

Abiturient 1-6

Noaniq integral yechimlari.

105-106-Mavzular.

Muallif : Pulatov Dilmurod Halimbayvich

Telegram tarmog'ida :

@axborotnoma-matematika kanali

@axborotnomaguruhi-matematika guruhi

@fizikaguruh-fizikadan yordam guruhi

16-bob. Boshlang'ich
funksiya son qning
integral

105. Boshlang'ich
Noaniq integral:

$$\frac{13}{y} = \int \frac{1}{x \cdot \ln x} dx =$$

$$= \int \frac{1}{\ln x} d(\ln x) =$$

$$= \int \frac{1}{t} dt =$$

$$= \ln(t) + C =$$

$$= \ln|\ln x| + C. \quad \textcircled{C}$$

$$\frac{11}{y} = \int (\sin(\sin x) \cdot \cos x) dx$$

$$= \int \sin(\sin x) \cdot d(\sin x) =$$

$$= \int \sin t dt =$$

$$= -\cos t + C =$$

$$= -\cos(\sin x) + C \quad \textcircled{D}$$

$$\frac{14}{y} = \int \frac{x-1}{x+2} dx =$$

$$= \int \left(\frac{x+2}{x+2} - \frac{3}{x+2} \right) dx =$$

$$= \int \left(1 - \frac{3}{x+2} \right) dx =$$

$$= x - 3 \ln|x+2| + C \quad \textcircled{C}$$

$$\frac{12}{y} = \int \frac{1}{(x-2)(x+2)} dx =$$

$$= \int \frac{1}{(x+2)-(x-2)} \left(\frac{1}{x-2} - \frac{1}{x+2} \right) dx$$

$$= \int \frac{1}{4} \left(\frac{1}{x-2} - \frac{1}{x+2} \right) dx =$$

$$= \frac{1}{4} \int \left(\frac{1}{x-2} - \frac{1}{x+2} \right) dx =$$

$$= \frac{1}{4} \left(\ln|x-2| + \ln|x+2| \right) + C$$

$$= \frac{1}{4} \left(\ln \left| \frac{x-2}{x+2} \right| \right) + C$$

$$= \frac{\ln \left| \frac{x-2}{x+2} \right|}{4} + C \quad \textcircled{A}$$

$$\frac{15}{F(x)} = \sin(\cos x) + C.$$

$$F'(x) = -\cos(\cos x) \cdot \sin x \quad \textcircled{D}$$

$$\frac{16}{y} = \int \left((2x-3)^2 + \frac{2}{x} \right) dx =$$

$$= \frac{(2x-3)^3}{3 \cdot 2} + 2 \cdot \ln x + C$$

$$= \frac{(2x-3)^3}{6} + 2 \ln x + C$$

$$\text{Javob: } \quad \textcircled{C}$$

©axbozotnoma.

$$\int \cos 4x \cdot \sin^5 4x \, dx =$$

$$= \int \sin^4 4x \, d(\sin 4x) =$$

$$= \int t^4 \, dt =$$

$$= \frac{1}{5} t^5 + C =$$

$$= \frac{1}{20} \sin^5 4x + C \quad \text{(B)}$$

@axborotnoma.

$$\int (2x-5) \cdot \sin(x^2-5x+7) \, dx$$

$$= \int \sin(x^2-5x+7) \, d(x^2-5x+7) =$$

$$= \int \sin t \, dt =$$

$$= -\cos t + C =$$

$$= -\cos(x^2-5x+7) + C$$

Javob: (C)

$$\int \frac{1}{x} \, dx =$$

$$= \ln x + C$$

$$\text{K10} \quad F(x) = \ln|x^2-3x| + C.$$

$$F'(x) = \frac{2x-3}{x^2-3x} \quad \text{(B)}$$

$$\text{K11} \quad \int \frac{1}{x} \, dx =$$

$$= \ln|x| + C.$$

Javoblarda to'g'riyi ush.

$$\text{K12} \quad \int (e^{9x} - \sin 4x) \, dx =$$

$$= \frac{1}{9} e^{9x} + \frac{1}{4} \cos 4x + C \quad \text{(A)}$$

$$\text{K13} \quad F(x) = \ln|x^3-3x^2| + C$$

$$F'(x) = \frac{3x^2-6x}{x^3-3x^2} \quad \text{(A)}$$

$$\text{K14} \quad 3) \int \cos x \, dx = \sin x + C$$

$$4) \int \frac{1}{x^2} \, dx = -\frac{1}{x} + C$$

$$5) \int \frac{1}{x^2} \, dx = \frac{1}{x} + C$$

Javob: (D)

$$\text{K15} \quad F(x) = 5 \lg x + 3x + C$$

$$F'(x) = 5 \cdot \frac{1}{x} + 3$$

Javob: (D)

1216) $\int \frac{2x-1}{x+2} dx =$
 $= \int \left(\frac{2x+4}{x+2} - \frac{5}{x+2} \right) dx$
 $= \int \left(2 - \frac{5}{x+2} \right) dx =$ (A)
 $= 2x - 5 \ln|x+2| + C$

1220) 2) $f(x) = a^x$
 $\int a^x dx = \frac{a^x}{\ln a} + C$
 3) $\int \sin x dx = -\cos x + C$
 9) $\int \frac{1}{2^x} = \frac{1}{\ln 2} 2^{-x} + C$ (B)

1217) $y' = 4y$
 $F(x) = Ce^{0,25x}$ (B)

1221) $\int \left(\sin(5x+3) - \frac{1}{x} + \ln 3 \right) dx =$
 $= -\frac{\cos(5x+3)}{5} - \ln|x| + \ln 3 \cdot x + C$
 javob: (C)

1218) $f(x) \sim F(x)$
 $f(0,2x) \sim ?$
 $\int f(0,2x) dx =$
 $= \frac{F(0,2x)}{0,2} =$
 $= 5F(0,2x)$ (C)

1222) $0(3) - \frac{1(2)}{0,0(6)} =$
 $= \frac{1}{3} - \frac{1 \cdot \frac{2}{3}}{6} =$
 $= \frac{1}{3} - \frac{11 \cdot 9^{10}}{9 \cdot 6} =$
 $= \frac{1}{3} - \frac{11 \cdot 5}{3} =$ (B)
 $= \frac{2-55}{3} = -\frac{53}{3} = -17$

1219) $F(x) = \cos(x^3+3)$
 $F'(x) = -\sin(x^3+3) \cdot 3x^2$
 $F(x) = -3x^2 \sin(x^3+3)$
 javob: (B)

1223) $\int (2x+3)^5 dx =$
 $= \frac{(2x+3)^6}{6} \cdot \frac{1}{2} + C =$
 $= \frac{1}{12} (2x+3)^6 + C$

224) $F(x) = \ln(x^2 + 4)$

$F'(x) = \frac{2x}{x^2 + 4}$ (D)

227) $F(x) = 24x^3 - \frac{4}{x} + 3^x$

$F'(x) = 120x^2 + 4 + 3^x \cdot \ln 3$

Jawab: (D)

228) $\int \frac{2}{x(x+1)} dx =$

$= 2 \int \frac{1}{x(x+1)} dx =$

$= 2 \int \frac{1}{x+1-x} \left(\frac{1}{x} - \frac{1}{x+1} \right) dx = \int \frac{1 - \cos^2 x}{\cos^2 x} dx =$

$= 2 \int \left(\frac{1}{x} - \frac{1}{x+1} \right) dx = \int \left(\frac{1}{\cos^2 x} - 1 \right) dx =$

$= 2 \left(\ln|x| - \ln|x+1| \right) + C = \ln|x| - \ln|x+1| + C$ (D)

$= 2 \left(\ln \left| \frac{x}{x+1} \right| \right) + C$

$= \ln \left(\frac{x}{x+1} \right)^2 + C$ (B)

Parabola

226) $\int \left(\sin(5x+3) - \frac{1}{x} + \ln 3 \right) dx =$

$= \frac{-\cos(5x+3)}{5} - \ln|x| + \ln 3 + C$

$+ C$ (C)

229) $\int \tan^2 x dx =$
 $= \int \frac{\sin^2 x}{\cos^2 x} dx =$

$= \int \frac{1 - \cos^2 x}{\cos^2 x} dx =$

$= \int \left(\frac{1}{\cos^2 x} - 1 \right) dx =$

$= \tan x - x + C$ (D)

229) $\int \left(\sin(5x+3) - \frac{1}{x} + \ln 3 \right) dx =$

$= \frac{-\cos(5x+3)}{5} - \ln|x| +$

$+ \ln 3 + C$

Jawab: (C)



230) $f(x) = 2 \cos x - 4 \sin x$

$F(x) \quad F\left(\frac{\pi}{3}\right) = \sqrt{3} + 5$

$F(x) = \int (2 \cos x - 4 \sin x) dx =$

$= 2 \sin x + 4 \cos x + C$

$2 \sin\left(\frac{\pi}{3}\right) + 4 \cos\left(\frac{\pi}{3}\right) + C = \sqrt{3} + 5$

$2 \cdot \frac{\sqrt{3}}{2} + 4 \cdot \frac{1}{2} + C = \sqrt{3} + 5$

$2 + C = 5$

$C = 5 - 2 = 3$

$F(x) = 2 \sin x + 4 \cos x + 3$

$F(\pi) = 2 \sin(\pi) + 4 \cos \pi + 3 =$

$0 - 4 + 3 = -1$ (B)

231) $\int (\sin(5x+3) - \frac{1}{x} + \ln 3) dx$

$= \frac{-\cos(5x+3)}{5} - \ln x +$

$+ \ln 3 x + C$

Jawab! (C)

232) $\int \frac{1}{x(x+2)} dx =$

$= \int \frac{1}{x+2-x} \left(\frac{1}{x} + \frac{1}{x+2} \right) dx$

$= \int \frac{1}{2} \left(\frac{1}{x} + \frac{1}{x+2} \right) dx$

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

$= \frac{1}{2} \left(\ln \left| \frac{x}{x+2} \right| \right) + C$

Jawab! (C)

TUGAS 10

@pulanalis
 @pulanalis
 @pulanalis
 @pulanalis
 @pulanalis

106. Boshlang'ich
 funksiya
 qavdalar.

$$\int \cos ux \cdot \sin^5 ux \, dx =$$

$$\int \frac{1}{(x-2)(x+2)} \, dx = \int \frac{1}{4} \sin^5 ux \, d(\sin ux) =$$

$$= \int \frac{1}{x+2-x-2} \left(\frac{1}{x-2} + \frac{1}{x+2} \right) dx = \frac{1}{4} \int \sin^5 ux \, d(\sin ux) =$$

$$= \int \frac{1}{4} \left(\frac{1}{x+2} - \frac{1}{x-2} \right) dx = \frac{1}{4} \int t^5 \, dt =$$

$$= \frac{1}{4} \frac{t^6}{6} + C =$$

$$= \frac{1}{4} \ln \left| \frac{x-2}{x+2} \right| + C \quad \text{(A)} = \frac{1}{24} \sin^6 ux + C \quad \text{(B)}$$

@axborotnomax

$$\int \frac{\cos(\ln 2x)}{x} \, dx = \int x \cdot \cos x^2 \, dx =$$

$$= \int \frac{2 \cos(\ln 2x)}{2} d(\ln 2x) = \frac{1}{2} \int \cos x^2 \, d(x^2) =$$

$$= \int \frac{2 \cos(\ln 2x)}{2} d(\ln 2x) = \frac{1}{2} \int \cos t \, dt =$$

$$= \int \frac{2 \cos t}{2} \, dt = \frac{1}{2} \sin t + C =$$

$$= \frac{2 \sin t}{2} + C = \frac{1}{2} \sin x^2 + C$$

$$= \frac{2 \sin(\ln 2x)}{2} + C = \sin(\ln 2x) + C \quad \text{Javob: } \text{(D)}$$

$$= \sin(\ln 2x) + C \quad \text{(C)}$$

$$\text{E5} \int f(x) dx = F(x)$$

$$\int f(0,5x) dx =$$

$$= \frac{F(0,5x)}{0,5}$$

$$= 2F(0,5x) \quad \textcircled{C}$$

$$\text{E6} \int \cos 3x \cdot \sin^6 3x dx =$$

$$= \frac{1}{3} \int \sin^6 3x d(\sin 3x) =$$

$$= \frac{1}{3} \int t^6 dt =$$

$$= \frac{1}{3} \frac{t^7}{7} + C =$$

$$= \frac{1}{21} \sin^7 3x + C \quad \textcircled{D}$$

$$\text{E7} \int \frac{x-3}{x+3} dx = \int \left(\frac{x+3}{x+3} - \frac{6}{x+3} \right) dx$$

$$= \int \left(1 - \frac{6}{x+3} \right) dx =$$

$$= x - 6 \ln|x+3| + C$$

Jawab: \textcircled{C}

$$\text{E8} f(x) = 8x^3 - 5$$

$$A(1; 4) \quad F(x) = ?$$

$$\int (8x^3 - 5) dx =$$

$$= \frac{8x^4}{4} - 5x + C$$

$$F(x) = 2x^4 - 5x + C$$

$$2 - 5 + C = 4$$

$$-3 + C = 4$$

$$C = 7$$

$$F(x) = 2x^4 - 5x + 7$$

\textcircled{B}

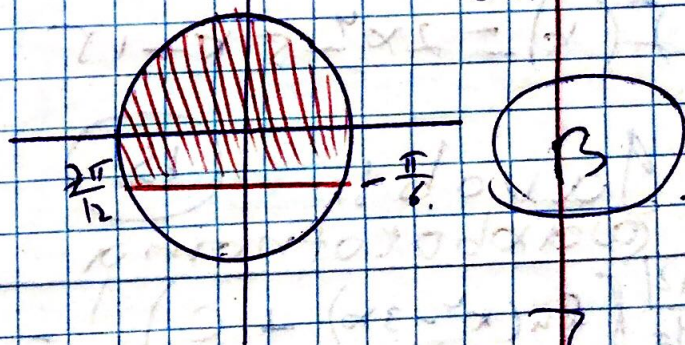
$$\text{E9} y = 2 \sin^2 x + x$$

$$y'(x) \geq 0$$

$$2 \cdot 2 \sin x \cdot \cos x + 1 \geq 0$$

$$2 \cdot \sin 2x + 1 \geq 0$$

$$\sin 2x \geq -\frac{1}{2}$$



\textcircled{B}

$$\left[-\frac{\pi}{6} + 2\pi k, \frac{2\pi}{12} + 2\pi k \right]$$

$$\text{E10} \int \left(\sin(5x+3) - \frac{1}{x} + \ln 3 \right) dx =$$

$$= \frac{-\cos(5x+3)}{5} - \ln|x| + \ln 3 x +$$

$$+ C \quad \text{(C)}$$

$$\text{E11} f(x) = 8x^3 - 5$$

$$A(2; 7) \quad F(x) = ?$$

$$\int (8x^3 - 5) dx =$$

$$= \frac{8x^4}{4} - 5x + C$$

$$F(x) = 2x^4 - 5x + C$$

$$2 \cdot 16 - 10 + C = 7$$

$$32 - 10 + C = 7$$

$$22 + C = 7$$

$$C = -15$$

$$F(x) = 2x^4 - 5x - 15$$

javob: (B)

o'xoborotnom

$$\text{E12} y = \left(\ln(x^2 - 3x) + C \right)'$$

$$= \frac{2x-3}{x^2-3x} \quad \text{(B)}$$

$$\text{E13} y' = 3y'$$

$$F(x) = y = C \cdot e^{\frac{x}{3}} \quad \text{(A)}$$

$$\text{E14} \int \left(\frac{2x^2+2}{x+1} \right) dx =$$

$$= \int \frac{2(x^2+1)}{x+1} dx =$$

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

$$= 2 \int (x^2 - x + 1) dx =$$

$$= 2 \left(\frac{x^3}{3} - \frac{x^2}{2} + x \right) + C$$

$$= \frac{2x^3}{3} - x^2 + 2x + C$$

javob: (B)

$$\text{E15} y = 3y'$$

$$\int (3y') dx =$$

$$= C \cdot e^{\frac{x}{3}} \quad \text{(B)}$$

javob: (B)

$$\int (3x^2 - 4) \cos(x^3 - 2x^2 + 12) dx = \int f(x) dx = F(x)$$

$$= \int \cos(x^3 - 2x^2 + 12) d(x^3 - 2x^2 + 12) = \int f(0,5x) dx = \frac{F(x)}{0,5}$$

$$= \int \cos t dt =$$

$$= 2F(x) \quad \textcircled{D}$$

$$= \sin t + C =$$

$$= \sin(x^3 - 2x^2 + 12) + C$$

Jawab! \textcircled{B}

$$\int 4 \sin^3 x \cdot \cos x dx =$$

$$= \int 4 \sin^3 x d(\sin x) =$$

$$= 4 \int \sin^3 x d(\sin x) =$$

$$= 4 \int t^3 dt =$$

$$= 4 \frac{t^4}{4} + C =$$

$$= t^4 + C =$$

$$= \sin^4 x + C \quad \textcircled{D}$$

$$\int \left(x - \frac{x^2}{2}\right) dx =$$

$$= \frac{x^2}{2} - \frac{1}{2} \cdot \frac{x^3}{3} + C$$

$$F(x) = \frac{x^2}{2} - \frac{x^3}{6} + C$$

$$\frac{36}{2} - \frac{6^3}{6} + C = 2$$

$$18 - 36 + C = 2$$

$$-18 + C = 2$$

$$C = 20$$

$$F(x) = -\frac{x^3}{6} + \frac{x^2}{2} + 20$$

Jawab! \textcircled{A}

$$F(x) = \ln(x^2 - 3x) + C$$

$$F'(x) = \frac{2x - 3}{x^2 - 3x}$$

Jawab! \textcircled{B}

221) $F(x) = \ln(4x^3 - 2x^2) + C$

$F'(x) = \frac{12x^2 - 4x}{4x^3 - 2x^2}$ (A)

221) $\int \frac{\ln^2 x}{x} dx$

$= \int \ln^2 x \cdot d(\ln x)$

$= \int t^2 dt$

$= \frac{t^3}{3} + C$

$= \frac{\ln^3 x}{3} + C$

$C = 7$ dob odabrano,

$F(x) = \frac{\ln^3 x}{3} + 7$ (B)

222) $\int \frac{\cos 2x}{\sin^2 x} dx$

$= \int \left(\frac{1 - 2\sin^2 x}{\sin^2 x} \right) dx$

$= \int \left(\frac{1}{\sin^2 x} - 2 \right) dx$

$= -\cot x - 2x + C$

javob: (A)
@axborotnomia

223) $\int \frac{2x+1}{x^2+1} dx$

$= \int \left(\frac{2x}{x^2+1} + \frac{1}{x^2+1} \right) dx$

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

$= \int \frac{1}{x^2+1} d(x^2+1) + \arctan x + C$

$= \int \frac{1}{t} dt + \arctan x + C$

$= \int \ln t + \arctan x + C$

$= \ln|x^2+1| + \arctan x + C$
javob: (B)

224) $y = 0,25y'$

$F(x) = Ce^{4x}$

(A)

226) $y' = \frac{5y}{x}$

$y = \frac{x \cdot y'}{5}$

$F(x) = Cx^5$

Javob: (B)

227) $\int \frac{\ln^4 x}{x} dx =$
 $\int \ln^4 x d(\ln x) =$

229) $y = 0,25 y'$
 $F(x) = C e^{4x}$ (A)

$\int t^4 dt =$
 $\frac{t^5}{5} + C =$
 $\frac{\ln^5 x}{5} + C$ (C)

230) $\int \frac{4x-12}{x^2-6x} dx =$
 $= 2 \int \frac{2x-6}{x^2-6x} dx =$
 $= 2 \int \frac{1}{x^2-6x} d(x^2-6x)$

238) $\int ((1+x)\sqrt{x}) dx =$
 $\int (\sqrt{x} + x\sqrt{x}) dx =$
 $\int (x^{1/2} + x^{3/2}) dx =$

$= 2 \int \frac{1}{t} dt =$
 $= 2 (\ln t) + C =$
 $= 2 \cdot \ln |x^2-6x| + C =$
 $= \ln |x^2-6x|^2 + C$

$\frac{x^{3/2} \cdot 2}{3} + \frac{x^{5/2}}{5/2} + C =$

avob: (C)

$= \frac{2}{3} x^{3/2} + \frac{2}{5} x^{5/2} + C$

$= \frac{2}{3} x\sqrt{x} + \frac{2}{5} x^2\sqrt{x} + C$

$= 2x\sqrt{x} \left(\frac{1}{3} + \frac{x}{5} \right) + C$

(A)

Тугайил дийл
 @PulatoorDilmurodillo
 @arboratornoma
 @arboratornoma
 @arboratornoma
 @arboratornoma