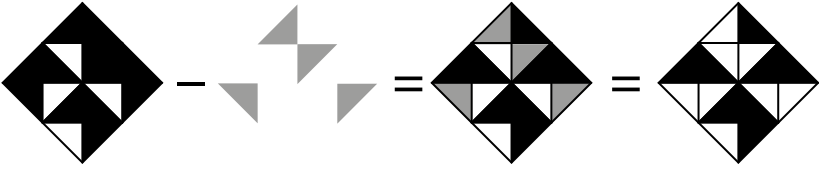
3D Shapes (pages 37–38)

1	A	
2	D	

3	C		
4	E		
5	B		
6	A		
7	C		
8	B		

Practice Paper 1: Merge Shapes (Addition and Subtraction) (pages 40–42)

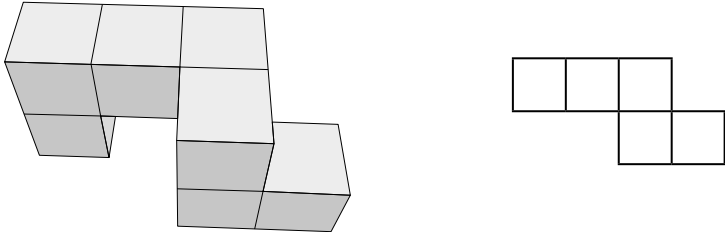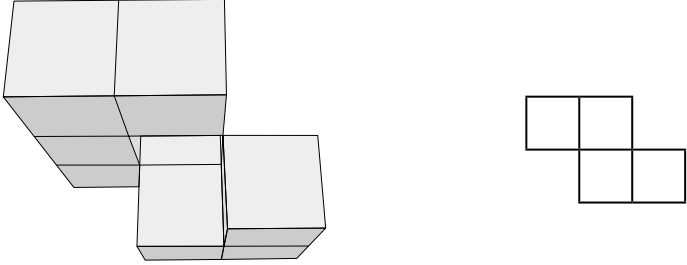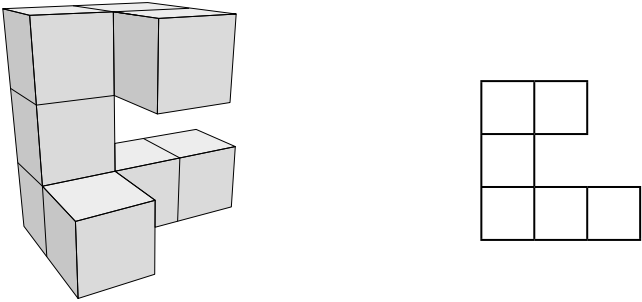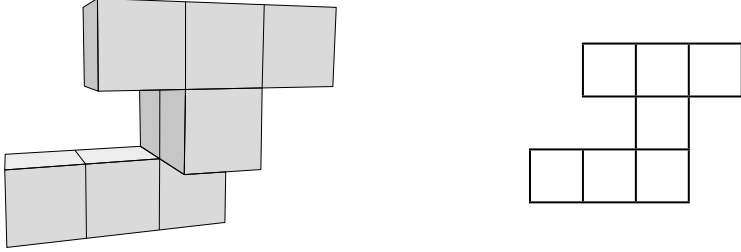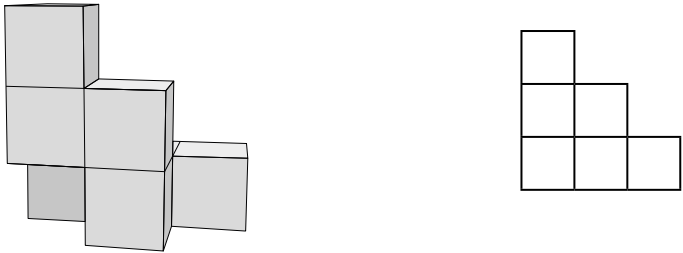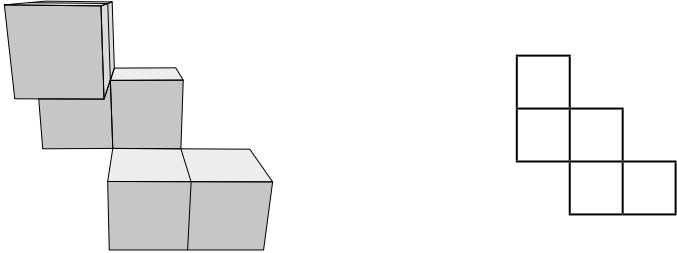|		
1	D	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image or overlapping lines.
2	B	The answer diagram uses black for the left-hand image or overlapping lines and grey for the right-hand image.
3	C	The answer diagram uses dotted lines for what was subtracted.
4	A	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image or overlapping lines.
5	C	The answer diagram uses solid lines and a black fill for the starting image and dotted lines and shading for what was subtracted.
6	E	The answer diagram uses solid lines for the starting image and dotted lines for what was subtracted.

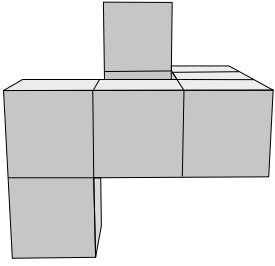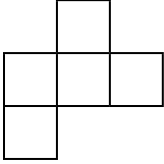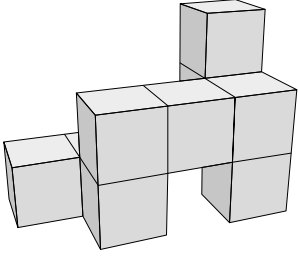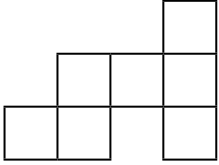| 7	B	The answer diagram uses thin grey lines and grey shading for the left-hand image and black fill for the right-hand image or overlapping lines.
8	E	The answer diagram uses solid lines for the starting image and dotted lines for what was subtracted.
9	C	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image.
10	A	The answer diagram uses black for the starting image and grey for what was subtracted.
11	D	The answer diagram uses dotted lines for what was subtracted.
12	B	The answer diagram uses a black fill for the starting image and shading for what was subtracted.
13	E	The answer diagram uses thin lines for the left-hand image and thick lines for the right-hand image.
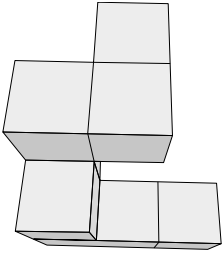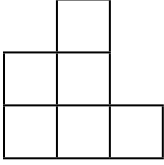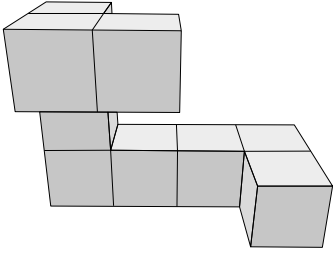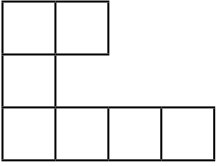
Practice Paper 1: Series (pages 43–45)

14	D	The angle of the 'mouth' alternates between 45° and 90°. The position of the black 'teeth' changes: inner, middle, outer, inner, middle.
15	B	The entire scene rotates by 90° anticlockwise each time.
16	A	Each time, the number of sides of the outer shape increases by one and the number of sides of the inner shape decreases by one.
17	E	Each time, the black circle moves 60° anticlockwise and the white circle moves 120° clockwise. The shading is parallel to the line joining the circles.
18	B	Each time the dot moves one segment clockwise, the plus symbol moves two segments clockwise and the thick line moves three segments clockwise.
19	A	This is a seven-segment display. The three thick segments move one position clockwise each time.
20	C	The arrow and circle move 90° clockwise each time and the plus symbol moves 90° anticlockwise.
21	D	The number of shapes decreases by one each time.
22	D	The diagonal line alternates direction. The arrow moves clockwise around the edges of the square and alternates pointing clockwise and anticlockwise.
23	E	The shading used for each shape changes from striped to white to black to dot to striped, and so on.
24	B	The smaller inner pentagon loses one side in an anticlockwise direction each time. The larger outer pentagon gains one side in a clockwise direction each time.
25	E	The central shape alternates between a circle and a square. The number of 'petals' increases by one each time. The shape of the 'petals' changes from pointed end to straight end to curved end to pointed end and so on.
26	C	The circle that was black in the previous square, turns white and moves to the opposite side or corner of the square. So the white circle on the left edge was from square 1, which means the circle top right in square 3, must have been black in square 2 and must have been bottom left circle. So the answer is C.

Practice Paper 2: 3D Shapes (pages 47–49)

1	B		
2	E		
3	A		
4	C		
5	C		
6	B		

7	D	
8	A	
9	D	
10	E	

Practice Paper 2: Analogies (pages 50–52)

11	A	The shape is rotated 90° anticlockwise. The inner shapes are rotated 90° anticlockwise.
12	C	Shading type moves from triangle to quadrilateral, quadrilateral to pentagon and pentagon to triangle. So, black moves from triangle to quadrilateral, white moves from quadrilateral to pentagon and striped moves from pentagon to triangle.
13	D	The first shape is copied and is positioned to overlap the original shape by half of its height. The shapes are just outlines with no fill, so you can see the edges of them.
14	B	The outer shape moves to the bottom, and the other shapes change lines from solid to dashed and dashed to solid.
15	E	The shape is rotated 90° clockwise and then a small vertical reflection of itself is added inside.
16	A	The number of short lines are used to make a black regular polygon inside a larger copy of the shape.

17	B	The outer shape is rotated 90° clockwise and its bottom half is striped. The small symbols are rotated 90° anticlockwise and put in a rectangle below it.
18	C	The shape is rotated 90° clockwise. The small black shape becomes white, and the arrowhead becomes a triangle.
19	B	The smaller shape is replicated and enlarged twice to form a large, medium and small version of the shape. The three shapes then overlap, with the smaller shape on top, and each shape is shaded. The large shape is black, the medium shape is striped diagonally and the small shape is white.
20	C	The shape is rotated 90° clockwise and then the rotated shape overlaps the original shape.
21	B	The number of sides of the outer shape decreases by one and the number of sides of the inner shape also decreases by one.
22	A	The shape is rotated 90° clockwise.
23	C	The shape is rotated 45° clockwise. White becomes black and black becomes white.

Practice Paper 3: Matrices (pages 54–56)

1	D	In each column, the bottom shape is a vertical reflection of the top shape, with solid lines becoming dotted and dotted lines becoming solid.
2	A	Each row and column has a circle, a square and a triangle; a large, medium and small shape, and a white, black and striped shape.
3	C	In each row the first shape is rotated 45° clockwise to give the second shape.
4	B	In each column, the middle shape is made by putting the top and bottom shapes on top of each other.
5	B	In each column, the bottom shape is a vertical reflection of the top shape, with white and black being swapped.
6	D	The direction of a pointer is halfway between those above and below it. (Also, it is halfway between those to its left and right.)
7	E	In each row, the top-right and bottom-left quarters of the second shape are smaller copies of the first shape, and the top-left and bottom-right quarters of the second shape are the same as in the first shape.
8	B	In each row and column, there is exactly one of each of the nine shapes (circle, triangle, square, plus symbol, multiplication symbol, division symbol, question mark, equals symbol and asterisk).
9	B	In each column, the shape is reflected vertically. Thick lines become thin, and thin lines become thick.
10	D	In the middle column, the shapes match the square to the left, and the colours match the positioning of square to the right. It is also a Latin square, where each row and column has one of each type of shape and shading (circle, triangle, square; black, white, striped).
11	D	In each row, the right-hand shape is a horizontal reflection of the left-hand shape with the colours changed so white becomes black, black becomes striped, and striped becomes white.

12	B	Each row and column has: a square, a circle, and a triangle; lines in three directions (pointing up, to the bottom right and to the bottom left); and shapes in three positions (top left, top right, and bottom).
13	C	In each row, the right-hand square is a horizontal reflection of the left-hand square with the shape in front moved to the back and the shape at the back moved to the front.

Practice Paper 3: Folding and Punching (pages 57–59)

The diagrams show the position of the holes as the paper is unfolded.

14	D	
15	C	
16	A	
17	E	
18	D	
19	B	
20	E	

21	D	
22	A	
23	A	