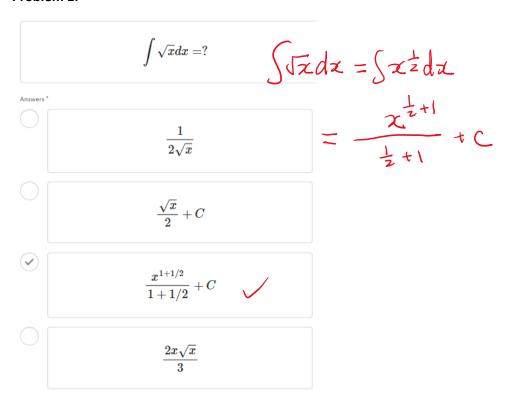
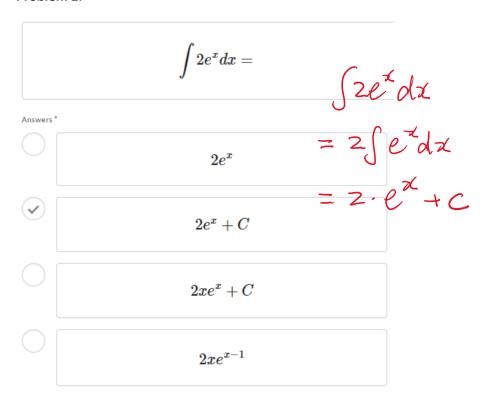
Daily Quiz #11: Antiderivatives

Problem 1.



Problem 2.



Problem 3.

$$\int \frac{3}{x} dx = ?$$

Answers *

$$\int \frac{3}{x} dx = ?$$

$$\int \frac{3}{2} dx$$

$$3 \ln x + C = 3 \int \frac{1}{2} dx$$

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

$$-3x^{-2}+C$$

does no exist since the denominator could be 0.

Problem 4.

$$\int \frac{1}{\sqrt{x}} dx = \int \frac{1}{\sqrt{z}} dx = \int \frac{1}{\sqrt{z}} dx$$

Answers*
$$\frac{\sqrt{x}}{2} + C$$

$$= \int \chi^{-\frac{1}{2}} d\chi$$

$$\chi^{-\frac{1}{2} + 1} + \zeta \qquad \chi^{\frac{1}{2}}$$

$$\frac{1}{2\sqrt{x}}$$

$$+ \zeta$$

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

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

Problem 5.

Answers'
$$3 - 2x)dx = \begin{cases} (3 - 2x)dx \\ 3 - x^2 + C \end{cases} = \begin{cases} 3 dx - 2 \begin{cases} x dx \\ 1 + 1 \end{cases} + C$$

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

$$-x^2 + C$$

$$3x - x^2 + C$$

Problem 6.

[Hint: expand the integrand before taking integral]

Answers'

$$\frac{x^3}{3} + x^2 + x + C = \int x^2 dx + 2 \int x dx + \int 1 dx$$

$$\frac{(x+1)^3}{3} + C = \frac{x^2}{2+1} + 2 \cdot \frac{x(t)}{1+1} + x + C$$

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

$$x^3 + 2x^2 + 1 + C$$

Problem 7

$$\int (\sqrt{x} + \frac{1}{\sqrt{x}})^2 dx = \int (\sqrt{x} + \frac{1}{\sqrt{x}})^2 dx$$
 [Hint: do expansion first]

Answers' $= \left(\left(\frac{1}{2} \right)^{2} + 2 \cdot \left(\frac{1}{2} \right)^{2} \right) d \times d + \left(\frac{1}{2} \right)^{2} d \times d + \left$

$$x^2+2+2\sqrt{x}+C$$

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

$$\frac{x^2}{2} + 2x + \ln|x| + C$$

$$\frac{|x|^{2}+2x+\ln|x|+C}{\frac{x^{2}}{2}+2+2\sqrt{x}+C} = \frac{|x|+C}{\frac{x^{2}}{2}+2+2\sqrt{x}+C} + 2x+ \ln|x|+C$$

Problem 8

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

Answers *

 (\checkmark)

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

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

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

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

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$$x + 2 \ln |x| + C = \chi + \frac{1}{2} \ln |x| + C$$

$$x + \ln|2x| + C$$

Problem 9

[Hint: rewrite and then integrate]

Answers '

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

$$2(x^{3/2} - x) + C = \int x dx - \int x^{\frac{1}{2}} dx$$

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

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

Problem 10

AROUNTS'
$$\int x\sqrt{3x}dx = \int x\sqrt{3x}dx$$

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

$$2\sqrt{3x} + C = \int \sqrt{3} \int x \cdot x\sqrt{x} dx$$

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

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