

|                                                                                                                                                                                                                                                                                                                                                             |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| $u f(u) > 0 \quad f(u) > 0 \rightarrow [-4, -5] \quad [2, 5]$ $(0, 2) \rightarrow u f(u) < 0 \quad \underbrace{u f(u) < 0}_X \quad \underbrace{\checkmark u f(u) > 0 \rightarrow [-5, 0]}_{\checkmark}$ $[-5, 0] \cup [2, 5]$                                                                                                                               | ۱ |
| $\frac{-u}{f(u)} \geq 0 \quad u = -3 \quad u = 0 \quad u = 2 \quad (-3, 0) \cup (0, 2)$ $f(u) > 0 \leftarrow u < 0 \quad -u > 0$ $(-3, -2) \rightarrow - \quad -3 < u < 0$ $(-2, 0) \rightarrow + \quad f(u) < 0 \quad -u > 0$ $(0, 2) \rightarrow - \quad 0 < u < 2 \quad -u < 0$ $(2, 5) \rightarrow +$ $\underbrace{-3, -1, 1}_{(2)}$                    | ۲ |
| $f(-2) - 2f(-2) = (-2)^2 - 3(-2) + 2 \rightarrow 4 + 6 + 2 = 12$ $f(2) = -2$ $f(-2) - 2f(-2) = 12$ $f(-2) + 2 = 12 \rightarrow 10$ $f(-2) = 10$                                                                                                                                                                                                             | ۳ |
| $f(u) = u - \sqrt{u+2} \rightarrow u - 2 = 2 \quad f(1) = 2 + 2 = 4$ $f(u) = 2 \quad f(f(1)) = f(4)$ $f(f(u)) = f(2)$ $f(2) = 2(2) + 2 = 6$ $f(f(u)) = 6$ $f(1) = 2 + 2 = 4$ $f(f(1)) = 6$ $f(f(1)) = 6$                                                                                                                                                    | ۴ |
| $f(n-1) = a(n-1)^2 - b(n-1) + 2$ $a(n^2 - 2n + 1) - b(n-1) + 2$ $an^2 - 2an + a - bn + b + 2$ $f(n-1) - f(n) = (an^2 - 2an + a - bn + b + 2) - (a(n^2 - 2n + 1) - b(n-1) + 2)$ $= -2an + a + b = 9n + 2 \quad a + b = 2$ $-2a = 9 \quad a = -\frac{9}{2} \quad -\frac{9}{2} + b = 2 \quad b = \frac{13}{2} \quad a - b = -\frac{9}{2} - \frac{13}{2} = -11$ | ۵ |

$$f(x) = x^2 - 9 + 1 \rightarrow 9 - 9 + 1 = 1$$

$$f(-1) = 1 + 9 + 1 = 11$$

$$1 + 11 = 12$$

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

$$(-1)^2 = 1 \quad \frac{1}{1} = 1$$

6

$$f(x) = 1x + 1 = 1x$$

$$f(-x) \rightarrow +x$$

$$f(x) = 9 + 1 = 10$$

$$\frac{f(1x) - f(x)}{1} = \frac{10 - 1}{1} = 9$$

7

$$f(x) = 9 \quad f(f(x)) = 9$$

$$f(x) = x \quad f(x)$$

$$f(x) = 1 \quad f(x) = x$$

$$f(1) = 9 \quad f(f(x)) = 9$$

$$f(1) - x = 9 - x = 8 \rightarrow \frac{0}{8} = 0$$

8

$$\sqrt{x} - x = a$$

$$a + x = \sqrt{x}$$

$$a^2 + 1a + 1 = (a + x)^2$$

$$\frac{x + 1 + 1}{x + 1 + 1} = \frac{1}{1}$$

9

$$f(\sqrt{n}) = (\sqrt{n})^2 + \frac{1}{(\sqrt{n})^2}$$

$$f(\sqrt{n}) = n + \frac{1}{n}$$

$$(f(\sqrt{n}))^2 = (n + \frac{1}{n})^2$$

$$n^2 + 2n \times \frac{1}{n} + \frac{1}{n^2} \rightarrow n^2 + 2 + \frac{1}{n^2}$$

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

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