

$$1. \underbrace{\int_a^a f(x)dx}_0 + \underbrace{\int_a^c f(x)dx + \int_c^b f(x)dx + \int_b^a f(x)dx}_{\int_a^a f(x)dx} = 0 + 0 = 0$$

Cevap: C

$$2. \int_0^{\pi} 3x \cdot \sin t \cdot dt = -3x \cdot \cos t \Big|_0^{\pi}$$

$$= -3x \cdot \cos \pi + 3x \cdot \cos 0$$

$$= -3x \cdot (-1) + 3x = 6x$$

Cevap: B

$$3. \int_{-\pi}^{\pi} \cos(2x) d(2x) = (\sin 2x) \Big|_{-\pi}^{\pi}$$

$$= \sin 2\pi - \sin(-2\pi)$$

$$= \sin 2\pi + \sin 2\pi = 2 \cdot \sin 2\pi = 0$$

Cevap: C

$$4. \int_0^{\frac{3\pi}{2}} \sin^2 x \cdot \sin 2x dx = \int_0^{\frac{3\pi}{2}} \sin^2 x \cdot 2 \sin x \cdot \cos x dx$$

$$\sin x = u \Rightarrow \cos x dx = du$$

$$\int 2 \cdot u^3 \cdot du = 2 \cdot \frac{u^4}{4} = \left( \frac{2 \cdot (\sin x)^4}{4} \right) \Big|_0^{\frac{3\pi}{2}}$$

$$\frac{2 \left( \sin \left( \frac{3\pi}{2} \right) \right)^4}{4} - \frac{2 \cdot (\sin 0)^4}{4}$$

$$= \frac{2(-1)^4}{4} - 0 = \frac{1}{2}$$

Cevap: C

$$5. \int_{\ln 2}^{\ln 5} e^{3x} \cdot dx = \frac{e^{3x}}{3} \Big|_{\ln 2}^{\ln 5}$$

$$= \frac{e^{3 \ln 5}}{3} - \frac{e^{3 \ln 2}}{3}$$

$$= \frac{e^{\ln 125}}{3} - \frac{e^{\ln 8}}{3}$$

$$= \frac{125}{3} - \frac{8}{3} = \frac{117}{3} = 39$$

Cevap: E

$$6. \int_1^{e^2} \frac{1}{x} \cdot e^{\ln x} dx$$

$$\ln x = u \Rightarrow \frac{1}{x} dx = du$$

$$\int e^u \cdot du = e^u = e^{\ln x} \Big|_1^{e^2}$$

$$e^{\ln e^2} - e^{\ln 1} = e^2 - 1$$

Cevap: A

$$7. \int_0^{\pi} \sin x dx = -\cos x \Big|_0^{\pi}$$

$$= -\cos \pi + \cos 0$$

$$= 1 + 1 = 2$$

Cevap: E

$$8. \int_0^{\frac{3\pi}{2}} (\cos^2 2x) dx =$$

$$\cos 4x = 2 \cdot \cos^2 2x - 1$$

$$\frac{\cos 4x + 1}{2} = \cos^2 2x$$

$$\int \frac{\cos 4x + 1}{2} dx = \int \frac{\cos 4x}{2} dx + \int \frac{1}{2} dx$$

$$\frac{1}{2} \int \cos 4x dx + \frac{x}{2}$$

$$\frac{1}{2} \cdot \frac{1}{4} \cdot \sin 4x + \frac{x}{2} = \left( \frac{\sin 4x}{8} + \frac{x}{2} \right) \Big|_0^{\frac{3\pi}{2}}$$

$$\frac{\sin\left(4 \cdot \frac{3\pi}{2}\right)}{8} + \frac{3\pi}{2} - \frac{\sin 0}{8} - \frac{0}{2} = \frac{3\pi}{4}$$

Cevap: A

$$9. \int x \cdot e^{-2x} dx$$

Türev	İntegral
x	$e^{-2x}$
1	$-\frac{e^{-2x}}{2}$
0	$+\frac{e^{-2x}}{4}$

$$-x \cdot \frac{e^{-2x}}{2} - \frac{e^{-2x}}{4} + c$$

$$10. \int_{-a}^a f(x) dx = 0 \text{ olur.}$$

Cevap: D

Cevap: C

$$11. \int_0^2 e^y dy = e^y \Big|_0^2 = e^2 - e^0$$

$$= e^2 - 1$$

Cevap: D

$$12. f(x) = \log_5 x$$

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

$$\int d(f^{-1}(x)) = f^{-1}(x) = 5^x + c$$

Cevap: A

$$13. f(x) = t(x+1)(x-1)^2$$

$$f(0) = t(0+1)(0-1)^2 = -1$$

$$= t = -1$$

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

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

$$= -(x^3 - 2x^2 + x + x^2 - 2x + 1)$$

$$= -x^3 + x^2 + x - 1$$

$$- \int_{-1}^1 (-x^3 + x^2 + x - 1) dx$$

$$- \left[ -\frac{x^4}{4} + \frac{x^3}{3} + \frac{x^2}{2} - x \right] \Big|_{-1}^1 =$$

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

$$- \left[ \frac{2}{3} - 2 \right] = - \left[ \frac{2-6}{3} \right] = \frac{4}{3}$$

Cevap: C

$$14. \int_1^3 \frac{1}{x \cdot \ln 2} dx = \frac{1}{\ln 2} \cdot \ln|x| \Big|_1^3$$

$$\frac{1}{\ln 2} \cdot \ln 3 - \frac{1}{\ln 2} \cdot \ln 1 = \frac{\ln 3}{\ln 2}$$

Cevap: A

$$15. \int_2^{10} |2x - 8| dx = \int_2^4 (-2x + 8) dx + \int_4^{10} (2x - 8) dx$$

$$\left( -\frac{2x^2}{2} + 8x \right) \Big|_2^4 + \left( \frac{2x^2}{2} - 8x \right) \Big|_4^{10}$$

$$-4^2 + 8 \cdot 4 + 2^2 - 8 \cdot 2 + 10^2 - 8 \cdot 10 - 4^2 + 8 \cdot 4 =$$

$$-16 + 32 + 4 - 16 + 100 - 80 - 16 + 32 = 40$$

Cevap: C

$$16. -3 \int \cos^2 x \cdot \sin x dx$$

$$\cos x = u \Rightarrow -\sin x \cdot dx = du$$

$$3 \int u^2 \cdot du = 3 \cdot \frac{u^3}{3} = (\cos x)^3 + c$$

Cevap: A

$$17. \int \frac{-\tan x \cdot dx}{\ln(\cos x)} = - \int \frac{\sin x \cdot dx}{\cos x \cdot \ln(\cos x)}$$

$$\cos x = u \Rightarrow -\sin x \cdot dx = du$$

$$\int \frac{1}{u \cdot \ln u} \cdot du$$

$$\ln u = t \Rightarrow \frac{1}{u} du = dt$$

$$\int \frac{1}{t} dt = \ln|t| = \ln|\ln u| + c$$

$$= \ln|\ln(\cos x)| + c$$

Cevap: D

$$18. \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} (\sin 2x) dx = \left( -\frac{\cos 2x}{2} \right) \Big|_{\frac{\pi}{2}}^{\frac{3\pi}{2}}$$

$$= -\frac{\cos 2 \cdot \frac{3\pi}{2}}{2} + \frac{\cos 2 \cdot \frac{\pi}{2}}{2}$$

$$= \frac{1}{2} - \frac{1}{2} = 0$$

Cevap: C

$$19. x + 2 = x^2$$

$$x^2 - x - 2 = 0$$

$$x_1 = -1$$

$$x_2 = 2$$

$$\int_{-1}^2 (x + 2 - x^2) dx = \left( \frac{x^2}{2} + 2x - \frac{x^3}{3} \right) \Big|_{-1}^2$$

$$= \frac{4}{2} + 4 - \frac{8}{3} - \frac{1}{2} + 2 - \frac{1}{3}$$

$$= \frac{3}{2} - \frac{9}{3} + 6 = \frac{3}{2} + 3 = \frac{9}{2}$$

Cevap: A

$$20. \int_1^a \left( \frac{k}{x} - \frac{3}{x} \right) dx = 8$$

$$\int_1^a \frac{3}{x} dx = 12 \Rightarrow 3 \ln|x| \Big|_1^a = 12$$

$$\Rightarrow 3 \ln a = 12$$

$$\ln a = 4$$

$$\boxed{e^4 = a}$$

$$\left( (k-3) \ln|x| \right) \Big|_1^a = (k-3) \ln|a| = 8$$

$$= (k-3) \cdot 4 = 8$$

$$k = 5$$

Cevap: B