

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

## M201: Function Concepts

### Pre-Badge Task

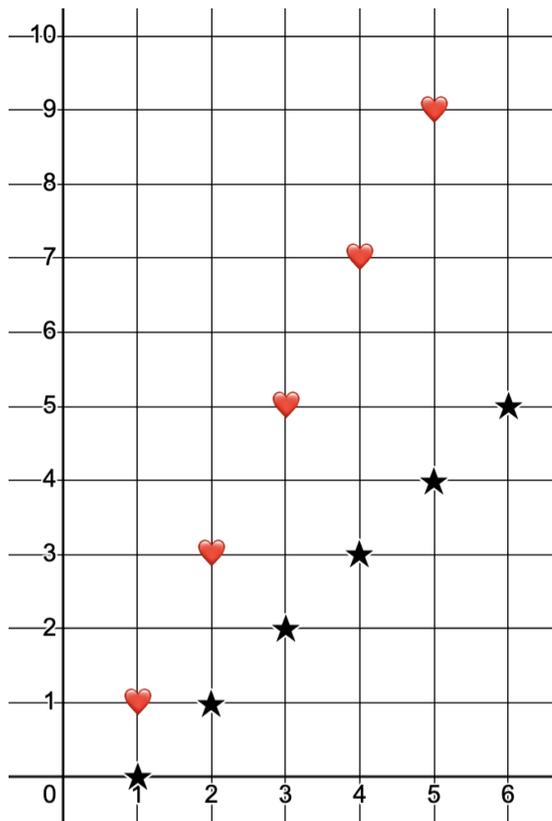
#### New Badge Alert!

This task will provide a preview of what we will be learning during the M201 - Function Concepts. You already know so much math, so use this task to share any understanding that you have before we start our learning. You will have a chance to do the same task at the end of the badge to see how your thinking has evolved.

#### The Task

##### QUESTION 1

The figure shows the graphs of two functions—the Heart and Star functions. The Heart function is defined recursively by  $H(1) = 1$ ,  $H(n) = H(n - 1) + 2$ . Which choice defines the Star function? How do you know?



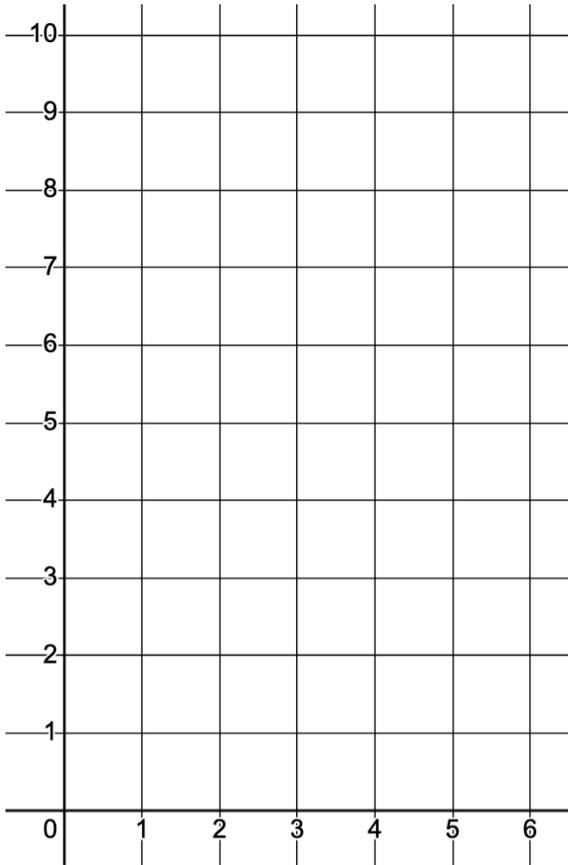
(a)  $S(1) = 0$ ,  $S(n) = S(n - 1) + 2$

(b)  $S(1) = 0$ ,  $S(n) = S(n - 1) + 1$

(c)  $S(0) = 1$ ,  $S(n) = S(n - 1) + 1$

### QUESTION 2

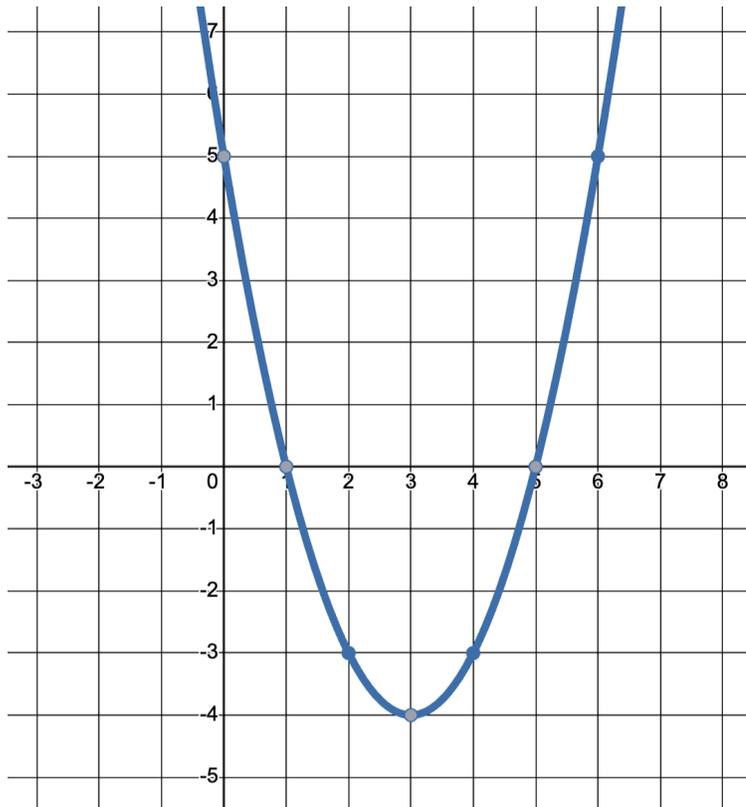
The Dot Function is defined recursively by  $D(1) = 8$ ,  $D(n) = D(n - 1) - 0.5$ .  
Draw the graph of the Dot function on the grid provided.



For which value of  $n$  will  $D(n) = 0$ ?  
Explain how you determined your answer.

**QUESTION 3**

The graph of  $f(x) = x^2 - 6x + 5$  is shown below. Express the function in factored form and vertex form.



Factored Form:

Vertex Form:

### QUESTION 4

Three equivalent forms of quadratic function are given. Determine the vertex, x-intercepts and y-intercept of the graph. Then, draw the graph of the function.



Standard Form:

$$g(x) = x^2 + 2x - 8$$

Factored Form:

$$g(x) = (x - 2)(x + 4)$$

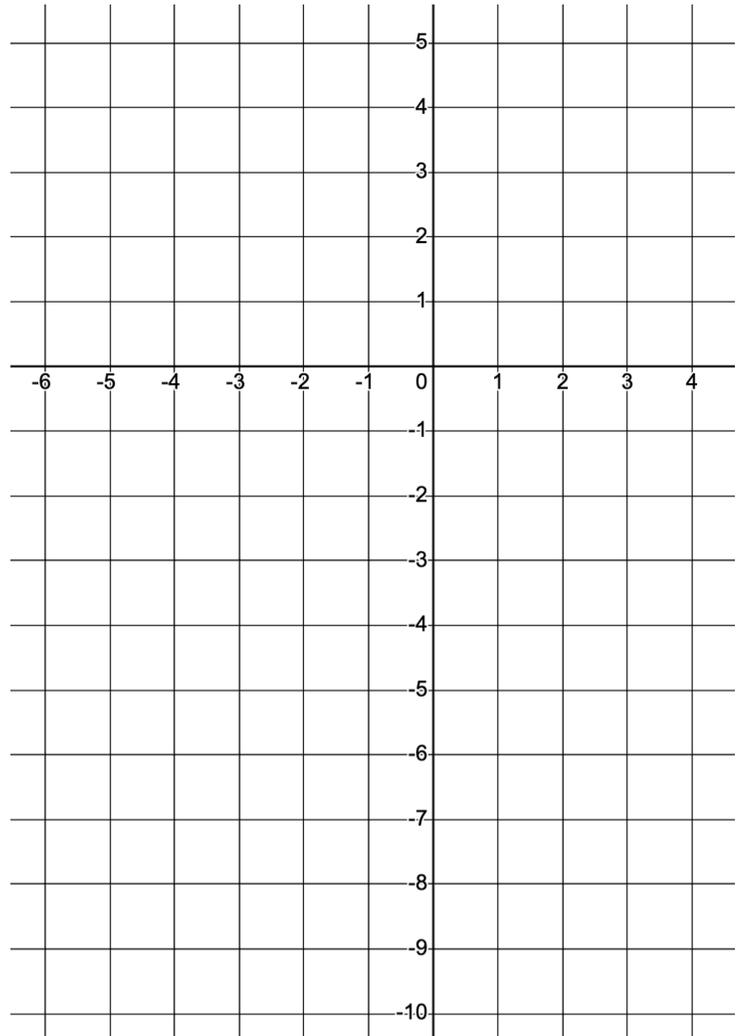
Vertex Form:

$$g(x) = (x + 1)^2 - 9$$

Vertex:

x-intercepts:

y-intercept:



### QUESTION 5

The figure shows the graph of  $F(x) = |x|$ . Draw the graph of each function:

- $y = F(x) + 2$
- $y = F(x + 3)$
- $y = -2F(x)$

Label each function on your graph.

