

1. Find the domain of the following function.

$$f(x) = \frac{\sqrt{x+3}}{x^2 - 5x + 6} \quad (1)$$

2. Suppose  $f(x) = x + 2\ln(x)-1$  and  $g(x) = \sqrt[3]{x+5}$  are given. First, find the inverse value of  $g(x)$ . Then, calculate the following value.

$$g(1) + f^{-1}(0) \quad (2)$$

hint: Please note that in most cases specially this problem for the case  $f(x)$  we cannot calculate the inverse function directly. However, we can use the fact that the domain of  $f^{-1}(x)$  is equal to the range of  $f(x)$  and the range of  $f^{-1}(x)$  is equal to the domain of  $f(x)$ . Use this fact and to find the correct answer!

3. Find the limit.

$$\lim_{x \rightarrow -2} \frac{\frac{1}{3} - \frac{1}{x^2+x+1}}{x+2} \quad (3)$$

hint: Simplify the numerator by making them one fraction.