

$$\begin{aligned}
 1. \quad g(-4) &= \frac{f(-4)}{3} + 2 \\
 &= \frac{\sqrt{|-4|} - \frac{1}{3}}{3} + 2 \\
 &= \frac{2 - \frac{1}{3}}{3} + 2 = \frac{5}{9} + 2 = \frac{23}{9}
 \end{aligned}$$

Cevap: D

$$\begin{aligned}
 2. \quad f(1) &= 1 \\
 f(2) &= 1f(1) = 1.1 = 1! \\
 f(3) &= 2.f(2) = 2.1 = 2! \\
 f(4) &= 3.f(3) = 3.2.1 = 3! \\
 &\vdots \\
 f(101) &= 100!
 \end{aligned}$$

Cevap: B

$$\begin{aligned}
 3. \quad \lim_{x \rightarrow 1^+} ax + b &= \lim_{x \rightarrow 1^-} x^2 + x - 1 \\
 a + b &= 1 + 1 - 1 \\
 a + b &= 1
 \end{aligned}$$

Cevap: B

$$4. \quad f(x) = \frac{x}{x-1} + \frac{2}{x(1-x)}$$

$$f(x) = \frac{x}{x-1} - \frac{2}{x(x-1)}$$

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

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

$$f^{-1}\left(\frac{x^2 - 2}{x(x-1)}\right) = x \Rightarrow \frac{x^2 - 2}{x(x-1)} = 1$$

$$x^2 - 2 = x^2 - x$$

$$\boxed{x=2}$$

Cevap: B

$$5. \quad f(-1) = \underbrace{1-1}_0 + \underbrace{1-1}_0 + \underbrace{1-1}_0 + \dots + 1 + 4$$

$$f(-1) = 1 + 4 = 5$$

Cevap: E

$$6. \quad f(x+1) = 2.9(x-1)$$

$$f(x+1) = 2.(x-1-1)$$

$$f(x+1) = 2x - 4$$

$$f(x-1+1) = 2(x-1) - 4$$

$$f(x) = 2x - 6$$

$$f^{-1}(x) = \frac{x+6}{2}$$

$$(g \circ f^{-1})(x) = g(f^{-1}(x)) = g\left(\frac{x+6}{2}\right)$$

$$= \frac{x+6}{2} - 1 = \frac{x+4}{2}$$

Cevap: D

$$7. \quad f(x) - 1 = 3^x$$

$$f(x-1) = 3^{x-1} + 1 = 3^x \cdot \frac{1}{3} + 1$$

$$= \frac{(f(x)-1)+3}{3} = \frac{f(x)+2}{3}$$

Cevap: D

$$8. \quad (g^{-1} \circ f^{-1})^{-1}(x) = (f \circ g)(x)$$

$$= f(g(x)) = f(2(x-1) - 3)$$

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

Cevap: B

$$9. \quad f(x) = 3^x + 1 \Rightarrow f(x) - 1 = 3^x$$

$$f(x+1) = 3^{x+1} + 1 = 3^x \cdot 3 + 1$$

$$= (f(x) - 1) \cdot 3 + 1 = 3f(x) - 2$$

Cevap: D

$$10. \quad (f(x)+1) \frac{3}{2} = 3^x$$

$$f(2x-1) = 2 \cdot 3^{2x-1-1} - 1 = 2 \cdot 3^{2x-2} - 1$$

$$= 2 \cdot (3^x)^2 \cdot \frac{1}{9} - 1$$

$$= 2 \left( \frac{3}{2} (f(x)+1) \right)^2 \cdot \frac{1}{9} - 1$$

$$= 2 \cdot \frac{9}{4} \cdot (f^2(x) + 2f(x) + 1) \cdot \frac{1}{9} - 1$$

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

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

Cevap: D

$$11. \quad \left. \begin{array}{l} f(3) = \frac{1}{2-1} = 1 \\ f(4) = \frac{1}{3+1} = \frac{1}{4} \end{array} \right\} 1 + \frac{1}{4} = \frac{5}{4}$$

Cevap: C

$$12. \quad f^{-1}\left(\frac{x}{4} - 1\right) = 1 + \frac{x}{2}$$

$$(g \circ f^{-1})(2) = g(f^{-1}(2))$$

$$= g\left(1 + \frac{12}{2}\right) = g(7)$$

$$= 2 \cdot 7 - 3 = 11$$

Cevap: C

$$13. \quad (g \circ f)(x) = g(f(x)) = x - \sqrt{x}$$

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

$$= g(\sqrt{x^2}) = x^2 - \sqrt{x^2}$$

$$= g(x) = x^2 - x$$

Cevap: E

$$14. \quad (g^{-1} \circ f)(x) = x^2 + 3$$

$$g^{-1}(f(x)) = x^2 + 3$$

$$g(x^2 + 3) = f(x)$$

$$x^2 = 0 \Rightarrow x = 0$$

$$g(3) = f(0) = 0 + 1 = 1$$

Cevap: C

$$15. \quad 11[f(1) + f(2) + \dots + f(10)]$$

$$11 \left[ \frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \dots + \frac{1}{10 \cdot 11} \right]$$

$$11 \left[ \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \dots + \frac{1}{10} - \frac{1}{11} \right]$$

$$11 \left[ \frac{1}{1} - \frac{1}{11} \right] = 11 - 1 = 10$$

Cevap: C

$$16. \quad f(x+1-1) = 2(x+1) + 3$$

$$f(x) = 2x + 5$$

$$f^{-1}(x) = \frac{x-5}{2}$$

$$g((3x-1)) = \frac{x-5}{2}$$

$$g(3x-1) = \frac{x-5}{2}$$

$$g\left(3 \cdot \frac{x+1}{3} - 1\right) = \frac{\frac{x+1}{3} - 5}{2}$$

$$g(x) = \frac{x-14}{6}$$

Cevap: D

$$17. g^{-1}(x) = \frac{x+3}{2}$$

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

$$2.x.f(x-1) - f(x-1) = x-2$$

$$2.x.f(x-1) - x = f(x-1) - 2$$

$$x = \frac{f(x-1)-2}{2.f(x-1)-1}$$

$$g^{-1}(x) = \frac{\frac{f(x-1)-2}{2.f(x-1)-1} + 3}{2} = \frac{f(x-1)-2 + 6f(x-1) - 3}{4.f(x-1)-2}$$

$$= \frac{7.f(x-1)-5}{4f(x-1)-2}$$

Cevap: B

$$18. \left. \begin{array}{l} f(-5) = a + 5 \\ f(4) = 4 - a^2 \end{array} \right\} \begin{array}{l} a + 5 = 4 - a^2 - a \\ a^2 + 2a + 1 = 0 \\ (a + 1)^2 = 0 \\ a = -1 \end{array}$$

$$f(a+7) = f(6) = 4 - a = 4 + 1 = 5$$

Cevap: D

$$19. f^{-1}(g(x)) = x^3 + 10$$

$$f^{-1}(2x+5) = x^3 + 10$$

$$f(x^3 + 10) = 2x + 5$$

$$x = -2$$

$$f(2) = 2(-2) + 5 = 1$$

Cevap: B

$$20. f(4x+3) = \frac{2x+1}{x-1}$$

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

Cevap: C