

Name _____

Calculus II

When finished submit your answers at <https://pryor.mathcs.wilkes.edu/submissions>.
If you feel the answer is none of the choices given, submit no answer to the question.

1. Using a trigonometric substitution $\int \frac{x^2}{\sqrt{x^2 + 25}} dx$ becomes

A. $25 \int \tan^2 \theta \sec \theta d\theta$

C. $25 \int \frac{\tan^2 \theta}{\sec \theta} d\theta$

B. $5 \int \tan^2 \theta \sec \theta d\theta$

D. $25 \int \sin^2 \theta d\theta$

2. Which of the following is an integrating factor for the differential equation:
 $ty' - (t + 2)y = 2 \tan 3t$?

A. $\frac{1}{t^2 e^t}$

B. $\frac{t + 2}{t}$

C. $\frac{1}{t^2}$

D. $t^2 e^t$

3. Using a trigonometric substitution $\int \frac{\sqrt{x}}{\sqrt{9 - x}} dx$, what would be the substitution for dx in terms of du ?

A. $dx = 18 \sin u \cos u du$

C. $dx = -18 \sin u \cos u du$

B. $dx = -18 \sin^2 u du$

D. $dx = 18 \cos^2 u du$

4. Which of the following are true, if $f(x) = \int_0^1 \frac{1}{x^{\frac{3}{2}}} dx$, $g(x) = \int_0^1 \frac{1}{\sqrt{x}} dx$, and

$h(x) = \int_0^1 \frac{1}{x - 1} dx$? only $g(x)$ converges

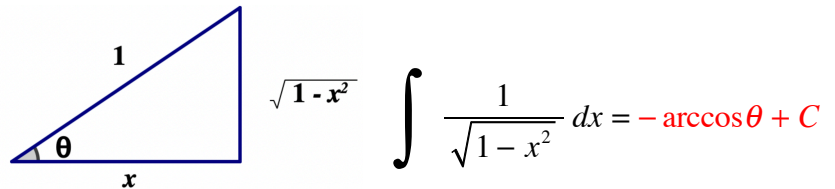
A. $f(x)$, $g(x)$, and $h(x)$ all converge

C. only $f(x)$ converges

B. only $f(x)$ and $g(x)$ converge

D. all diverge

5. Using guess, check, and adjust, $\int \frac{1}{\sqrt{1-x^2}} dx = \arcsin x + C$. What would be the difference, if any, if we used trigonometric substitution using the diagram below?



6. After using trigonometric identities $\int \sin^2 x \tan x dx$ can be rewritten as the sum of two "easily" integrable terms. What would be the two terms of this integrand?

$$\tan x - \sin x \cos x$$

7. If $f(x) = \int \sin^2 x \tan x dx$ and $f(0) = 1$, what is $f\left(\frac{\pi}{3}\right)$? $\frac{5}{8} + \ln 2$

8. Given the differential equation $y' + \frac{y}{x+2} = x$, if $y(0) = 2$, what is $y(1)$? $\frac{16}{9}$

9. What strategy should be used to calculate $\int \tan^4 x \sec^2 x dx$?

A. parts

C. rewrite using $\sin x$ and $\cos x$

B. use $\tan^2 x + 1 = \sec^2 x$

D. guess, check, and adjust

10. Using guess, check and adjust, $\int \frac{1}{x+1} dx = \ln|x+1| + C$. If we use the following

trigonometric substitution model, what would be the resulting **simplified** trigonometric **integrand** in terms of u ? $2 \tan u du$

