1. Circle the number of the transformation in function notation (see below) that matches the description of the transformations (a) - (e).

a) \( f(x) \) translated right 3
b) \( f(x) \) translated up 3
c) \( f(x) \) translated down 3 and right 2
d) \( f(x) \) translated down 3 and left 2
e) \( f(x) \) reflected in the y-axis
f) \( f(x) \) reflected in the x-axis

1. \( y = f(-x) \) 2. \( y = -f(x) \) 3. \( y = f(x - 3) \) 4. \( y = f(x + 3) \)
5. \( y = f(x) + 3 \) 6. \( y = f(x - 2) - 3 \) 7. \( y = f(x + 2) - 3 \) 8. \( y = f(x - 3) - 2 \)

2. State whether each relation below represents a function. Explain your reasoning. (Vertical line test is ONLY a valid reason if you provide a graph) Also, determine the domain and range for each relation.

a) \( \{(1, 2), (2, 3), (2, -1), (4, -1)\} \)

- Is a function
- Is not a function
Reasoning:

b) \( y = x \)

- Is a function
- Is not a function
Reasoning:

c) \( x = -5 \)

- Is a function
- Is not a function
Reasoning:

d) \( y = 7 \)

- Is a function
- Is not a function
Reasoning:

e) \( x^2 + y^2 = 49 \)

- Is a function
- Is not a function
Reasoning:

e) \( y = (x + 3)^2 + 4 \)

- Is a function
- Is not a function
Reasoning:

f) \( f(x) = \sqrt{x + 1} \)

- Is a function
- Is not a function
Reasoning:

3. Given \( f(x) = 5 - 4x \), find

a) \( f(2) \)

b) \(-f(3)\)

c) \( x \) when \( f(x) = 10 \)
4. Let \( f(x) = \sqrt{x+1} \)
   a) Determine the new image equation if \( y = f(x+2) - 4 \).

   b) Sketch a graph of \( f(x) = \sqrt{x+1} \) and \( y = f(x+2) - 4 \) on the same grid.
   Label each curve.

   c) State the domain and range of the original image, \( f(x) = \sqrt{x+1} \) and the transformed image, \( y = f(x+2) - 4 \).

   Original Image
   \[
   \begin{align*}
   \text{D: } & \{ \text{________________} \} \\
   \text{R: } & \{ \text{________________} \}
   \end{align*}
   \]

   Transformed Image
   \[
   \begin{align*}
   \text{D: } & \{ \text{___________} \} \\
   \text{R: } & \{ \text{___________} \}
   \end{align*}
   \]

   d) If the original image, \( f(x) = \sqrt{x+1} \) was transformed to \( y = f(-x) \) state its new domain and range.
   \[
   \begin{align*}
   \text{D: } & \{ \text{________________} \} \\
   \text{R: } & \{ \text{________________} \}
   \end{align*}
   \]

5. If \( f(x) = \frac{1}{x-2} + 5 \), state the domain, range and the equations of the asymptotes.

   Vertical Asymptote: \( \text{___________} \)  
   Horizontal Asymptote: \( \text{___________} \)

   \[
   \begin{align*}
   \text{D: } & \{ \text{________________} \} \\
   \text{R: } & \{ \text{________________} \}
   \end{align*}
   \]