

$$f(x^r + n) = r x^r - 1$$

$$x^r + n = r \rightarrow n = 1$$

$$x^r + n = 1 \rightarrow n = r$$

$$f(r) + f(1) = r(1)^{r-1} - 1 + r(r)^{r-1} - 1 = r - 1 + 1 - 1 = 1$$

9

$$f(x) = x^r - 5x^r + 17x$$

$$g(x) = x^r + 9x^r + 17x$$

$$(x-1)^r + 1 \quad (x+1)^r - 17$$

$$\frac{g(\sqrt{r}-1)}{f(\sqrt{r}+1)} = \frac{(\sqrt{r}-1)^r - 17}{(\sqrt{r}+1)^r + 1} = \frac{1-17}{1+1} = \frac{-16}{2} = -8$$

7

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

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

$$f(x) + g(x) = a + b\sqrt{x+c} \Rightarrow x + \sqrt{x-1} + \sqrt{x-1} - 1$$

$$a = 0 \quad b = 1 \quad c = -1 \quad \frac{a+b}{c} = \frac{0+1}{-1} = -1$$

1

$$Df = (n-1)(n-3) \rightarrow n \neq 1, 3$$

$$g(n) = \{(1,1), (1,0), (3,0), (0,3)\}$$

$$\frac{g}{f} = \{(1, -1), (1, \frac{1}{1}), (3, \frac{1}{1}), (0, 1)\}$$

9

$$f(x) = \{(1, 2), (3, -1), (2, 2), (-1, 5)\}$$

$$1) f(x^2) = \{(1, 2), (\sqrt{3}, -1), (2, 2), (\sqrt{-1}, 5)\}$$

$$2) x g'(x) + 1 = \{(-2, 19), (1, 3), (3, 9), (-1, 1)\}$$

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

10

$$y = \sqrt{x^3 f(x+1)} \rightarrow x^3 \times \left(\frac{1}{x}\right)^{x+1-1} = x^3 \times \left(\frac{1}{x}\right)^x = x^3 \times \frac{1}{x^x} = \frac{x^3}{x^x} = x^{3-x}$$

$$\frac{x^3}{x^{x-1}} - x^3 \geq 0 \rightarrow x^3 \left(\frac{1}{x^{x-1}} - 1\right) \geq 0 \rightarrow x^3 (1 - x^{x-1}) \geq 0$$

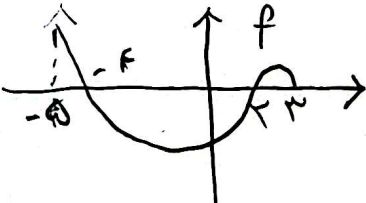
$$D_y = [0, 1]$$

$$f(x) = \sqrt{x + |x+2|}$$

$$f(-x) = \sqrt{-x + |2-x|}$$

$$x + |2-x| \geq 0 \rightarrow \begin{cases} x \geq 2 \rightarrow -x + x - 2 = -2 < 0 \times \\ x < 2 \rightarrow -x + 2 - x = -2x + 2 \geq 0 \rightarrow -2x \geq -2 \rightarrow x \leq 1 \end{cases}$$

$$D_f = [1, +\infty)$$



$$y = \sqrt{\frac{x-1}{f(x)}} \quad \frac{x-1}{f(x)} \geq 0$$

-2	1	2	3
-	+	-	+

$$D_y = (-2, 1] \cup (2, 3)$$

$$y = \sqrt{x^3 + x - \frac{7x}{x^3} - \frac{x}{x}} \rightarrow x^3 + x^3 - 7x^2 - x \geq 0$$

$$(x^3 - 7x^2) + (x^3 - x) \Rightarrow (x^2 - 7x) + x(x-1)$$

$$\rightarrow x^2 = t \quad (t-7)(t+1) + t(t-1)$$

$$\Rightarrow (t-7)(t^2 + 8t + 7) + t(t-1) \Rightarrow t = x^2 = 7 \Rightarrow x = \pm \sqrt{7}$$

$$D_y = [-\sqrt{7}, 0) \cup [7, +\infty)$$

$$9x^4 - x^2 - 5x^2 - 4x - 3$$

$$(3x^2 - x)(3x^2 + x) \rightarrow (3x^2 + x + 1)(3x^2 - x - 3)$$

$$(3x^2 - x + 0)(3x^2 + x + 0) \rightarrow (3x^2 + x + 1)(3x^2 - x - 3)$$

$$9x^4 + (3 \cdot 0 + 3 \cdot 0 - 1)x^3 + (-0 + 0)x^2 + 0x + 0 = 9x^4 - x^3 - 4x^2 - 3x$$

$$3 \cdot 0 + 3 \cdot 0 - 1 = -1$$

$$0 - 0 = -0 \Rightarrow 0 = 0 - 1 \Rightarrow 0 = -1$$

$$0 \cdot 0 = -3$$

$$\Rightarrow 3(0-1) + 3 \cdot 0 - 1 = -4$$

$$3 \cdot 0 - 1 \cdot 3 + 3 \cdot 0 = -3 \Rightarrow 0 = 1 \Rightarrow 0 = -3$$