

$$xf(n) \geq 0$$

$$xf(n)$$

$$[-4, -5] \rightarrow -$$

$$[-5, -5] \rightarrow 0$$

$$(-5, 0) \rightarrow +$$

$$[0, 0] \rightarrow 0$$

$$[0, 2] \rightarrow -$$

$$[2, 2] \rightarrow 0$$

$$(2, 5) \rightarrow +$$

$$[5, 5] \rightarrow 0$$

$$\rightarrow [-5, 0]$$

$$[2, 5]$$

(2) ✓

$$\frac{-x}{f(x)} \geq 0$$

$$[-4, -3] \rightarrow -$$

$$(0, 2) \rightarrow +$$

$$[-3, -3] \rightarrow 0$$

$$[2, 2] \rightarrow 0$$

$$(-3, 0) \rightarrow +$$

$$(2, 5) \rightarrow -$$

$$[0, 0] \rightarrow 0$$

$$[5, 5] \rightarrow 0$$

$$\rightarrow [-3, 2] = \{0\}$$

$$-3, -2, -1, 0, 1, 2, 5$$

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$$f(n) - 2f(r) = n^2 - 3n + 2 \rightarrow$$

$$f(r) - 2f(r) = f - 4 + f \rightarrow -f(r) = 2 \rightarrow f(r) = -2$$

$$f(-2) + f = f + 4 + f \rightarrow f(-2) = 10$$

(2) ✓

$$f(n) = \begin{cases} n - \sqrt{n+4} & n > 3 \\ 2n - 3 & n \leq 3 \end{cases}$$

$$f(1) = 4 + 3 = 7$$

$$f(0) = 5 - \sqrt{0+4} = 3$$

$$f(r) = f + 3 = 7$$

$$1 \leq 3$$

$$0 > 3$$

$$3 \leq 3$$

$$f(f(0)) + f(f(1)) = 7 + 3 = 10$$

(2) ✓



$$1 \quad f(n) = an^r - bn + r$$

$$2 \quad f(n-1) = a(n-1)^r - r(n-1) + a - b(n-1) + b + r$$

$$3 \quad f(n-1) - f(n) = a(n-1)^r - r(n-1) + a - b(n-1) + b + r - an^r + bn - r$$

$$= -ran + a + b = 9n + r$$

$$-ra = 9 \rightarrow a = -r$$

$$-r + b = r \rightarrow b = 2r$$

$$a - b = -r - 2r = -3r = -1$$

$$7 \quad f(n) = n^r - rn + 1 \rightarrow f(r) = 9 - 9 + 1 = 1$$

$$f(-1) = 1 - r + 1 = 2$$

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

$$9 \quad \frac{f(r) + f(-1)}{f'(r)} = \frac{1 + 2}{1} = 3$$

$$11 \quad f(x) = \begin{cases} rx + 1 & x \geq r \\ x^r & x < r \end{cases}$$

$$f(r) = 12 + 1 = 13$$

$$f(-r) = r$$

$$-r < r$$

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

$$14 \quad \frac{rf(r) - (f(-r))}{f(r)} = \frac{109 - 1}{10} = \frac{108}{10} = \frac{54}{5}$$

$$16 \quad \frac{f(f(r)) - f(f(-r))}{f(r) - r} = \frac{0}{r} = 0$$

$$17 \quad f(1) = r$$

$$19 \quad f(n) = \frac{n^r + fn + 9}{n^r + fn + 6} \rightarrow \frac{(\sqrt{r} \cdot r)^r + 9\sqrt{r} - 1 + 9}{(\sqrt{r} \cdot r)^r + 9\sqrt{r} - 1 + 6} = \frac{1}{r} = \frac{1}{r}$$

$$20 \quad f(\sqrt{r} - r) = \frac{(\sqrt{r} - r + r)^r + 6}{(\sqrt{r} - r + r)^r + 1} = \frac{r + 6}{r + 1} = r$$

$$+ (f(\sqrt{3}-2) = f(2) = \frac{(2+2)^2 + 6}{(2+2)^2 + 1} = \frac{21}{17}$$

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

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

(10)

$$(n + \frac{1}{n})^r = n^r + \frac{1}{n^r} + r$$

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

$$\cancel{\frac{1}{n^r}} = (r)$$

(r) ✓