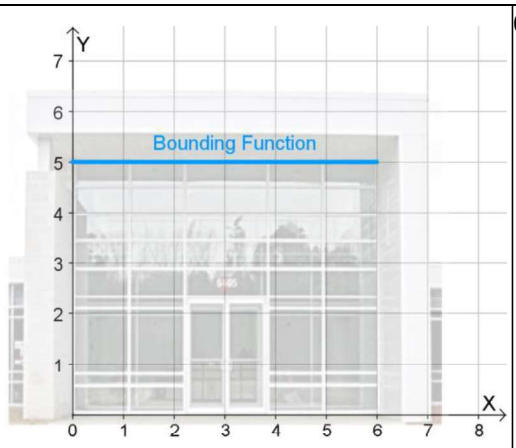
## *Activity 5*

**Group A**

Figure 1 shows the UCD Student Computer Centre.

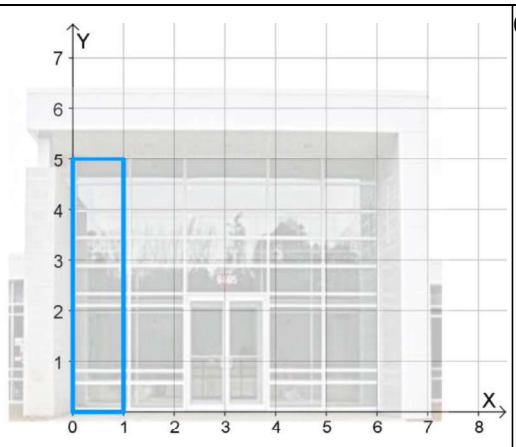
**Figure 1 - The UCD Student Computer Centre.**




**Q1.** Write down the function which describes the height of the building as we move from left ($x = 0$) to right ($x = 6$).

$h(x) =$

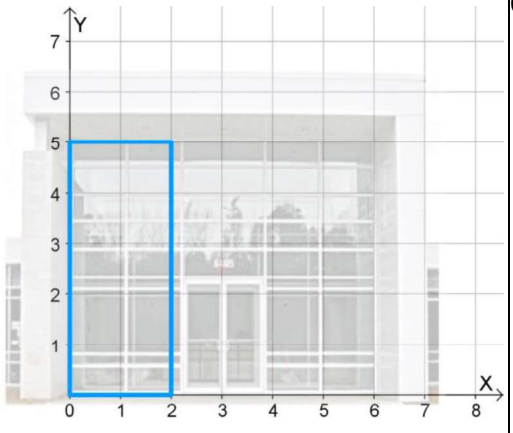
**The area under the bounding function changes as we move from left to right. We will now investigate the relationship between the area of the building and its width.**




**Q2.** By calculating the area of the rectangular piece of building shown, complete the statement:

When **the width of the rectangular piece is 1** unit, the area of the rectangle is:

$A =$




**Q3.** By calculating the area of the rectangular piece of building shown, complete the statement:

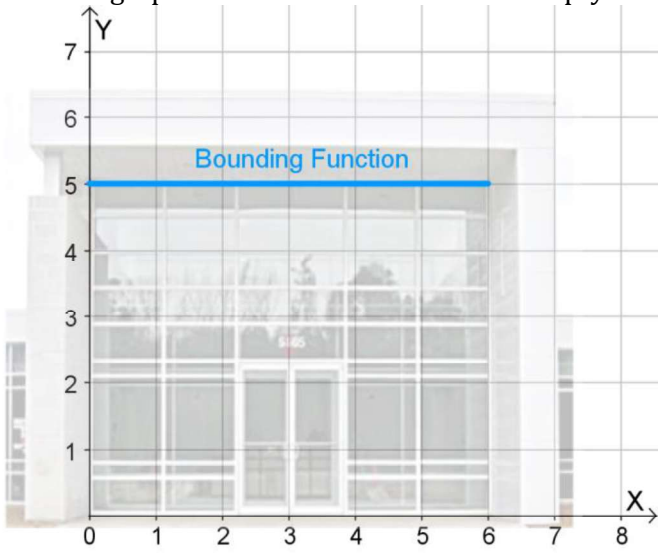
When **the width of the rectangular piece is 2** units, the area of the rectangle is:

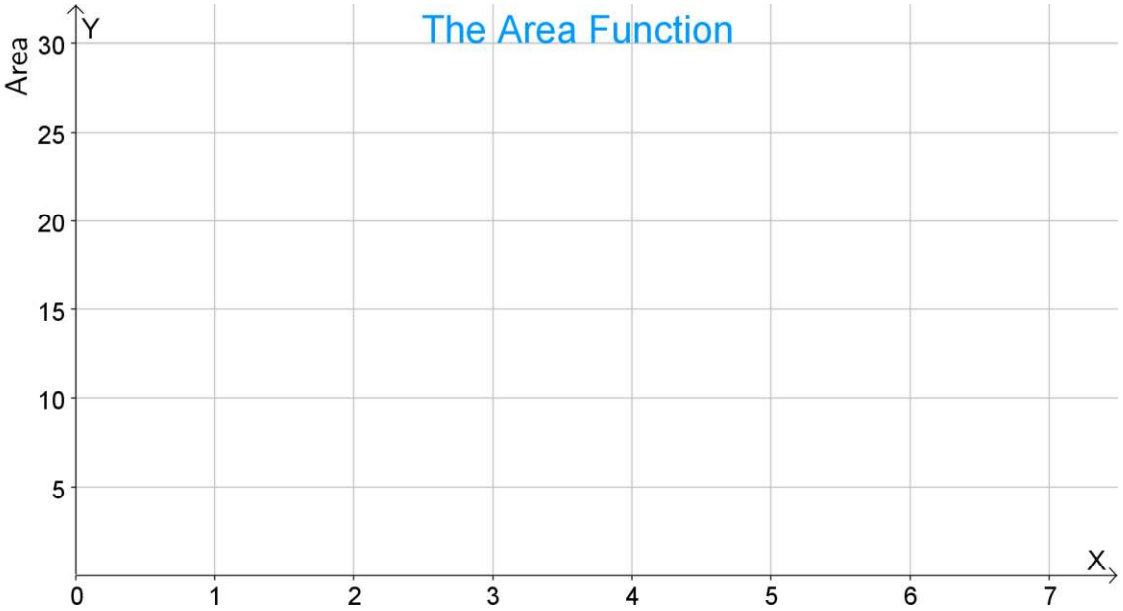
$A =$

**Q4.** Complete the table below using an approach similar to that used in Q2 and Q3.

| $x$ | Width | Height | Area | Pattern |
|---|---|---|---|---|
| 0 | 0 | 5 | 0 | $A = 5(0)$ |
| 1 | 1 | 5 | 5 | $A = 5(1)$ |
| 2 | | | | $A =$ |
| 3 | | | | $A =$ |
| 4 | | | | $A =$ |
| 5 | | | | $A =$ |
| 6 | | | | $A =$ |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| $x$ | | | $A(x) =$ | |

**Q5.** Sketch the graph of the area function on the empty axes.



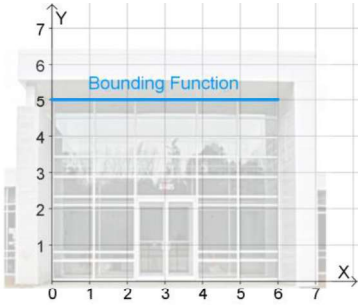
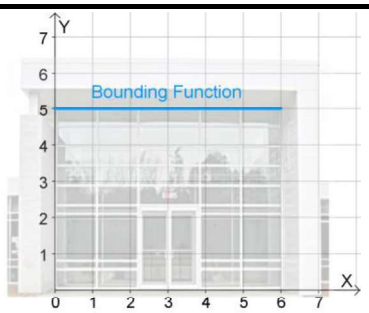
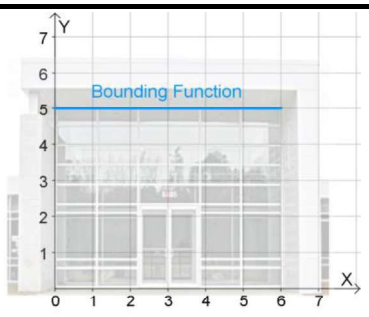



**Q6.** For each of the areas in the table below:

**(a)** Shade in the given area on the diagram.

**(b)** **<u>Use the area function</u>** to calculate the given area.

**(c)** Explain how the area function is used to calculate area.

| Section of Building | Diagram | Area Calculation |
|---|---|---|
| From $x = 0$ up to $x = 2$. |  | |
| Explanation: | | |
| From $x = 0$ up to $x = 5$. |  | |
| Explanation: | | |
| From $x = 2$ up to $x = 5$. |  | |
| Explanation: | | |

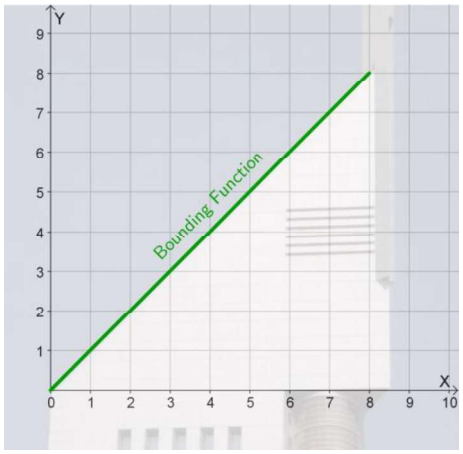
**Q7.** **(a)** In the space below write in the bounding function (from Q1 above) and the area function (from Q3 above).

| Bounding Function | Area Function |
|---|---|
| $h(x) =$ | $A(x) =$ |

**(b)** If you were presented only with the bounding function, is there a way in which you could determine the area function? Explain.

**Group B**
Figure 2 shows The Vu Bar in Dubai.

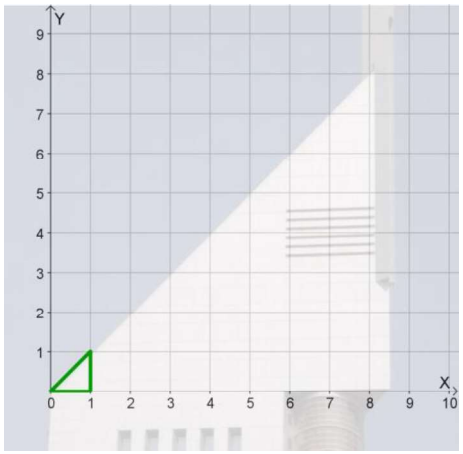
**Figure 2 - The Vu Bar, Dubai.**




**Q1.** The height of the building changes as we move from from left ($x = 0$) to right ($x = 8$). Write down the function which describes the changing height of the building.

$h(x) =$

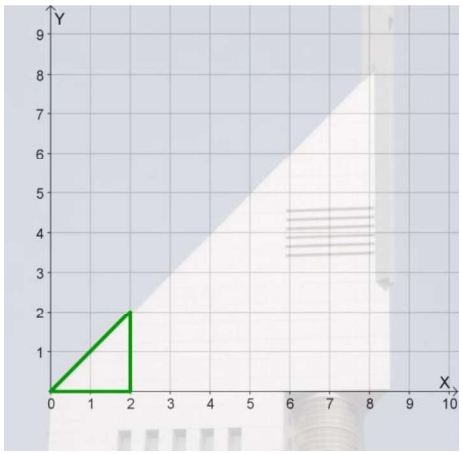
**The area under the bounding function changes as we move from left to right. We will now investigate the relationship between the area of the building and its width.**




**Q2.** By calculating the area of the triangular piece of building shown, complete the statement:

When **the width of the triangular piece is 1** unit, the area of the triangle is:

$A =$




**Q3.** By calculating the area of the triangular piece of building shown, complete the statement :

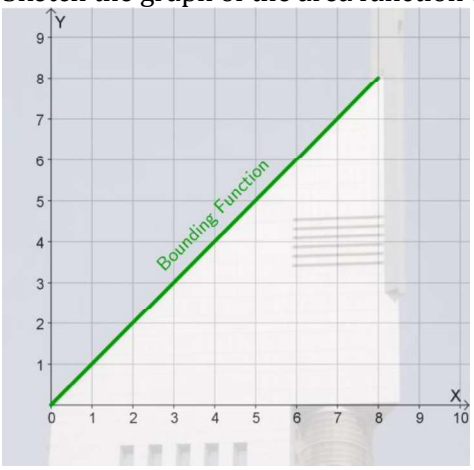
When **the width of the triangular piece is 2** units, the area of the rectangle is:

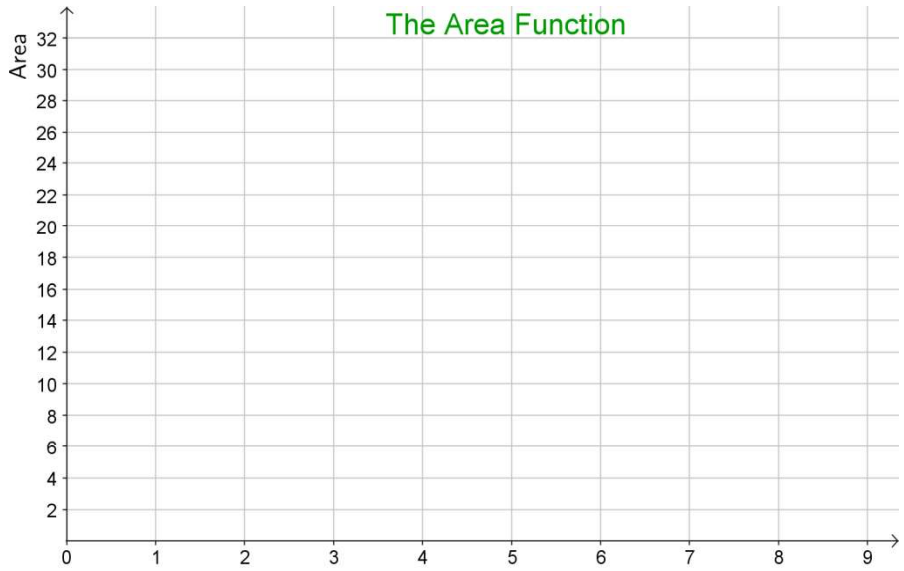
$A =$

**Q4.** Complete the table below using an approach similar to that used in Q2 and Q3.

| $x$ | Width | Height | Area | Pattern |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | $A = \frac{1}{2}(0)(0)$ |
| 1 | 1 | 1 | 0.5 | $A = \frac{1}{2}(1)(1)$ |
| 2 | | | | $A =$ |
| 3 | | | | $A =$ |
| 4 | | | | $A =$ |
| 5 | | | | $A =$ |
| 6 | | | | $A =$ |
| 7 | | | | |
| 8 | | | | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| $x$ | | | $A(x) =$ | |

**Q5.** Sketch the graph of the area function on the empty axes.



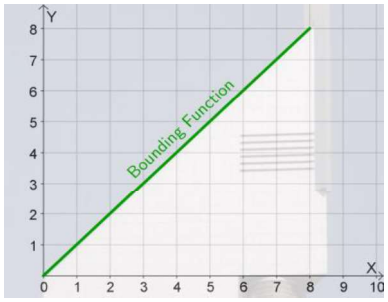
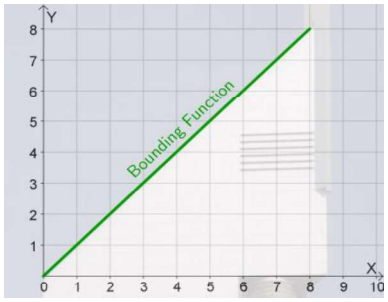
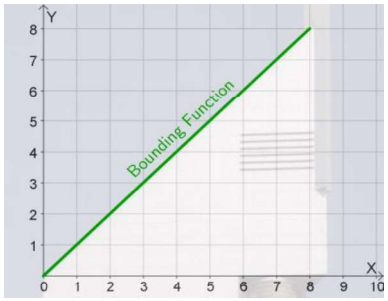



**Q6.** For each of the areas in the table below:

**(a)** Shade in the given area on the diagram.

**(b)** **<u>Use the area function</u>** to calculate the given area.

**(c)** Explain how the area function is used to calculate area.

| Section of Building | Diagram | Area Calculation |
|---|---|---|
| From $x = 0$ up to $x = 3$. |  | |
| Explanation: | | |
| From $x = 0$ up to $x = 5.5$. |  | |
| Explanation: | | |
| From $x = 3$ up to $x = 5.5$. |  | |
| Explanation: | | |

**Q7.** **(a)** In the space below write in the bounding function (from Q1 above) and the area function (from Q3 above).

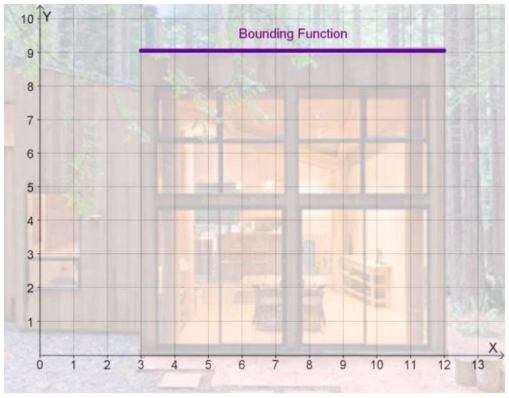
| Bounding Function | Area Function |
|---|---|
| $h(x) =$ | $A(x) =$ |

**(b)** If you were presented only with the bounding function, is there a way in which you could determine the area function? Explain.

**Group C**

Figure 3 shows a modern timber dwelling.

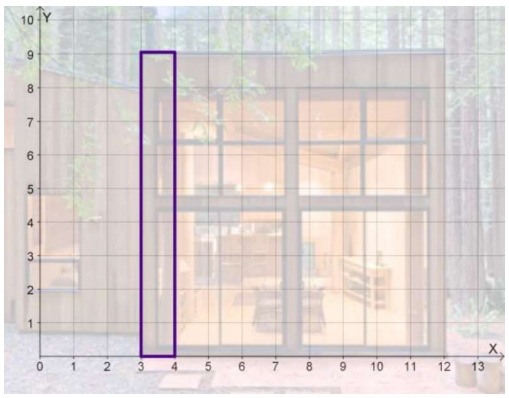
**Figure 3 – Timber Dwelling.**




**Q1.** Write down the function which describes the height of the building as we move from left ($x = 0$) to right ($x = 12$).

$h(x) =$

**The area under the bounding function changes as we move from left to right. We will now investigate the relationship between the area of the building and its width.**




**Q2.** By calculating the area of the rectangular piece of building shown, complete the statement:

When **the width of the rectangular piece is 1** unit, the area of the rectangle is:

$A =$


**Q3.** By calculating the area of the rectangular piece of building shown, complete the statement:

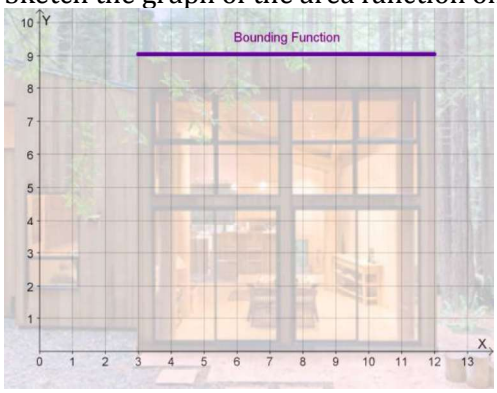
When **the width of the rectangular piece is 2** units, the area of the rectangle is:

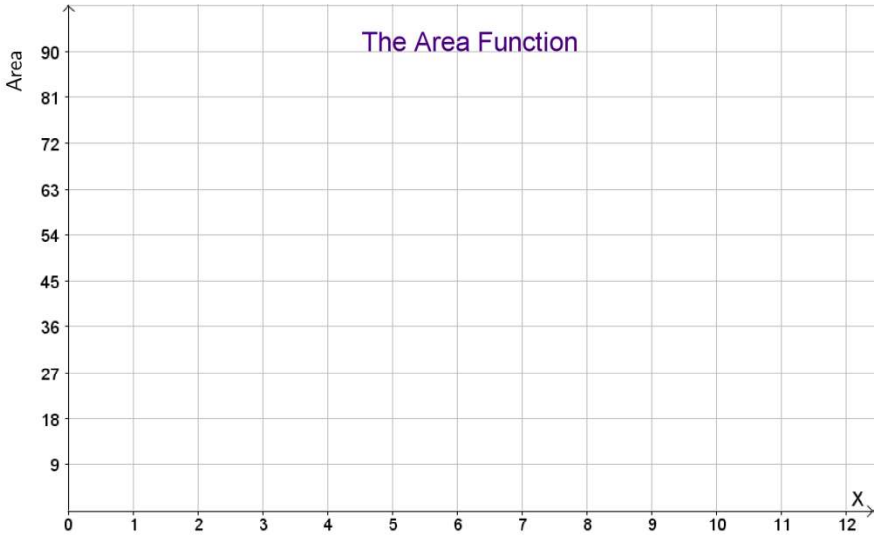
$A =$

**Q4.** Complete the table below using an approach similar to that used in Q2 and Q3.

| $x$ | Width | Height | Area | Pattern |
|---|---|---|---|---|
| 3 | 0 | 9 | 0 | $A = (9)(0)$ |
| 4 | 1 | 9 | 9 | $A = (9)(1)$ |
| 5 | | | | $A =$ |
| 6 | | | | $A =$ |
| 7 | | | | $A =$ |
| 8 | | | | $A =$ |
| 9 | | | | $A =$ |
| 10 | | | | |
| 11 | | | | |
| 12 | | | | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| $x$ | | | $A(x) =$ | |

**Q5.** Sketch the graph of the area function on the empty axes.



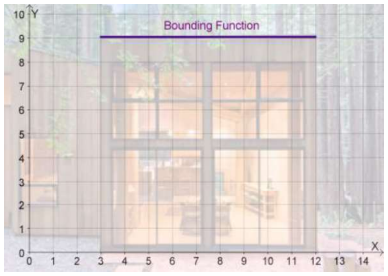
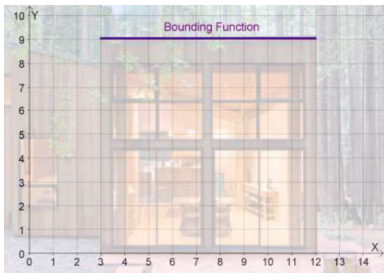
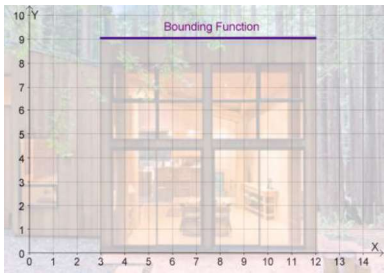



**Q6.** For each of the areas in the table below:

**(a)** Shade in the given area on the diagram.

**(b)** **<u>Use the area function</u>** to calculate the given area.

**(c)** Explain how the area function is used to calculate area.

| Section of Building | Diagram | Area Calculation |
|---|---|---|
| From $x = 3$ up to $x = 11$. |   | |
| Explanation: | | |
| From $x = 3$ up to $x = 6$. |   | |
| Explanation: | | |
| From $x = 6$ up to $x = 11$. |   | |
| Explanation: | | |

**Q7.** **(a)** In the space below write in the bounding function (from Q1 above) and the area function (from Q3 above).

| Bounding Function | Area Function |
|---|---|
| $h(x) =$ | $A(x) =$ |

**(b)** If you were presented only with the bounding function, is there a way in which you could determine the area function? Explain.