

الف) $x \neq 1$ $x > 1$ یا $x < 0$ 1
 $x > 1$ $\frac{1}{x} > 0$ $\frac{1}{x} < 0$

$\frac{1-2x}{x(x-1)} > 0$ $\frac{0}{0} \frac{1}{x} \frac{1}{x-1}$ $D_f = (-\infty, 0) \cup$
 $[\frac{1}{x} + \infty) = \{1\}$

ب) $x \neq -1, 0, 1, -2$

$\frac{x}{x-1} + \frac{1}{x+2} \neq 0 \Rightarrow \frac{x(x+2)}{(x+2)(x-1)} \neq 0 \Rightarrow x \neq -\frac{2}{x}$

$D_f = \{-2, -\frac{2}{x}, -1, 0, 1\}$

الف) $x > 0$ $x < 2, 0 - 2$ 2
 $x-9 > 0 \Rightarrow x > 9$

$D_f = (-\infty, -9] \cup [9, +\infty)$

ب) $x-1 > 0$ $x > 1$

$\sqrt{x+1} = x - \sqrt{x-1}$

$x - \sqrt{x-1} > 0$ $\sqrt{x-1} < x$

$x-1 < 1$
 $x < 2$

$D_f = [1, 2]$

$$x^r - x - r > 0 \quad (x - r)(x + 1) > 0 \quad \frac{-1}{+ \quad -} \quad -r$$

$$x^r - 1 > 0 \quad x > 1 \quad x < -1$$

$$D_f = (-\infty -1) \cup (r + \infty)$$

$$r + ax - x^r > 0 \quad r + ax - x^r = 0$$

$$-rb = \frac{r}{-1} = -r$$

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

$$\Rightarrow \boxed{1}$$

$$f(x) - x > 0 \quad f(x) = rx - r$$

$$rx - r - x > 0 \quad rx - r > 0 \quad x > 1$$

$$f(x) = rx + r \quad rx + r - x > 0 \quad x + r > 0$$

$$x > -r$$

$$\Rightarrow -r < x < 1 \quad D_f = [-r \quad +\infty)$$

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

$$\Rightarrow r \left(\frac{\sqrt{r}}{r} + 1 \right)^r - r \left(\frac{\sqrt{r}}{r} + 1 \right)$$

$$f \left(\sin \frac{\pi}{r} + \cos \pi \right) = -\frac{1}{r}$$

$$\frac{a+1}{a-1} + 1 = \frac{r_a}{r} = a \quad \checkmark$$

$$\frac{a+1}{a-1} - 1 \quad a \neq 1 \quad D_f = \mathbb{R} - \{1\}$$

$$f(g(a)) = (\sqrt{a^r-1})^r - r \sqrt{a^r-1} \Rightarrow t = \sqrt{a^r-1} - 1$$

$$t^r - r t = -r t^r - r t + r = 0 \Rightarrow (t-r)^r = 0$$

$$t = r \Rightarrow \sqrt{a^r-1} = r \Rightarrow a^r - 1 = r^2$$

$$a^r = \omega \quad a = \pm \sqrt{\omega}$$

$$\left. \begin{array}{l} n = -r \Rightarrow f(-r) = r^4 + r^3 + r = 11r \\ n = 1 \Rightarrow f(r) = 1 - \omega + r = r \end{array} \right\} \quad -9$$

$$f(r) \times f(-r) = r \times 11r = 11r^2$$

$$\cos x = t \quad f(t^r + \omega t) = \frac{r}{\omega} \quad -10$$

$$r(t^r + \omega t) - r = 0$$

$$t = \frac{-r\omega \pm \sqrt{14r\omega}}{r}$$

$$-1 \leq \cos x \leq 1$$

$$\frac{-r\omega + \sqrt{14r\omega}}{r} \quad \checkmark$$

$$\frac{-r\omega - \sqrt{14r\omega}}{r} \quad \times$$

$$f\left(\frac{r}{\omega}\right) = 1 - \left(\frac{-r\omega + \sqrt{14r\omega}}{r}\right)^r = \frac{-r\omega + \sqrt{14r\omega}}{r} \Rightarrow \frac{1149 + \omega\sqrt{14\omega}}{104}$$