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$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} \checkmark$$

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

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الف

$$2 \cos \frac{\pi}{4} = 2(\frac{1}{\sqrt{2}}) = \frac{1}{\sqrt{2}}$$

$$f(\frac{1}{\sqrt{2}}) = \sqrt{\frac{2(2) - 1}{2^2}} = \frac{\sqrt{3}}{2} \checkmark$$

$$\frac{\sqrt{2}}{1-\sqrt{2}} = \frac{2+\sqrt{2}}{-1} = -2-\sqrt{2} \approx -3.41$$

$$[-2, 4] = -8 \checkmark$$

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$$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\frac{\sqrt{2}}{2} \sqrt{1 - \frac{1}{2}} = \frac{\sqrt{2}}{2} \times \frac{1}{\sqrt{2}} = \frac{1}{2} \checkmark$$

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$$f \circ g(x) = \{(4, 5), (2, 5), (4, 12), (1, 12)\} \checkmark$$

$$g \circ f(x) = \emptyset \checkmark$$

$$f \circ f(x) = \emptyset \checkmark$$

$$g \circ g(x) = \{(4, 1), (2, 4), (4, 1)\} \checkmark$$

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$$\left. \begin{matrix} (4, 2) \\ a \rightarrow 2 \\ 2 \rightarrow 2 \end{matrix} \right\} \Rightarrow a = 4 \checkmark$$

$$\left. \begin{matrix} (4, 1) \\ 4 \rightarrow 5 \\ b \rightarrow 1 \end{matrix} \right\} \Rightarrow b = 5 \checkmark$$

$$(4, 5) \checkmark$$

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$$F(F(x)) = 5x + 7$$

$$F(x) = 4x + b$$

$$F(F(x)) = 5x + 7b + b = 5x + 7$$

$$b = 1$$

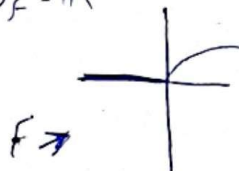
$$f(x) = 4x + 1$$

$$f(-1) = 4(-1) + 1 = -1$$

$$g(-1) = g(4x + 1) \Rightarrow x = -1$$

$$g(4(-1) + 1) = -4 - 1 = -1 \checkmark$$

$$D_f = \mathbb{R} \checkmark$$



$$D_g = \mathbb{R} - \{0, 5\} \checkmark$$

$$f(x) \neq 0, 5$$

$$x > 0 \quad \sqrt{x+1} \neq 0, 5$$

$$x \neq 0, 1$$

$$D_{g \circ f} = \mathbb{R} - \{0, 1\}$$

$$(0, +\infty) - \{1\}$$

$$D_f = [-1, 1] \checkmark$$

$$R_f = [0, 1]$$

$$D_g = [0, +\infty) \checkmark$$

$$R_g = [0, +\infty)$$

$$D_{f \circ g} \cap R_f = \{x \in D_f, f(x) \in D_{f \circ g}\}$$

$$[-1, 1]$$

$$D_f \cap D_g \cap R_f = [-1, 1]$$

$$D_{f \circ g} = D_f \cap D_g = [0, 1] \rightarrow 0 \leq f(x) \leq 1 \rightarrow x \in [0, 1]$$

$$F(x) = \frac{-2(5x+1) - 1}{5x+1-2} = \frac{-10x-3}{5x-1}$$

$$\left(x + \frac{1}{x}\right)^r = x^r + \frac{1}{x^r} + r \left(x + \frac{1}{x}\right)^{r-1} \Rightarrow x^r + \frac{1}{x^r} = t - r + 1$$

$$f(x) = x^r - r x$$

$$x = \frac{rt+1}{t-r} \rightarrow f\left(\frac{rt+1}{t-r}\right) + 1$$

$$f(x) = \frac{13x-11}{x-r}$$

$$x_1 \sqrt{x_1} = 1$$

$$x_1^r = 1$$

$$x_1 = 1$$

$$x_r \sqrt{x_r} = r \sqrt{r}$$

$$x_r = r$$

$$|x_r - x_1| = |r - 1| = 1 \checkmark$$