National Security Agency (NSA) / Central Security Service (CSS)

MATRIX TEST

PREPARATION GUIDE

OVERVIEW

This preparation guide is intended to help you prepare for the Matrix Test. The Matrix Test measures your ability to reason and identify patterns. You will be presented a 3 x 3 matrix containing shapes that follow one or more patterns. The lower right cell of the matrix is missing. You need to use the patterns in the rest of the matrix in order to decide which answer choice belongs in the missing cell.

PRACTICE TEST

To help you prepare for the Matrix Test, the NSA/CSS has included five practice items similar to those on the actual test. Read each question and determine which of the options represents the correct answer. Once you are done with each question, look at the next page and compare your answers to the answers and explanations that we have provided for you. *Although it may be tempting to check an answer before completing a question, you will receive the most benefit from the practice situations if you answer the question first.*

TEST TAKING TIPS

Before starting the practice Matrix Test, review these test taking tips:

1. Review each question carefully before determining the correct response.

2. Answer all questions even if you are unsure which option represents the correct answer. You are not penalized for incorrect responses.

3. Finally, take time to study the explanation for each of the questions/answers very carefully. This will help you fine-tune your reasoning on the actual test.
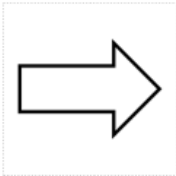
Practice Item #1

In the item below, try to visualize the shape that would complete the matrix, based on the pattern(s) of shapes. Select the option that best completes the matrix.
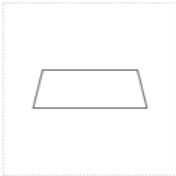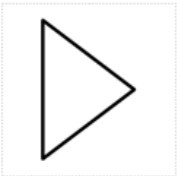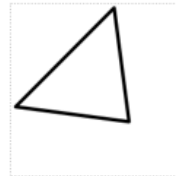

A

E

B

F

C
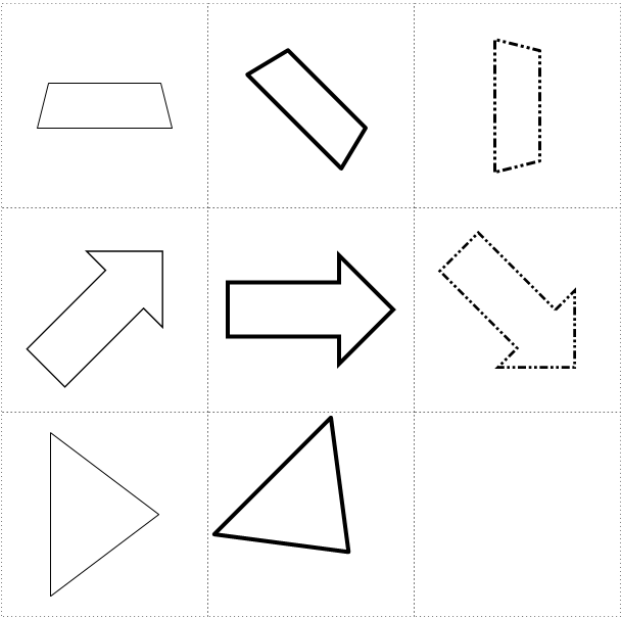
G

D

H

Practice Item #1 Explanation
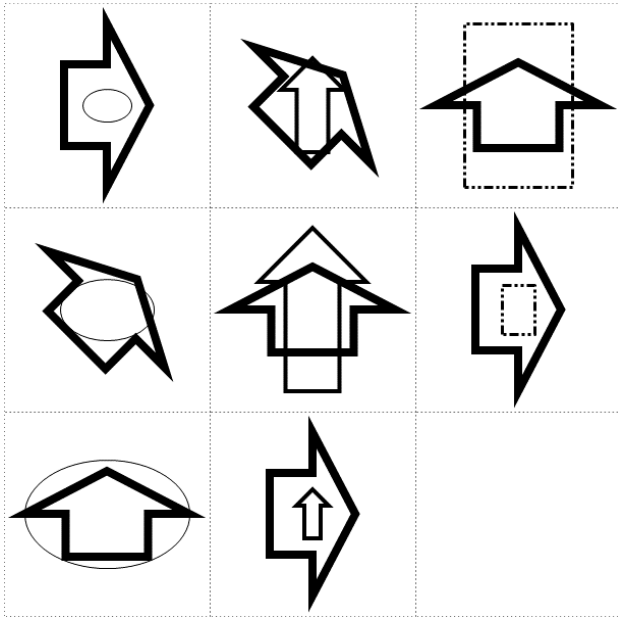
There are three patterns in this matrix:

- In the first pattern, the **shape changes across rows**, from trapezoids in the top row, to arrows in the middle row, to triangles in the bottom row. Therefore, the missing cell must contain a *triangle*.

- In the second pattern, the **line type changes across columns**. The lines in the left column are medium thickness, the lines in the middle column are bold, and the lines in the right column are dotted. Therefore, the missing cell must have a shape with *dotted lines*.

- In the third pattern, the **shapes rotate across columns**. Moving from the left column to the center column, the shapes rotate clockwise by 45 degrees (one eighth of a turn). From the center column to the right column, the shapes rotate another 45 degrees. Therefore, the shape in the missing cell must be *rotated 45 degrees compared to the shape that is in the middle column of the bottom row*.

Putting these requirements together, the correct answer will be a *triangle* with *dotted lines* that is *rotated 45 degrees compared to the triangle that is in the middle column of the bottom row*. **Option A** is correct because it meets all of these requirements.

The following pages contain four more practice items and explanations for the correct response. These practice items involve more shapes than the first practice item, but the process is the same: Identify the different patterns in the matrix, and select the response option that completes all of the patterns.

Practice Item #2

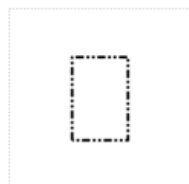Select the option that best completes the matrix.

A

B

C

D

E

F

G

H

Practice Item #2 Explanation

There are two sets of shapes in this matrix. Each set has its own patterns.

The first set of shapes is the bold, wide arrow that appears in every cell.

- This shape has three orientations: pointing to the right, pointing up, and pointing to the upper right. Each orientation appears **exactly once in each row and each column**. The right column and the bottom row each already contain one bold, wide arrow pointing up, and one that is pointing to the right. So, the missing cell must contain a *bold, wide arrow that is pointing to the upper right*.

The second set of shapes has two patterns:

- First, the **shape and line type change across columns**, from ovals with thin lines in the left column, to narrow arrows with medium lines in the middle column, to rectangles with dotted lines in the right column. So, the missing cell must contain a *rectangle with dotted lines*.

- Second, there are three different sizes of shapes in this set: small, medium, and large**.** Each size **appears exactly once in each row and once in each column.** The right column and the bottom row each contain one large shape and one small shape. Therefore, the missing cell must contain a *medium-sized shape*.
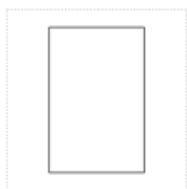
Putting these requirements together, the correct answer must contain a *bold, wide arrow pointing to the upper right* to complete the first set of shapes, as well as a *medium-sized rectangle with dotted lines* to complete the second set of shapes. Therefore, **Option A** is correct.

Practice Item #3

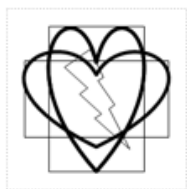Select the option that best completes the matrix.

A

E

B

F

C
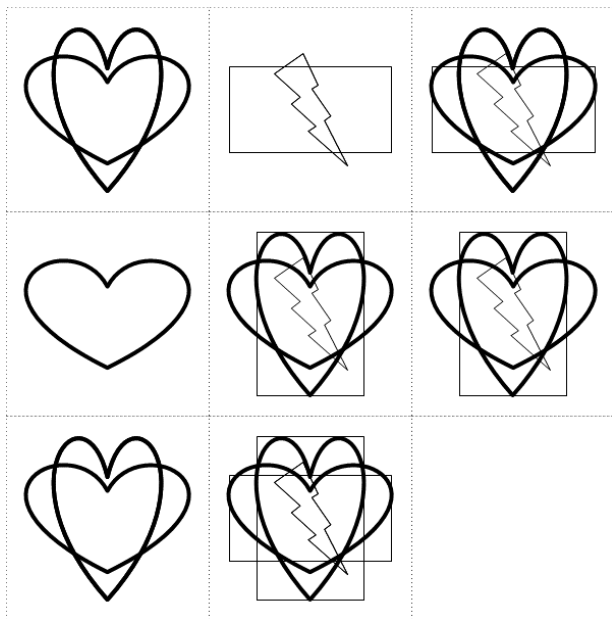
G

D

H

Practice Item #3 Explanation

This item is different from the example item and the first practice item. In this item, **the shapes in the right column are determined by <u>combining</u> the shapes in the left and middle columns**. In other words, the shapes in the right column are <u>all</u> of the shapes that appear in the left column, plus <u>all</u> of the shapes that appear in the center column.

Look at the top row. The right column contains the two hearts that are in the left column, <u>and</u> the rectangle and the lightning bolt that are in the center column.

Similarly, in the middle row, the heart in the left column is added to the shapes in the center column. The right column contains <u>all</u> of these shapes. (The heart that is in the left column overlaps with the same heart in the middle column, so they appear as a single shape in the right column.)

In the bottom row, the two hearts in the left column are added to the five shapes in the center column. Therefore, the missing cell must contain five shapes: the wide heart, the narrow heart, the wide rectangle, the narrow rectangle, and the lightning bolt. **Option C** is the correct answer because it contains all five of these shapes. (Just like in the middle row, the two hearts that are in the left column completely overlap with the same two hearts in the center column.)

Note that this pattern also holds vertically: The bottom row contains <u>all</u> of the shapes that appear in the top row, plus <u>all</u> of the shapes that appear in the middle row.

Practice Item #4
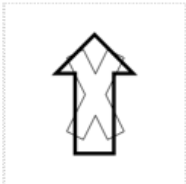
Select the option that best completes the matrix.

A

B

C

D

E

F

G
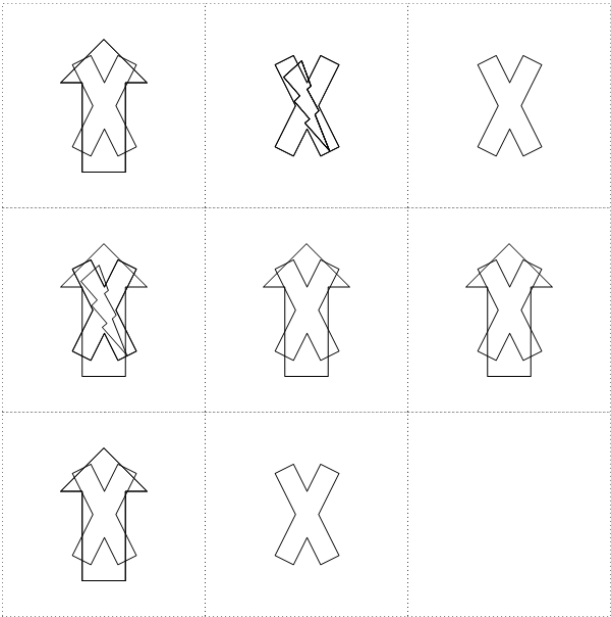
H

Practice Item #4 Explanation

In this item, **the shapes that are in the right column are the ones that are <u>common</u> to both the left and center columns**. In other words, the right column contains <u>only</u> the shapes that appear in <u>both</u> the left column <u>and</u> the center column of the same row. Shapes that are in <u>only</u> the left column <u>or</u> the center column do <u>not</u> appear in the right column.

Look at the top row. The X appears in <u>both</u> the left <u>and</u> center columns. However, the arrow <u>only</u> appears in the left column and the lightning bolt <u>only</u> appears in the center column. Therefore, the right column contains the X, but <u>not</u> the arrow or the lightning bolt.
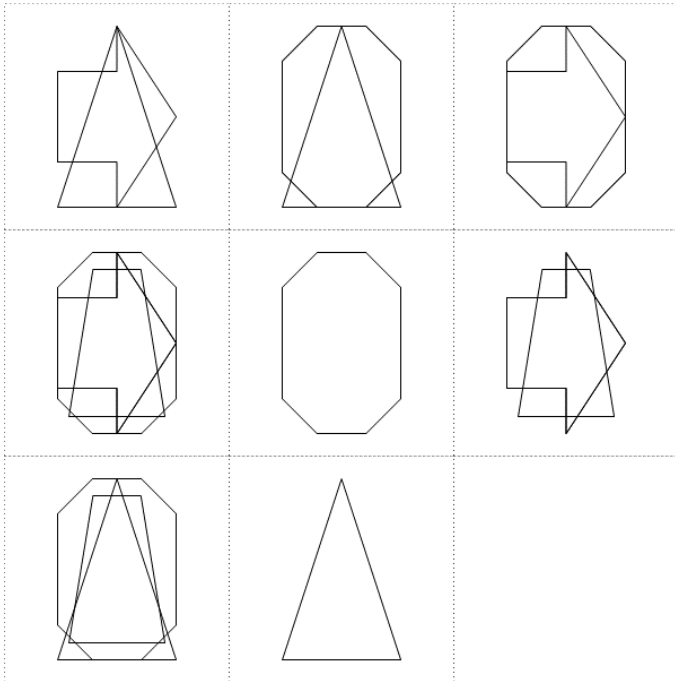
Similarly, in the middle row, the X and the arrow appear in <u>both</u> the left <u>and</u> center columns, but the lightning bolt is <u>only</u> in the left column. Therefore, the right column contains the X and the arrow, but <u>not</u> the lightning bolt.

To decide what is in the missing cell, look at the two cells in the bottom row. Both contain an X, so the missing cell should have an X. The arrow <u>only</u> appears in the left column, so it will <u>not</u> be in the right column. So, the correct response is **Option G**, because it contains an X, but <u>not</u> an arrow.

Note the pattern also holds vertically: The bottom row contains all of the shapes that appear in <u>both</u> the top row <u>and</u> the middle row.
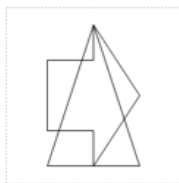
Practice Item #5
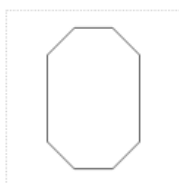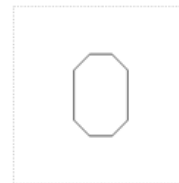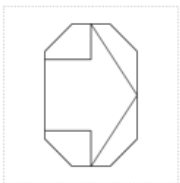
Select the option that best completes the matrix.

A

B

C

D

E

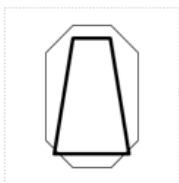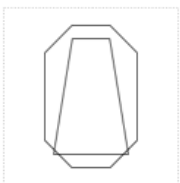F

G

H

Practice Item #5 Explanation

In this item, **the right column contains the shapes that are <u>unique</u> in the left and center columns**. In other words, the right column contains shapes that appear in <u>either</u> the left column <u>or</u> the center column, but <u>not</u> the shapes that appear in <u>both</u> the left <u>and</u> center columns.

Look at the top row. The same triangle appears in both the left and center columns, so it does <u>not</u> appear in the right column. The arrow is <u>only</u> in the left column and the octagon is <u>only</u> in the center column. So, the right column contains the arrow and the octagon.

Now look at the middle row. The octagon appears in both the left and middle columns, so it does <u>not</u> appear in the right column. The arrow and the trapezoid are unique to the left column, so they appear in the right column. The middle column does not have any shapes besides the octagon, so it does not contribute any additional shapes to the right column.

In the bottom row, the triangle appears in both the left and center columns, so it will <u>not</u> appear in the right column. The octagon and the trapezoid are unique to the left column, so they will appear in the right column. The middle column does not contain any other shapes, so it does not contribute any additional shapes to the right column.

Option D is the correct answer, because it contains the trapezoid and the octagon. Note that Option H is <u>not</u> correct, because the trapezoid in Option H is not the same as the other trapezoids (it has bold lines, and the type of line does not change in this item).

Note that this pattern also holds vertically: The bottom row contains all of the shapes that appear in <u>either</u> the top row <u>or</u> the middle row, but <u>not</u> the shapes that appear in <u>both</u> the top row <u>and</u> the middle row.