# Integrals Practice (All types including U-sub, etc.)

Name

**1.** $\int_0^{\frac{\pi}{2}} \frac{\cos\theta}{\sqrt{1+\sin\theta}} d\theta =$

(A) $-2(\sqrt{2}-1)$

(B) $-2\sqrt{2}$

(C) $2\sqrt{2}$

(D) $2(\sqrt{2}-1)$

(E) $2(\sqrt{2}+1)$

---

**2.** $\int_0^{1} (3x-2)^2 dx =$

(A) $-\frac{7}{3}$

(B) $-\frac{7}{9}$

(C) $\frac{1}{9}$

(D) 1

(E) 3

---

**3.** $\int \frac{x dx}{\sqrt{3x^2+5}} =$

## Integrals Practice (All types including U-sub, etc.)

(A) $\frac{1}{9}(3x^2+5)^{\frac{3}{2}}+c$

(B) $\frac{1}{4}(3x^2+5)^{\frac{3}{2}}+c$

(C) $\frac{1}{12}(3x^2+5)^{\frac{1}{2}}+c$

(D) $\frac{1}{3}(3x^2+5)^{\frac{1}{2}}+c$

(E) $\frac{3}{2}(3x^2+5)^{\frac{1}{2}}+c$

---

**4.** $\int \cos(3x)dx =$

(A) $-3\sin(3x)+c$

(B) $-\frac{1}{3}\sin(3x)+c$

(C) $\frac{1}{3}\sin(3x)+c$

(D) $\sin(3x)+c$

(E) $3\sin(3x)+c$

---

**5.** $\int \frac{x}{x^2-4}\,dx =$

## Integrals Practice (All types including U-sub, etc.)

(A) $\frac{-1}{4(x^2-4)^2}+C$

(B) $\frac{1}{2(x^2-4)}+C$

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

(D) $2\ln|x^2-4|+C$

(E) $\frac{1}{2}\arctan\left(\frac{x}{2}\right)+C$

---

6. Using the substitution $u=\sin(2x)$, $\int_{\pi/6}^{\pi/2}\sin^5(2x)\cos(2x)\ dx$ is equivalent to

(A) $-2\int_{1/2}^{1}u^5\ du$

(B) $\frac{1}{2}\int_{1/2}^{1}u^5\ du$

(C) $\frac{1}{2}\int_{0}^{\sqrt{3}/2}u^5\ du$

(D) $\frac{1}{2}\int_{\sqrt{3}/2}^{0}u^5\ du$

(E) $2\int_{\sqrt{3}/2}^{0}u^5\ du$

---

7. $\int(3x+1)^5dx=$

## Integrals Practice (All types including U-sub, etc.)

(A) $\frac{(3x+1)^6}{18}+C$

(B) $\frac{(3x+1)^6}{6}+C$

(C) $\frac{(3x+1)^6}{2}+C$

(D) $\frac{\left(\frac{3x^2}{2}+x\right)^6}{2}+C$

(E) $\left(\frac{3x^2}{2}+x\right)^5+C$

---

**8.** $\int_0^1 x\sqrt{1+8x^2}\,dx=$

(A) $\frac{1}{24}$

(B) $\frac{13}{12}$

(C) $\frac{9}{8}$

(D) $\frac{52}{3}$

(E) 18

---

**9.** Let *f* be a function such that $\int_6^{12} f\,(2x)\;\;dx=10$. Which of the following must be true?

## Integrals Practice (All types including U-sub, etc.)

(A) $\int_{12}^{24} f(t)\ dt = 5$

(B) $\int_{12}^{24} f(t)\ dt = 20$

(C) $\int_{6}^{12} f(t)\ dt = 5$

(D) $\int_{6}^{12} f(t)\ dt = 20$

(E) $\int_{3}^{6} f(t)\ dt = 5$

---

10. $\int_{2}^{4} \frac{dx}{5-3x} =$

(A) $-\ln 7$

(B) $-\frac{\ln 7}{3}$

(C) $\frac{\ln 7}{3}$

(D) $\ln 7$

(E) $3\ln 7$

---

11. The function $f$ is continuous and $\int_{0}^{8} f(u)\ du = 6$. What is the value of $\int_{1}^{3} xf\left(x^2-1\right)\ dx$ ?

## Integrals Practice (All types including U-sub, etc.)

(A) $\frac{3}{2}$

(B) 3

(C) 6

(D) 12

(E) 24

---

**12.** $\int_0^1 e^{-4x}\,dx =$

(A) $\frac{-e^{-4}}{4}$

(B) $-4e^{-4}$

(C) $e^{-4} - 1$

(D) $\frac{1}{4} - \frac{e^{-4}}{4}$

(E) $4 - 4e^{-4}$

---

**13.** Using the substitution *u* = 2x + 1, $\int_0^2 \sqrt{2x+1}\,dx$ is equivalent to

## Integrals Practice (All types including U-sub, etc.)

(A) $\frac{1}{2}\int_{-1/2}^{1/2} \sqrt{u}\, du$

(B) $\frac{1}{2}\int_{0}^{2} \sqrt{u}\, du$

(C) $\frac{1}{2}\int_{1}^{5} \sqrt{u}\, du$

(D) $\int_{0}^{2} \sqrt{u}\, du$

(E) $\int_{1}^{5} \sqrt{u}\, du$

---

**14.** If $\int_{0}^{k} \frac{x}{x^2+4}\, dx = \frac{1}{2}\ln 4$, where $k > 0$, then $k =$

(A) 0

(B) $\sqrt{2}$

(C) 2

(D) $\sqrt{12}$

(E) $\frac{1}{2}\tan\left(\ln\sqrt{2}\right)$

---

**15.** $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx =$

## Integrals Practice (All types including U-sub, etc.)

(A) $2e^{\sqrt{x}}+c$

(B) $\frac{1}{2}e\sqrt{x}+c$

(C) $e^{\sqrt{x}}+c$

(D) $2\sqrt{x}e^{\sqrt{x}}+c$

(E) $\frac{1}{2}\frac{e^{\sqrt{x}}}{\sqrt{x}}+c$

---

**16.** If the substitution $\sqrt{x}=\sin y$ is made in the integrand of $\int_0^{1/2}\frac{\sqrt{x}}{\sqrt{1-x}}dx$, the resulting integral is

(A) $\int_0^{1/2}\sin^2 y dy$

(B) $2\int_0^{1/2}\frac{\sin^2 y}{\cos y}dy$

(C) $2\int_0^{\pi/4}\sin^2 y dy$

(D) $\int_0^{\pi/4}\sin^2 y dy$

(E) $2\int_0^{\pi/6}\sin^2 y dy$

---

**17.** $\int_0^5\sqrt{\frac{5-x}{5}}dx=$

## Integrals Practice (All types including U-sub, etc.)

(A) $\frac{2}{3}$

(B) $\frac{10}{3}$

(C) 5

(D) $\frac{50\sqrt{5}}{3}$

---

**18.** $\int_0^{\ln 2} \frac{e^x}{1+(e^x-1)^2} dx =$

(A) arctan(ln 2)

(B) ln 2

(C) π/4

(D) π/2

---

**19.** Using the substitution $u = x + 1$ $\int \frac{x}{\sqrt{x+1}} dx$ is equivalent to

(A) $\int \frac{1}{u+1} du$

(B) $\int u^{-1/2} du$

(C) $\int \left(u^{1/2} - u^{-1/2}\right) du$

(D) $(u-1) \int u^{-1/2} du$

---

## Integrals Practice (All types including U-sub, etc.)

**20.** $\int_1^e \frac{x^2+1}{x}\,dx =$

(A) $\frac{e^2-1}{2}$

(B) $\frac{e^2+1}{2}$

(C) $\frac{e^2+2}{2}$

(D) $\frac{e^2-1}{e^2}$

(E) $\frac{2e^2-8e+6}{3e}$

---

**21.** An antiderivative for $\frac{1}{x^2-2x+2}$ is

(A) $-\left(x^2-2x+2\right)^{-2}$

(B) $\ln\left(x^2-2x+2\right)$

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

(D) arcsec($x$-1)

(E) arctan($x$-1)

---

**22.** $\int\limits_1^2 \frac{x^2-x-5}{x+2}dx =$

## Integrals Practice (All types including U-sub, etc.)

(A) $-\frac{3}{2}+\ln\frac{4}{3}$

(B) $-\frac{25}{21}$

(C) $\frac{5}{2}+3\ln\frac{3}{4}$

(D) $\frac{23}{45}$

---

**23.** $\displaystyle\int \frac{6x^2-4x-25}{x-2}dx =$

(A) $3x^2 + 8x - 9ln\ |x-2| + C$

(B) $3x^2+8x+\frac{9}{(x-2)^2}+C$

(C) $\left(2x^3-2x^2-25x\right)\ln\left|x-2\right|+C$

(D) $\frac{2x^3-2x^2-25x}{\frac{x^2}{2}-2x}+C$

---

**24.** If $\displaystyle\int_1^2 f(x-c)dx = 5$ where $c$ is a constant, then $\displaystyle\int_{1-c}^{2-c} f(x)dx =$

## Integrals Practice (All types including U-sub, etc.)

(A) 5+$c$

(B) 5

(C) 5-$c$

(D) $c$-5

(E) -5

---

**25.** Which of the following are equivalent to $\int_2^4 \frac{2x+5}{5-x}\,dx$ ?

1. $\dfrac{\int_2^4 (2x+5)\,dx}{\int_2^4 (5-x)\,dx}$
2. $\int_2^4 \left(-2+\frac{15}{5-x}\right) dx$
3. $\int_1^3 \left(\frac{15}{u}-2\right) du$

(A) I only

(B) II only

(C) III only

(D) II and III only

---

**26.** $\int \frac{8}{\sqrt{12-x^2-4x}}\,dx =$

(A) $16\sqrt{12 - x^2 - 4x} + C$

(B) $2\sin^{-1}\left(\frac{x+2}{4}\right) + C$

(C) $8\sin^{-1}\left(\frac{x-2}{4}\right) + C$

(D) $8\sin^{-1}\left(\frac{x+2}{4}\right) + C$

---

**27.** $\displaystyle\int \frac{4x^3}{2x+3}\,dx =$

(A) $\frac{x^4}{x^2+3x} + C$

(B) $x^4 \ln|2x+3| + C$

(C) $\frac{2}{3}x^3 - \frac{3}{2}x^2 + \frac{9}{2}x - \frac{27}{4}\ln|2x+3| + C$

(D) $\frac{2}{3}x^3 - \frac{3}{2}x^2 + \frac{9}{2}x - \frac{27}{2}\ln|2x+3| + C$

---

**28.** $\displaystyle\int \frac{4x^4+3}{4x^5+15x+2}\,dx =$

(A) $-\frac{1}{5\left(4x^5+15x+2\right)^2} + C$

(B) $\frac{\frac{4}{5}x^5+3x}{\frac{2}{3}x^6+\frac{15}{2}x^2+2x} + C$

(C) $\frac{1}{5}\ln\left|4x^5+15x+2\right| + C$

(D) $5\ln\left|4x^5+15x+2\right| + C$

---

## Integrals Practice (All types including U-sub, etc.)

**29.** $\int_0^1 \left(x^3+x\right)\left(x^4+2x^2+9\right)^{\frac{1}{2}} dx =$

(A) $\frac{1}{6}$

(B) $\frac{2}{3}$

(C) $4\sqrt{3}-\frac{9}{2}$

(D) $16\sqrt{3}-18$

---

**30.** $\int \frac{1}{\sqrt{9-x^2}} dx =$

(A) $\ln\left(\sqrt{9-x^2}\right)+C$

(B) $\frac{1}{3}\sin^{-1}\left(\frac{x}{3}\right)+C$

(C) $3\sin^{-1}\left(\frac{x}{3}\right)+C$

(D) $\sin^{-1}\left(\frac{x}{3}\right)+C$

---