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sigma Σ
in mathematics & statistics support

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Non-Verbal Reasoning Practice Test 1 - Answers

Mark Scheme (1 mark for every correct answer)

Completing a Sequence

Question Number	Correct Answer
1	C
2	B
3	E
4	A
5	B
6	D
7	E

Identifying the 'odd one out'

Question Number	Correct Answer
8	D
9	B
10	E
11	C
12	A
13	E
14	D

Identifying Common Feature

Question Number	Correct Answer
15	A
16	B
17	C
18	B
19	B
20	C
21	C

Applying Operations

Question Number	Correct Answer
22	D
23	A
24	D
25	C
26	A
27	D
28	B

Guidance for Answering the Questions

Completing a Sequence

Question 1

Shapes move down by one place. When they reach the bottom, they return to the top.

The answer is C.

Question 2

Numbers move up by one place. When they reach the top, they return to the bottom.

The answer is B.

Question 3

The number of ovals intersecting lines increases by one along the sequence. Once all ovals intersect, the number starts decreasing by one.

The answer is E.

Question 4

The number of sides of the outer shape increases by one until the shape has 6 sides, then it begins to decrease by one.

The inner shape has one fewer side than the outer.

Shading alternates along the series.

The answer is A.

Question 5

The triangle shading and orientation alternates along the sequence.

The circle changes colour every other box.

The horizontal and vertical bars alternately increase in length.

The answer is B.

Question 6

The outer shapes repeat every third image of the sequence.

The inner rectangle alternates in orientation.

The inner rectangle changes shading every other image.

The answer is D.

Question 7

The star moves clockwise from each corner to the next.

The circle alternates between the bottom right corner and the top left corner.

The triangle rotates clockwise by 90°.

The answer is E.

Identifying the 'odd one out'

Question 8

The answer is D.

For all other shapes, both outer and inner shapes each have 4 sides.

Question 9

The answer is B.

All the other boxes contain exactly 3 squares.

Question 10

The answer is E.

For all other images, the right side of the grid is a reflection of the left side.

Question 11

The answer is C.

For all other images, the number of short lines is one less than the number of long lines.

Question 12

The answer is A.

All other images are made up of 5 cubes.

Question 13

The answer is E.

In all other images, for each shape in the inner circle, there are two similar but differently coloured shapes in the outer circle.

Question 14

The answer is D.

For all other images the bottom rectangle is formed by superimposing the second image onto the first.

Identifying Common Feature

Question 15

Set A: both shapes have 6 sides.

Set B: both shapes have 5 sides.

Figure 1: both shapes have 6.

The answer is A.

Question 16

Set A: there are two shaded circles in each square.

Set B: there is only one black circle in each square.

Figure 1: there is one black circle.

The answer is B.

Question 17

Set A: in each box, each white shape has a corresponding shaded shape.

Set B: in each box, identical shapes have the same shading.

Figure 1: not each white shape has a corresponding shaded shape, and not all identical shapes have the same shading.

The answer is C.

Question 18

Set A: the outer and inner shapes are the same and all elements are different colours.

Set B: the two central shapes are the same and all elements are different colours.

Figure 1: the two central shapes are the same and all elements are different colours.

The answer is B.

Question 19

Set A: the number of dots is equal to the number of sides of the shape.

Set B: the number of dots is one more than the number of sides of the shape.

Figure 1: the number of dots is one more than the number of sides of the shape.

The answer is B.

Question 20

Set A: the right side of the grid is a reflection of the left side.

Set B: the bottom half of the grid is a reflection of the top half.

Figure 1: the line of reflection goes from the top left corner of the grid to the bottom right corner.

The answer is C.

Question 21

Set A: the grey circle is nearest the opening of the cone.

Set B: the black circle is nearest the opening of the cone.

Figure 1: the striped circle is nearest the opening of the cone.

The answer is C.

Applying Operations**Question 22**

The input and operation are known, whereas the output is unknown.

The operation that is applied is: all symbols reflect in the horizontal axis. Therefore, shapes do not change their positions.

The reflection of the middle shape may be more difficult to picture, but the first and third shapes should be relatively easy to imagine:

- The base of the triangle goes to the top, the side edge stays on the left, the vertex that is at the top goes to the bottom. This results in possible answers being B or D.
- Third shape has a horizontal line of symmetry going through the middle of it. Therefore, when reflected using this line, the shape does not change. This results in possible answers being A, C or D.
- There is no need to reflect the middle shape as there is already only one answer (D) in common for the reflection of the first and third shapes.

The answer is D.

Question 23

The input and output are known, whereas the operation is unknown.

We compare input and output.

- The 1st and 3rd symbols are in the same positions so C (1st and 3rd symbols change places) is not correct.
- The 1st and 3rd symbols are unchanged so D (all symbols change shading) is not correct.
- Only the 2nd symbol appears changed so we need decide whether this is a rotation of 90° anticlockwise (A) or a reflection in the horizontal axis (B).
A reflection is possibly easiest to visualise and would result in an L shape with a vertical bar on the left and a bar along the top, which is not correct.
- The correct operator must therefore be A (rotation of 90° anticlockwise) and a quick final check of each of the symbols would assure us that this is the case.

The answer is A.

Question 24

The operation and output are known, whereas the input is unknown.

The operation performed on the input is 'All symbols move one place to the left'. We work backwards from the output using the **inverse** of this operation which is 'All symbols move one place to the right'. So, applying this inverse to the output:

- The circle moves to Position 2 (so A and B are not correct).
- The heart moves to Position 3 so D is the only possible answer.
- The 'plus' sign moves into Position 1 following the inverse operation, verifying the answer.

The answer is D.

Question 25

The input and a combination of two operators are known, whereas the output is unknown.

After the first operator (1st and 2nd symbols change places) is applied to the input, the L-shape and white diamond change places, so the order becomes: white diamond, L shape, shaded diamond (with black uppermost).

Applying the second operation (all squares change shading) to the **revised** order:

- Any triangles remain the same, so the 1st and 3rd symbols are unchanged; therefore, A and D are not correct.
- The squares making up the L shape all change shading (the top and bottom squares on the vertical bar become white with the remaining squares becoming black), so only C is correct.

The answer is C.

Question 26

The input and a combination of two operators are known, whereas the output is unknown.

After the first operator (all symbols rotate 90° clockwise) is applied to the input:

- in the 1st symbol, the bar inside the circle will slope upwards from left to right;
- in the 2nd symbol, the base of the triangle will become a vertical left side and the white section of the triangle will be uppermost;
- in the 3rd symbol, the ends of the crescent will point downwards.

Using the second operator (2nd and 3rd symbols change places) on the revised shapes, the order now changes to: circle, crescent, triangle.

The answer is A.

Question 27

The output and a combination of two operators are known, whereas the input is unknown.

The operations performed on the input are '1st and 3rd symbols change places' followed by 'all symbols reflect in the horizontal axis'.

We work backwards from the output using the inverse of these operations. Both operations are 'self-inverses', that is:

- The inverse of a reflection in the horizontal axis is reflecting back again in the horizontal axis.
- The inverse of swapping the 1st and 3rd symbols is swapping 3rd and 1st symbols.

First apply the inverse of the horizontal reflection on the **output**:

- The square in Position 1 of the output changes so that the black section is uppermost;
- The lightning bolt in Position 2 of the output changes so that it slopes upwards from left to right with point uppermost;
- The top right and bottom left sectors of the circle in Position 3 of the output become shaded (with the remaining sectors becoming unshaded).

Secondly, apply the inverse of the position change (which is 3rd and 1st symbols change places) on the **revised symbols**:

- The circle moves to Position 1 (so only answers B and D are possible);
- The 2nd symbol remains as the lightning bolt sloping upwards from left to right with point uppermost (only D is now possible);
- A quick final check confirms answer as the square (with shaded upper section) moves to Position 3.

The answer is D.

Question 28

The input and output are known, whereas the first of two operators is unknown.

We start by working backwards from the output as in Question 27.

First apply the inverse of the second operator to the **output**.

The second operator is 'all symbols move one place to the right'.

The inverse is therefore 'all symbols move one place to the left'. Applying this to the output:

- The T shape moves to Position 1.
- The square moves to Position 2.
- The L shape then moves to Position 3.

Using these revised positions as our output, we can now compare the given input with this **revised output** using a similar technique as for Question 23:

- The order of the symbols is unchanged, so neither C (all symbols move one place to the right) nor D (1st and 2rd symbols change places) can be correct.
- The T shape appears unchanged, so A (all symbols reflect in the horizontal axis) is not correct as this would result in an 'up-side-down' T shape.
- The required operator is therefore B (all symbols reflect in the vertical axis). A quick final check of the remaining symbols would assure us that this was the case.

The answer is B.

This resource was produced by the **sigma** Network Employability Special Interest Group whose members are:

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