Feedback — Chapter 3 Quiz: Integration

Although your quiz has been submitted, we were unable to verify your identity due to time-out. If you believe this is an error or if you encountered technical difficulties during authentication, please contact us.

You submitted this exam on **Sun 24 Feb 2013 4:00 PM EST -0500**. You got a score of **8.00** out of **10.00**.

The following is an *exam* and counts toward your final evaluation for this class. Please answer the ten (10) problems below. You may *not* use a calculator, or any other assistance, including software, textbooks, or notes. You may *not* collaborate with others or post your solutions on a discussion board. Use your head, some paper, and a writing utensil. Good luck!

Question 1

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

Your Answer	Score	Explanation
○ $\frac{(\arcsin x)^3}{3\sqrt{1-x^2}} + C$		
○ $\frac{1}{3}\sqrt{1-(\arcsin x)^3} + C$		
○ $\sqrt{\frac{1}{3}(\arcsin x)^3} + C$		
◉ $\frac{1}{3}(\arcsin x)^3 + C$	✓ 1.00	

$\frac{2}{3}\sqrt{1-\sin^3 x}+C$	
$\frac{1}{3}\sin^3 x+C$	
$\frac{1}{3}\left(\arcsin\sqrt{1-x^2}\right)^3+C$	
$\frac{x^3}{3}+C$	
Total	1.00 / 1.00

Question 2

$$\int \frac{dx}{x^2+x-6} =$$

Your Answer		Score	Explanation
$-\frac{1}{3}\ln\left\|\frac{x+2}{x-3}\right\|+C$			
$\frac{1}{3}\ln\left\|\frac{x+2}{x-3}\right\|+C$			
$\frac{1}{3}\ln\left\|\frac{x-2}{x+3}\right\|+C$			
$\frac{1}{5}\ln\left\|\frac{x-2}{x+3}\right\|+C$	✓	1.00	
$-\frac{1}{3}\ln\left\|\frac{x-2}{x+3}\right\|+C$			
$\frac{1}{5}\ln\left\|\frac{x+2}{x-3}\right\|+C$			
$-\frac{1}{5}\ln\left\|\frac{x+2}{x-3}\right\|+C$			

$-\frac{1}{5}\ln\left\|\frac{x-2}{x+3}\right\|+C$	
Total	1.00 / 1.00

Question 3

Which of the following integrals converge? In order to receive full credit for this problem, you must select **all** the integrals that converge (there may be many) and **none** of those that diverge.

Your Answer		Score	Explanation
☐ $\int_2^{+\infty} \frac{x^3-1}{x^3\sqrt{x-2}}\,dx$	✓	0.00	
☐ $\int_0^{+\infty} \frac{dx}{(x-2)^4}$	✓	0.00	
☐ $\int_1^3 \frac{dx}{(x-3)^2\ln x}$	✓	0.00	
☐ $\int_0^1 \frac{\sin^2 x}{x^{5/2}(x-1)^{1/2}}\,dx$	✓	0.25	
☐ $\int_0^1 \frac{dx}{x\sqrt{x-1}}$	✓	0.00	
☑ $\int_1^{+\infty} \frac{dx}{x^4(x-1)^{2/3}}$	✓	0.25	
☐ $\int_1^{+\infty} \frac{dx}{\sqrt{x(x-1)}}$	✓	0.25	
☑ $\int_0^2 \frac{\sin(\pi x)}{x-1}\,dx$	✓	0.25	

Total	1.00 / 1.00

Question 4

$$\int_0^{\pi/2} x \sin 2x \, dx =$$

Your Answer		Score	Explanation
$-\frac{1}{2}$			
$\frac{1}{2}$			
$\frac{\pi}{2}$			
$\frac{\pi}{4}$	✓	1.00	
$-\frac{\pi}{2}$			
$\frac{1}{4}$			
$-\frac{1}{4}$			
$-\frac{\pi}{4}$			
Total		1.00 / 1.00	

Question 5

$$\int \frac{dx}{x^2 - 2x + 5} =$$

Your Answer		Score	Explanation
○	$\frac{1}{2}\arctan\frac{x-1}{4}+C$		
○	$\frac{1}{2}\arctan\frac{x+1}{4}+C$		
○	$\frac{1}{3}\arctan\frac{x+1}{5}+C$		
◉	$\frac{1}{2}\arctan\frac{x-1}{2}+C$	✓ 1.00	
○	$\frac{1}{3}\arctan\frac{x-1}{5}+C$		
○	$\frac{1}{3}\arctan\frac{x+1}{3}+C$		
○	$\frac{1}{2}\arctan\frac{x+1}{2}+C$		
○	$\frac{1}{3}\arctan\frac{x-1}{3}+C$		
Total		1.00 / 1.00	

Question 6

Solve the differential equation $\frac{dx}{dt}=e^{t-x}$.

Your Answer		Score	Explanation
○	$x=\frac{t^2}{4}+\frac{1}{2}+Ce^{-2t}$		
○	$x=-\ln\left(C-e^t\right)$		
○	$x=t+\ln C$		
		✓ 1.00	

$x = \ln\left(e^t + C\right)$	
$x = -\frac{t}{2} - \frac{1}{4} + Ce^{2t}$	
$x = \frac{t}{2} - \frac{1}{4} + C$	
$x = \ln\left(Ce^{-2t}\right)$	
$x = \left(\frac{t^2}{2} + C\right)e^{-2t}$	
Total	1.00 / 1.00

Question 7

$\int \cos^3 3x \, dx =$

Your Answer	Score	Explanation
$\frac{1}{3}\cos 3x + \frac{1}{9}\cos^3 3x + C$		
$\frac{1}{3}\cos^4 3x + C$		
$9\cos^2 3x + C$		
$\frac{1}{3}\sin 3x - \frac{1}{9}\sin^3 3x + C$	✓ 1.00	
$\frac{1}{3}\sin 3x + \frac{1}{9}\sin^3 3x + C$		
$\cos 3x + \frac{1}{4}\cos^4 3x + C$		
$\sin 3x - \frac{1}{3}\sin^3 3x + C$		

$\frac{1}{12}\cos^4 3x + C$		
Total		1.00 / 1.00

Question 8

$$\frac{d}{dx}\int_0^{\ln x} \frac{\sin 2t}{\sqrt{1+t}}\,dt =$$

Your Answer		Score	Explanation
0			
$\frac{\sin 2x}{\sqrt{1+x}}\ln x$			
$\frac{d}{dx}\left(\frac{\sin(2\ln x)}{\sqrt{1+\ln x}}\right)$			
$\frac{\sin(2\ln x)}{x\sqrt{1+\ln x}}$			
$\int_0^{\ln x} \frac{d}{dt}\left(\frac{\sin 2t}{\sqrt{1+t}}\right)dt$			
$\frac{\sin(2\ln x)}{2x\sqrt{1+\ln x}}$			
$\frac{\sin(2\ln x)}{2\sqrt{1+\ln x}}$			
$\frac{\sin(2\ln x)}{\sqrt{1+\ln x}}$	✘	0.00	
Total		0.00 / 1.00	

Question 9

Which of the following is the *integrating factor* used to solve the linear differential equation

$$e^{3t}\,\frac{dx}{dt} = 2 - e^{t}\,x$$

Your Answer		Score	Explanation
○	$I = 2e^{3t}$, that is, $I = 2\exp(3t)$		
○	$I = e^{\frac{1}{3}e^{3t}}$, that is, $I = \exp\left(\frac{1}{3}\,e^{3t}\right)$		
○	$I = e^{-\frac{1}{3}e^{-3t}}$, that is, $I = \exp\left(-\frac{1}{3}\,e^{-3t}\right)$		
◉	$I = e^{-\frac{1}{2}e^{-2t}}$, that is, $I = \exp\left(-\frac{1}{2}\,e^{-2t}\right)$	✓	1.00
○	$I = e^{-e^{-t}}$, that is, $I = \exp\left(-e^{-t}\right)$		
○	$I = e^{e^{t}}$, that is, $I = \exp\left(e^{t}\right)$		
○	$I = 2e^{-3t}$, that is, $I = 2\exp(-3t)$		
○	$I = e^{\frac{1}{2}e^{2t}}$, that is, $I = \exp\left(\frac{1}{2}\,e^{2t}\right)$		
Total		1.00 / 1.00	

Question 10

The size $z(t)$ of a hailstone evolves according to the differential equation

$$\frac{dz}{dt} = A\sqrt{z} - B\sqrt{z^3}$$

where A and B are positive constants. Without solving the differential equation, determine the limiting size $\lim_{t\to+\infty} z(t)$ in the case where $z(0) = 1$.

Your Answer		Score	Explanation
○ $\frac{\sqrt{A}}{B}$			
◉ $\frac{A}{\sqrt{B}}$	✗	0.00	
○ $\sqrt{\frac{A}{B}}$			
○ $\frac{A}{B}$			
○ $\sqrt{\frac{B}{A}}$			
○ $-\frac{A}{B}$			
○ $\frac{B}{A}$			
○ $-\frac{B}{A}$			
Total		0.00 / 1.00	