

# The Haunted Mansion

**Assessment Type**  
Knowing and Understanding

**Recommended Grade Level**  
Grade 6 (MYP1)

**MYP Criterion Level**  
MYP 1

## **MYP Assessment Criteria**

Criterion A: Knowing and understanding

## **MYP Command Terms Used**

select, apply, find, write down, show, use, plot, label, describe, draw, determine, solve

**MYP Global Context**  
Identities and relationships

**MYP Key Concept**  
Relationships

**MYP Related Concepts**  
Quantity, Simplification

**MYP Branch of Mathematics**  
Numerical and abstract reasoning

## **MYP Topics and Skills**

- Number operations
- Order of operations and expanding brackets
- Points on the coordinate plane
- Basic reflections (over the  $x$ - and  $y$ -axis)

## **Prior Knowledge Needed**

- Applying the four basic mathematical operations (addition, subtraction, multiplication, division) on positive and negative numbers
- Plotting points and finding coordinates of points
- Reflect points over the  $x$ - and  $y$ -axis

## **Assessment Description**

In this assessment, students select and apply the appropriate mathematical method to find the value of expressions, using the correct order of operations. Additionally, students are asked to plot points on a coordinate plane, given their coordinates, and find the coordinates of points shown on a graph. Furthermore, students are asked to reflect points over the  $x$ -axis and the  $y$ -axis, and then find the coordinates of the point of reflection.

## **Materials Needed**

Pen, pencil (for points and lines), ruler (required for drawing)

## **Task-specific instructions / Recommendations**

The use of a calculator is not allowed for this assessment task.

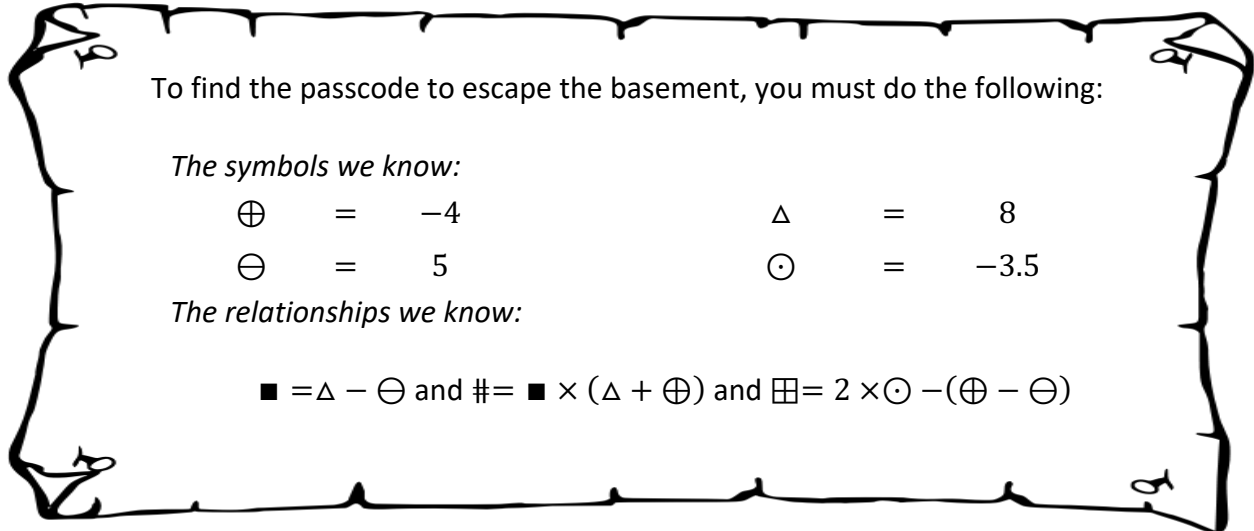
## Assessment Criterion A: Knowing and understanding

	Achievement Level Descriptor (MYP1)	Task Specific Descriptor
<b>0</b>	The student <b>does not</b> reach a standard described by any of the descriptors below.	
<b>1-2</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. select appropriate mathematics when solving <b>simple problems in familiar situations</b></li> <li>ii. apply the selected mathematics successfully when solving these problems</li> <li>iii. generally solve these problems correctly in a variety of contexts.</li> </ul>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>select</b> the appropriate method to find the value of the three missing symbols in question (1)</li> <li>ii. <b>apply</b> the selected method successfully when finding the value of the three missing symbols in question (1)</li> <li>iii. <b>find</b> the value of the three missing symbols and <b>list</b> these values in ascending order in question (1)</li> </ul>
<b>3-4</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. select appropriate mathematics when solving <b>more complex problems in familiar situations</b></li> <li>ii. apply the selected mathematics successfully when solving these problems</li> <li>iii. generally solve these problems correctly in a variety of contexts.</li> </ul>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>select</b> the appropriate method to find the value of the six symbols in question (2)</li> <li>ii. <b>apply</b> the selected method successfully when finding the value of the six symbols in question (2)</li> <li>iii. <b>find</b> the value of the six symbols, <b>write down</b> their final answers at the bottom of each box, <b>write down</b> the location of the friends in question (2), and <b>plot</b> and <b>label</b> the required locations in question (3)</li> </ul>
<b>5-6</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. select appropriate mathematics when solving <b>challenging problems in familiar situations</b></li> <li>ii. apply the selected mathematics successfully when solving these problems</li> <li>iii. generally solve these problems correctly in a variety of contexts.</li> </ul>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>select</b> the correct number for each blank space in question (4)</li> <li>ii. <b>plot</b> and <b>label</b> the required locations in questions (4) and (6) and <b>describe</b> the movement in question (5)</li> <li>iii. <b>draw</b> the moves described in questions (4) and (5), and <b>select</b> the correct description in question (6)</li> </ul>
<b>7-8</b>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. select appropriate mathematics when solving <b>challenging problems in both familiar and unfamiliar situations</b></li> <li>ii. apply the selected mathematics successfully when solving these problems</li> <li>iii. generally solve these problems correctly in a variety of contexts.</li> </ul>	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>i. <b>determine</b> the required reflection correctly, <b>write down</b> their choice in question (8), and <b>select</b> the appropriate method in question (9)</li> <li>ii. <b>describe</b> the movement in questions (7), (8), and (9), <b>apply</b> the selected method in question (9), and <b>plot</b> and <b>label</b> the required points in questions (8) and (9)</li> <li>iii. <b>draw</b> the moves described in questions (7) and (8), and <b>write down</b> the coordinates of the starting and ending points in question (8)</li> </ul>

## The Great Trap

You and your friends foolishly enter a haunted mansion, seeking adventure. As the doors shut behind you, a trap door is released below you, and you fall through it. Can you escape and return to your friends using your mathematical ability to outwit the mansion? Let's find out!

In the basement where you find yourself, you notice some writings on the wall:



- (1) **Select and apply** the appropriate method to **find** the value of the three missing symbols:  $\blacksquare$ ,  $\#$ ,  $\boxplus$ .

*Show your work below.*

$$\blacksquare = \Delta - \ominus = 8 - 5 = 3 \Rightarrow \blacksquare = 3$$

$$\# = \blacksquare \times (\Delta + \oplus) = 3 \times (8 + (-4)) = 3 \times 4 = 12 \Rightarrow \# = 12$$

$$\boxplus = 2 \times \odot - (\oplus - \ominus) = 2 \times (-3.5) - ((-4) - 5) = (-7) - (-9) = 2 \Rightarrow \boxplus = 2$$

**Write down** each value in the box below to open the secret door to escape the basement.

The value of $\blacksquare$ :
3

The value of $\#$ :
12

The value of $\boxplus$ :
2

Now that we have the value of each of the seven symbols ( $\oplus$ ,  $\ominus$ ,  $\Delta$ ,  $\odot$ ,  $\blacksquare$ ,  $\#$ , and  $\boxplus$ ), list these values in ascending order:

    -4          -3.5          2           3           5           8          12   

[A: 1-2, i-iii]

## Locating Your Friends

As you escape the basement through the secret door, you find a map on the floor. When you take a closer look, you're **shocked** to realize that the map seems to show the location of your friends in some coded way. To decode, you need to do some work.

- (2) (a) **Select** and **apply** the appropriate method to **find** the value of each of the six symbols.  
 (b) **Show** your work in the boxes.  
 (c) **Write down** the final answer at the bottom of each box in the space provided.

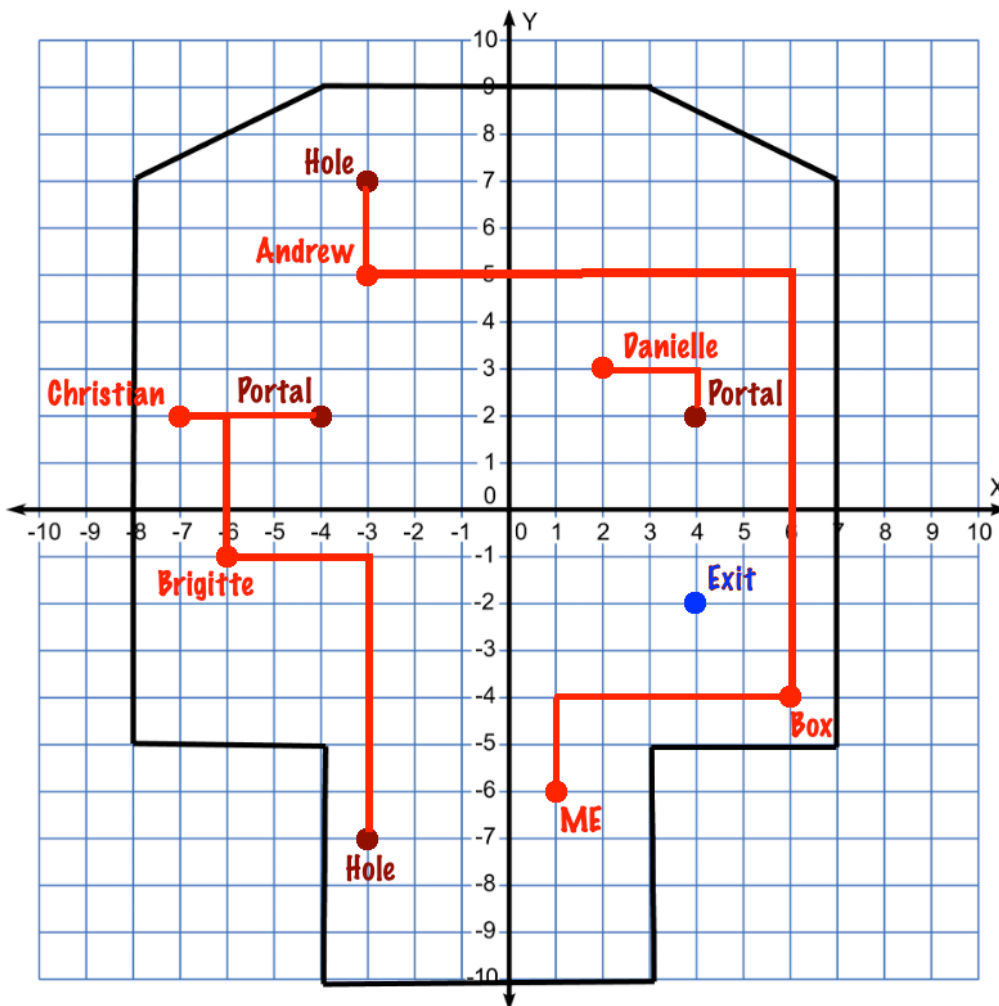
$15 + (-9) \times 2 = \heartsuit$ $15 + (-18) = -3$	$(-36) \div (-6 - 12) = \clubsuit$ $(-36) \div (-18) = 2$
$\heartsuit = -3$	$\clubsuit = 2$
$4 - (-5) \times (-2) = \color{purple}\bullet$ $4 - (10) = -6$	$(-3) \div (4 - 7) = \blacksquare$ $(-3) \div (-3) = 1$
$\color{purple}\bullet = -6$	$\blacksquare = 1$
$\frac{-8 + 2 \times (2 - 5)}{-2} = \color{orange}\blacklozenge$ $\frac{-8 + 2 \times (-3)}{-2} = \frac{-8 - 6}{-2} = \frac{-14}{-2} = 7$	$(2 - 6)^2 - \frac{22}{2} = \color{yellow}\odot$ $(-4)^2 - 11 = 16 - 11 = 5$
$\color{orange}\blacklozenge = 7$	$\color{yellow}\odot = 5$

Then, **use** the values you found for the symbols above to **write down** the location of each of your friends:

- (a) Andrew's location is ( $\heartsuit, \color{yellow}\odot$ ), which is (    $-3$    ,     $5$    )
- (b) Brigitte's location is ( $\color{purple}\bullet, -\blacksquare$ ), which is (    $-6$    ,     $-1$    )
- (c) Christian's location is ( $-\color{orange}\blacklozenge, \clubsuit$ ), which is (    $-7$    ,     $2$    )
- (d) Danielle's location is ( $\clubsuit, -\heartsuit$ ), which is (    $2$    ,     $3$    )

The map you found is shown below. According to the map, your location, as you exit the basement, is at the point  $(1, -6)$ .

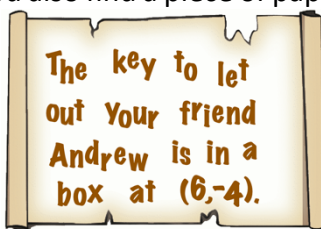
(3) On the map below, **plot** and **label** your location and the location of each of your friends.



[A: 3-4, iii]

**Starting the Rescue Mission**

As you step out of the basement room, you also find a piece of paper on the floor with the following writings:



(4) **Plot** and **label** the location of the box on the map above. Then, from the list of numbers provided in the red box, **select** the correct number for each blank space in the description below to **describe** the way in which you can get to the box mentioned in the writings above. **Use** a ruler to **draw** this move on the map provided.

**Description**

"From your location at  $(1, -6)$ , walk \_\_\_\_\_ **2** \_\_\_\_\_ units up in the positive  $y$  direction. Then, turn right and walk \_\_\_\_\_ **5** \_\_\_\_\_ units right in the positive  $x$  direction. Then you will reach the box at  $(6, -4)$ ."

**List**

-4	<b>2</b>	4
-2	-5	<b>5</b>

[A: 5-6, i-iii]

Now that you're at  $(6, -4)$ , you found the key that lets your friend Andrew free.

- (5) Use the description in question (4) to **describe** the way that allows you to go from your location at  $(6, -4)$  to Andrew's location at  $(\heartsuit, \text{sun})$ . Then, use a ruler to **draw** this move on the map provided in question (3) above.

To get to Andrew from my location, I move 9 units up in the positive  $y$  direction and 9 units to the left in the negative  $x$  direction.



[A: 5-6, ii-iii]

From Andrew location at  $(\heartsuit, \text{sun})$ , you accidentally go **two units up**, at which point you fall through a hole that slides you to the location with coordinates  $(-3, -7)$ .

- (6) **Plot** and **label** the location of the hole and the location to which you slide. Then, from the descriptions below, **select** what best describes this slide.

This move may be described as...

- (a) ... being reflected over the  $x$ -axis.  
(b) ... being reflected over the  $y$ -axis.  
(c) ... neither (a) nor (b).

[A: 5-6, ii-iii]

### Completing the Rescue

- (7) Use the description in questions (4) to **describe** the way that allows you to go  
a. from your current location at  $(-3, -7)$  to Brigitte's location at  $(\text{purple circle}, -\text{blue square})$ .

To get to Brigitte from my current location, I move 6 units up in the positive  $y$  direction and 3 units to the left in the negative  $x$  direction.

- b. Then, from Brigitte's that location to Christian's location at  $(-\text{orange diamond}, \text{green clover})$ .

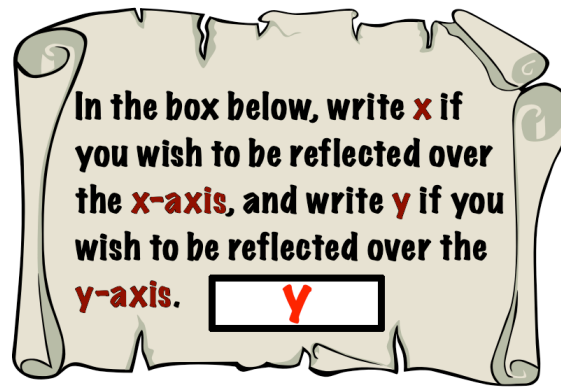
To get to Brigitte from my current location, I move 3 units up in the positive  $y$  direction and 1 unit to the left in the negative  $x$  direction.



- c. Then, use a ruler to **draw** both of these moves on the map provided in question (3) above.

[A: 7-8, ii-iii]

From Christian's location at  $(-\diamond, \clubsuit)$ , you and your friends with you start moving **to the right**. After moving **3 units**, you find another note that shows the following description of a **portal**:



(8) .

- Determine** which reflection would take you and your friends closer to Danielle, whose location is at  $(\clubsuit, -\heartsuit)$ . **Write down** your choice in the box above.
- Then, on the graph above, **plot** and **label** the point where you find yourself after this reflection and **write down** the coordinates of both the starting point and the ending point of this portal.

Starting point of the portal:  $(-4,2)$

Ending point of the portal:  $(4,2)$

- Then, **describe** the way that allows you to go to Danielle's location from the ending point of that portal.

Go 1 unit up in the positive  $y$  direction and 2 units to the left in the negative  $x$  direction.

- Then, **use** a ruler to **draw** this move on the map provided in question (3) above.

[A: 7-8, i-iii]

## The Final Escape

Now that you and all your friends are together at this final location at ( $\clubsuit, -\heartsuit$ ), there is only one more thing to do: to **find the exit** through which you all can escape from this Haunted Mansion.

(9)

- a. **Select** and **apply** the appropriate method to **find** the value of the  $x$  and  $y$ -coordinates by **solving** the expressions shown below.

$x$ -coordinate:

$$\begin{aligned} & \clubsuit \times (\blacksquare - \heartsuit) + \blacklozenge + \sun \times (\sun - \blacksquare) + (\heartsuit \div \heartsuit) = \\ & \frac{2 \times (1 - -6) + 7}{-3} + \frac{5 \times (5 - 1) + (-6 \div -3)}{2} = \frac{21}{-3} + \frac{22}{2} = -7 + 11 = 4 \end{aligned}$$

$y$ -coordinate:

$$\begin{aligned} & \heartsuit + \heartsuit + \sun \times \clubsuit + \left( \frac{\heartsuit}{\clubsuit} \times (\blacklozenge - \heartsuit) \right) \div \sun = \\ & = -6 + (-3) + 5 \times 2 + \left( \frac{-3}{2} \times (7 - (-3)) \right) \div 5 = -9 + 10 + (-15) \div 5 = -2 \end{aligned}$$

- b. Then, **plot** and **label** this exit point on the map provided in question (3).  
 c. Then, **describe** your movement to get to that point.