

## Calculus 2 Exam #1: All Integrals

(Q1.)  $\int \frac{1}{x^2 + 2x + 10} dx = ?$

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

(B)  $\frac{1}{9} \tan^{-1}\left(\frac{x+1}{9}\right) + C$

(C)  $\tan^{-1}(x^2 + 2x + 10) + C$

(D)  $\ln(x^2 + 2x + 10) + C$

(E)  $\ln|x+2| + \ln|x+5| + C$

(Q2.) Which of the following is **false**?

(A)  $\int \sec^2 x dx = \tan x + C$

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

(C)  $\int 2^x dx = 2^x \ln 2 + C$

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

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

(F) None of the above

(Q3.) Pikachu is trying to integrate  $\int \frac{x^3}{\sqrt{x^2 + 4}} dx$  by using trig sub:  $x = 2 \tan \theta$ .

Which of the following integral should he obtain?

(A)  $\int \frac{4 \tan^3 \theta}{\sec^2 \theta} d\theta$

(B)  $\int 4 \tan^3 \theta \sec \theta d\theta$

(C)  $\int \tan^3 \theta \sec \theta d\theta$

(D)  $\int 8 \tan^3 \theta \sec \theta d\theta$

(E)  $\int 4 \sin^3 \theta \sec \theta d\theta$

(F) None of the above

(Q4.)  $\int \frac{1}{\sqrt{2x+1}} dx = ?$

(A)  $2 \ln|2x+1| + C$

(B)  $\frac{1}{2} \ln|2x+1| + C$

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

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

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

(F) None of the above

(Q5.)  $\int \tan^{-1} x dx = ?$

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

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

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

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

(E) None of the above

(Q6.)  $\int \frac{\ln x}{x} dx = ?$

(A)  $(\ln x)^2 + C$

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

(C)  $\ln(\ln x) + C$

(D)  $\ln(x \ln x) + C$

(E) None of the above

$$(Q7.) \int \cos^5 x \, dx$$

$$(Q8.) \int \frac{x+3}{(x-1)(x-2)^2} \, dx$$

$$(Q9.) \int \sin(\ln x) \, dx$$

$$(Q10.) \int \sqrt{1-x^2} \, dx$$

$$(Q11.) \int (\cos x + \tan x)^2 \, dx$$

(Q12.) A person did the following. State **3 mistakes** that the person made.

$$\begin{aligned} & \int \frac{1}{x+2} \, dx \\ &= \int \left( \frac{1}{x} + \frac{1}{2} \right) \, dx \\ &= \ln x + \ln 2 \\ &= \ln(x+2) \end{aligned}$$

$$(Q13.) \int \frac{1}{\sqrt{e^x-1}} \, dx$$

$$(Q14.) \int \sqrt[5]{\tan x} \, dx$$