

نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ..... V ..... کلاس ..... بازبینی و تصحیح ..... A

۲. آخرین بیک از بهترین و کامل ترین بیک های هفته ت

$$f(x) = \sqrt{x + \sqrt{x - x}} \quad g(x) = \sqrt{x - \sqrt{x - x}} \quad f(x) + g(x) = a + b\sqrt{x + c} \quad \frac{a+b}{c} = ?$$

$$\begin{aligned} (A+B)^2 &= A^2 + B^2 + 2AB \\ A &= \sqrt{x-x} \quad B = \sqrt{x-x} \end{aligned} \rightarrow (\sqrt{x-x} + \sqrt{x-x})^2 = (\sqrt{x-x})^2 + (\sqrt{x-x})^2 + 2(\sqrt{x-x} \times \sqrt{x-x}) = (x-x) + (x-x) + 2(x-x) = x + \sqrt{x-x}$$

$$f(x) = \sqrt{(x-x) + x} \rightarrow x \geq 1 \rightarrow \sqrt{x-x} \geq 1 \rightarrow f(x) = \sqrt{x-x} + 1$$

$$\begin{aligned} f(x) + g(x) &= \sqrt{x-x} + \sqrt{x-x} + \sqrt{x-x} + \sqrt{x-x} \\ &= 2\sqrt{x-x} = a + b\sqrt{x+c} \\ &0 + 2\sqrt{x-x} \end{aligned}$$

$$\begin{aligned} a &= 0 \\ b &= 2 \\ c &= -x \end{aligned} \quad \frac{a+b}{c} = \frac{0+2}{-x} = \frac{2}{-x} = -\frac{2}{x}$$

$$(\sqrt{x-x} - \sqrt{x-x})^2 = (\sqrt{x-x})^2 + (\sqrt{x-x})^2 - 2(\sqrt{x-x} \times \sqrt{x-x}) = (x-x) + (x-x) - 2(x-x) = x - \sqrt{x-x}$$

$$g(x) = \sqrt{(x-x) - x} \rightarrow x \geq 1 \rightarrow \sqrt{x-x} \geq 1 \rightarrow g(x) = \sqrt{x-x} - 1$$

$$f(x) = \frac{x+1}{x^2 - x + 1}$$

$$g(x) = \{(1,1), (1,0), (3,5), (0,4)\}$$

$$\frac{g}{f} = \{(1, -\frac{1}{x}), (0, 4)\}$$

$$x=2 \rightarrow g(2)=1 \rightarrow f(2) = \frac{1}{4-2+1} = \frac{1}{3} = \frac{1}{3} \quad \frac{g(2)}{f(2)} = -\frac{1}{\frac{1}{3}} = -3 \quad (2, -\frac{1}{3})$$

$$x=1 \rightarrow g(1)=0 \rightarrow f(1) = \frac{1}{1-1+1} = \frac{1}{1} = 1 \quad \alpha \text{ ن.ت.}$$

$$x=3 \rightarrow g(3)=5 \rightarrow f(3) = \frac{5}{9-3+1} = \frac{5}{7} \quad \alpha \text{ ن.ت.}$$

$$x=0 \rightarrow g(0)=4 \rightarrow f(0) = \frac{4}{0-0+1} = 4 \quad \frac{g(0)}{f(0)} = \frac{4}{4} = 1 \quad (0, 1)$$

$$f(x) = \{(1,2), (3,-1), (4,2), (1,4)\}$$

$$g(x) = \{(-2,2), (1,-1), (3,2), (-1,2)\}$$

$$\begin{aligned} x=1 &\rightarrow x=1 \rightarrow \frac{1}{1} = 1 \quad (1, 2) \\ x=3 &\rightarrow x=3 \rightarrow \frac{3}{9} = \frac{1}{3} \quad (3, -1) \\ x=4 &\rightarrow x=4 \rightarrow \frac{4}{16} = \frac{1}{4} \quad (4, 2) \\ x=-1 &\rightarrow x=-1 \rightarrow \frac{-1}{1} = -1 \quad (-1, 4) \end{aligned}$$

$$\begin{aligned} x^2=1 &\rightarrow x=\pm 1 \quad (1,2), (-1,2) \\ x^2=3 &\rightarrow x=\pm\sqrt{3} \quad (\sqrt{3},-1), (-\sqrt{3},-1) \\ x^2=4 &\rightarrow x=\pm 2 \quad (2,2), (-2,2) \\ x^2=-1 &\alpha \end{aligned}$$

$$\begin{aligned} x &= -2 \rightarrow 2(x^2)+1 = 19 \quad (-2, 19) \\ x &= 1 \rightarrow 2(1^2)+1 = 3 \quad (1, 3) \\ x &= 3 \rightarrow 2(3^2)+1 = 19 \quad (3, 9) \\ x &= -1 \rightarrow 2(1^2)+1 = 3 \quad (-1, 1) \end{aligned}$$

$$f(x) = \{(2,1), (3,1), (4,9), (-2,0)\}$$

$$g = \{(5,1), (3,3), (-2,4), (-1,2), (2,3)\}$$

$$h = 2f + g \Rightarrow \{(2,5), (1,5), (-2,4)\}$$

$$\begin{aligned} x=2 &\rightarrow f(2)=1 \quad x_1=2 \\ g(2) &= 3 \quad (2,5) \\ h(2) &= 2+3=5 \end{aligned}$$

$$\begin{aligned} x=-2 &\rightarrow f(-2)=0 \quad x_1=0 \\ g(-2) &= 4 \quad (-2,4) \\ h(-2) &= 0+4=4 \end{aligned}$$

$$\begin{aligned} x=3 &\rightarrow f(3)=1 \quad x_1=3 \\ g(3) &= 3 \quad (3,5) \\ h(3) &= 2+3=5 \end{aligned}$$

۲

۴

$$f(x) = \frac{\sqrt{x^2 - x}}{x - 2}$$

$$g(x) = [x] + [-x]$$

$$(\frac{f}{g+1})(x) \quad \text{م.م.}$$

$$x \geq 0 \rightarrow x \geq 0$$

$$\sqrt{x^2 - x} \geq 0 \rightarrow (\sqrt{x^2 - x})^2 \geq 0 \rightarrow x^2 - x \geq 0 \rightarrow x(x-1) \geq 0 \rightarrow x \geq 1$$

$$x-2 \neq 0 \rightarrow x \neq 2 \quad D_f = [0, 2] - \{2\} \rightarrow [0, 2) \cup (2, \infty)$$

$$[0, 2) \cup (2, \infty) \Rightarrow x=0, 1, 2$$

$$D(\frac{f}{g+1}) = \{0, 1, 2\}$$

۲

۵

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                              |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| $f(x) = \sqrt{ax - x^2} - t$<br>$g(x) = \{(1, \sqrt{t})(t, \sqrt{t})(a, 1)\}$<br>$h(x) = \frac{f(x)}{g(x)} \rightarrow \{(1, 0)(t, \frac{\sqrt{t}}{t})(t, 0)\}$<br>$\lim_{x \rightarrow 0} (ax - x^2) > 0 \rightarrow x^2 - ax + t < 0 \rightarrow (x-1)(x-t) = 0$<br>$\downarrow x=1 \quad \downarrow x=t$<br>$D_f = 1 \leq x \leq t$<br>$n=1 \checkmark$<br>$n=t \checkmark$<br>$n=t \checkmark$<br>$x=a$                                                                                                                                                                                     | $h(x) \rightarrow \begin{cases} x=1 \rightarrow h(1) = \sqrt{a-1-t} = \sqrt{0} = 0 & h(1) = \frac{0}{1} = 0 \quad (1, 0) \\ x=t \rightarrow h(t) = \sqrt{1-t-t} = \sqrt{t} & h(t) = \frac{\sqrt{t}}{t} = \frac{1}{\sqrt{t}} \quad (t, \frac{1}{\sqrt{t}}) \\ x=a \rightarrow h(a) = \sqrt{1-a-t} = \sqrt{0} = 0 & h(a) = \frac{0}{t} = 0 \quad (t, 0) \end{cases}$                                                           | 6  |
| $\text{a)} y = x^3 - 3x^2 + 1 \rightarrow (x-1)^3 + 1 = y \rightarrow y-1 = (x-1)^3 \rightarrow x-1 = \sqrt[3]{y-1} \rightarrow x = \sqrt[3]{y-1} + 1$<br>$\rightarrow y = \frac{1}{x^3 - 3x^2} \rightarrow x^3 - 3x^2 = \frac{1}{y} \rightarrow x^3 - 3x^2 - \frac{1}{y} = 0$<br>$R = (-\infty, -1] \cup (0, +\infty)$                                                                                                                                                                                                                                                                         | $\Delta = b^2 - 4ac \rightarrow (-3)^2 - 4(-\frac{1}{y}) = 9 + \frac{4}{y}$<br>$\Delta > 0 \rightarrow 9 + \frac{4}{y} > 0 \rightarrow \frac{4}{y} > -9 \rightarrow \frac{1}{y} > -\frac{9}{4}$<br>$\rightarrow \frac{1}{y} > -1 \rightarrow \frac{1}{y} + 1 > 0 \rightarrow \frac{1+y}{y} > 0$<br>$\rightarrow +1 + \frac{1}{y} > 0 \rightarrow \frac{1}{y} > -1 \rightarrow \frac{1}{y} > -1 \rightarrow \frac{1}{y} > -1$ | 7  |
| $\text{a)} y = x^2 - 4x + 10 \quad x = \frac{-b}{2a} = \frac{4}{2} = 2 \quad y = 2^2 - 4 \cdot 2 + 10 = 2 \quad (2, 2) \quad \alpha = 1 > 0$<br>$\rightarrow y = -x^2 + 4x + 10 \quad x = \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad y = -(2)^2 + 4 \cdot 2 + 10 = 12 \quad (2, 12) \quad \alpha = -1 < 0$<br>$\text{b)} } \sqrt{x^2 - 4x - 3} > 0 \quad x = \frac{-b}{2a} = \frac{4}{2} = 2 \quad y = 2^2 - 4 \cdot 2 - 3 = -7 \quad R = [0, +\infty)$<br>$\rightarrow \sqrt{4x - x^2} > 0 \quad x = \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad y = 4 - 2^2 = 0 \quad \sqrt{4} = 2 \quad R = [0, 4]$ | $\text{a)} } \sqrt{x^2 - 4x - 3} > 0 \quad x = \frac{-b}{2a} = \frac{4}{2} = 2 \quad y = 2^2 - 4 \cdot 2 - 3 = -7 \quad R = [0, +\infty)$<br>$\rightarrow \sqrt{4x - x^2} > 0 \quad x = \frac{-b}{2a} = \frac{-4}{-2} = 2 \quad y = 4 - 2^2 = 0 \quad \sqrt{4} = 2 \quad R = [0, 4]$                                                                                                                                         | 8  |
| $\text{a)} } y = \frac{x^3 - 3x^2 + 1}{x^2} \quad R = \mathbb{R}$<br>$\rightarrow y = \frac{x^3 - 4x^2 + 10x + 1}{x^2} \quad R = \mathbb{R}$<br>$\text{b)} } y = \sqrt{x^3 - 4x^2 + 10x + 1} \quad R = [0, +\infty)$<br>$\rightarrow y = (x^3 - 4x^2 + 10x + 1)^2 \quad R = [0, +\infty)$                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                              | 9  |
| $\text{a)} } y = \frac{x^3 + 1}{x - 1} \quad a = 3 \quad c = 1 \quad R = \mathbb{R} - \{\frac{a}{c}\} = \mathbb{R} - \{\frac{3}{1}\} = \mathbb{R} - \{3\}$<br>$\rightarrow y = \frac{x^3 + 1}{x + 1} \quad a = 3 \quad c = 1 \quad R = \mathbb{R} - \{\frac{a}{c}\} = \mathbb{R} - \{\frac{3}{1}\} = \mathbb{R} - \{3\}$                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                              | 10 |