

Calculus 2

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Reference: Varberg, Purcell, Rigdon (ninth edition) . *Calculus*.



1. $D_x \int_0^{3x} t \cos t \, dt$

a. $x \sin(3x)$

b. $9x \cos(3x)$

c. $x \cos(3x)$

d. $-x \sin(3x)$



$$2. D_x \int_0^x t \cos t \, dt$$

a. $x \sin(x) - \sin(x)$

b. $-x \sin(x)$

c. $x \sin(x)$

d. $x \cos(x)$



3. The area of the region R under the curve $y = \cos x$, between $x = 0$ and $x = \frac{\pi}{2}$ is:

a. 2

b. 7

c. $\frac{23}{3}$

d. 1



4. The area of the region R under the curve $y = 3x^2 - 5$, between $x = 0$ and $x = 1$ is:

a. 4

b. 1

c. 2

d. -4

$$5. D_x \ln \left(\frac{2x+1}{x-1} \right)$$

$$a. \quad \frac{1}{2x+1} - \frac{1}{x-1}$$

$$b. \quad \frac{x}{2x+1} + \frac{1}{x-1}$$

$$c. \quad \frac{2}{2x+1} - \frac{1}{x-1}$$

$$d. \quad \frac{x}{2x+1} - \frac{1}{x-1}$$

6. $\int_3^5 \frac{1}{x-3} dx$

a. ∞

b. 1

c. 2

d. π



7. $\frac{\ln(8)}{\ln(2)}$

a. 7

b. 1

c. 4

d. 3



8. The inverse function of $f(x) = (x - 3)^{\frac{1}{4}}$

a. $f^{-1}(x) = (x - 3)^4$

b. $f^{-1}(x) = (x - 3)^4$

c. $f^{-1}(x) = x^4 + 3$

d. $f^{-1}(x) = x^4 - 3$



9. Let $f(x) = x^3 + 5x$, then $(f^{-1})'(6)$

a. $\frac{1}{32}$

b. $-\frac{1}{32}$

c. $-\frac{1}{8}$

d. $\frac{1}{8}$



10. $e^{x \ln y}$

a. y^x

b. $x + y$

c. $x - y$

d. xy



11. $\int_0^1 e^{-x} dx$

a. e

b. $1 - \frac{1}{e}$

c. $e + 1$

d. $e - 1$



12. $D_x 5^{\tan^{-1}(x)}$

a. $5^{\tan^{-1} x}$

b. $\frac{5^{\tan^{-1} x} \ln 5}{x^2 + 1}$

c. $5^{\tan^{-1} x} \ln 5$

d. $5^{\tan^{-1} x} \sec^2 x$



13. $\int 2^{3x} dx$

a. $\frac{2^{3x}}{3 \ln 2} + c$

b. $2^{3x} + c$

c. $3(2^{3x}) + c$

d. 2^3



14. $D_x \log_3 \sin x$

a. $3 \cos x$

b. $\frac{\cos x}{\sin x \ln 3}$

c. $\cot x$

d. $3 \ln(\cos x)$



$$15. \sin^{-1}(-1)$$

a. $\frac{-\pi}{2}$

b. 1

c. π

d. $-\pi$



16. $\tan^{-1}(-1)$

a. π

b. 2π

c. $\frac{\pi}{4}$

d. $-\frac{\pi}{4}$



$$17. D_x \sin^{-1}(x^2)$$

$$a. \quad \frac{2x}{\sqrt{1-x^4}}$$

$$b. \quad \frac{6x}{\sqrt{1-9x^4}}$$

$$c. \quad \frac{x}{\sqrt{1-x^2}}$$

$$d. \quad \frac{-x}{\sqrt{1-3x^2}}$$



18. $D_x \tan^{-1}(e^x)$

a. $\frac{e^x}{1 + e^{2x}}$

b. $\frac{e^x}{\sqrt{1 - e^x}}$

c. $\frac{1}{\sqrt{1 - e^x}}$

d. $\frac{1}{1 + e^{2x}}$



19. $\int_0^1 \frac{1}{\sqrt{4-x^2}} dx$

a. π

b. $\frac{\pi}{6}$

c. 2

d. $\frac{\pi}{2}$



20. $\int \frac{e^x}{1 + e^{2x}} dx$

a. $\ln |e^x + 1| + c$

b. $\frac{e^x}{e^x - x} + c$

c. $\tan^{-1}(e^x) + c$

d. $\ln |e^x + x| + c$