Feedback — Chapter 1 Quiz : Functions

You submitted this exam on **Sun 20 Jan 2013 4:24 PM EST**. 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

What is the domain of the function $f(x) = \sqrt{\ln x}$?

Your Answer		Score	Explanation
◉ $[1, \infty)$	✓	1.00	
Total		1.00 / 1.00	

Question 2

Which of the following is the Taylor series of $\ln \dfrac{1}{1-x}$ about $x = 0$ up to and including the terms of order three?

Your Answer		Score	Explanation
◉ $\ln \dfrac{1}{1-x} = x + \dfrac{1}{2}x^2 + \dfrac{1}{3}x^3 + O(x^4)$	✓	1.00	

Total	1.00 / 1.00

Question 3

Using your knowledge of Taylor series, find the sixth derivative $f^{(6)}(0)$ of $f(x) = e^{-x^2}$ evaluated at $x = 0$.

Your Answer		Score	Explanation
◉ -120	✓	1.00	
Total		1.00 / 1.00	

Question 4

Recall that the Taylor series for $\arctan$ is

$$\arctan x = \sum_{k=0}^{\infty} (-1)^k \frac{x^{2k+1}}{2k+1}$$

for $|x| < 1$. Using this, compute $\lim_{x \to 0} \frac{\arctan x}{x^3 + 7x}$.

Your Answer		Score	Explanation
◉ $\frac{1}{7}$	✓	1.00	
Total		1.00 / 1.00	

Question 5

$$\lim_{x\to+\infty} 2x\sin\frac{1}{2x} =$$

Your Answer		Score	Explanation
◉ $+\infty$	✗	0.00	
Total		0.00 / 1.00	

Question 6

Determine which value is approximated by

$$\sqrt{2}e - e^2 + \frac{2\sqrt{2}e^3}{3} - e^4 + \frac{4\sqrt{2}e^5}{5} + \text{H.O.T.}$$

Your Answer		Score	Explanation
◉ $\ln(1+\sqrt{2}e)$	✓	1.00	
Total		1.00 / 1.00	

Question 7

Which of the following expressions describes the sum

$$-x + \frac{\sqrt{2}}{4}x^2 - \frac{\sqrt{3}}{9}x^3 + \frac{2}{16}x^4 + \text{H.O.T.}$$

Choose all that apply.

Your Answer		Score	Explanation
☐ $\sum_{n=1}^{\infty}(-1)^n \frac{\sqrt{2}\sqrt{3}^{n-1}}{n^2}x^n$	✓	0.00	
	✓	0.00	

☐ $\sum_{n=0}^{\infty}(-1)^{n-1}\frac{\sqrt{2(n+1)}}{n^2}x^n$			
☑ $\sum_{n=1}^{\infty}(-1)^{n}\frac{\sqrt{n}}{n^2}x^n$	✓	0.50	
☐ $\sum_{n=1}^{\infty}(-1)^{n}\frac{\sqrt{2n}}{n^2}x^n$	✓	0.00	
☐ $\sum_{n=1}^{\infty}(-1)^{n}\sqrt{\frac{n}{n^2}}x^n$	✓	0.00	
☐ $\sum_{n=1}^{\infty}(-1)^{n}\frac{\sqrt{n}}{n}(x-1)^n$	✓	0.00	
☐ $\sum_{n=1}^{\infty}(-1)^{n}\frac{\sqrt{2n}}{n}x^n$	✓	0.00	
☑ $\sum_{n=0}^{\infty}(-1)^{n+1}\frac{\sqrt{n+1}}{(n+1)^2}x^{n+1}$	✓	0.50	
Total		1.00 / 1.00	

Question 8

Use the geometric series to evaluate the sum

$$\sum_{k=0}^{\infty}\frac{x^k}{2^k}$$

Don't forget to indicate what restrictions there are on x...

Your Answer	Score	Explanation
◉ $\sum_{k=0}^{\infty}\frac{x^k}{2^k}=\frac{2}{2-x}$ on $\lvert x\rvert<2$	✓ 1.00	

Total	1.00 / 1.00

Question 9

Which of the following is the Taylor series expansion about $x = 1$ of

$$x^3 - 3x^2 + 2x - 5$$

Your Answer		Score	Explanation
◉ $-5 + 2x - 3x^2 + x^3 + O(x^4)$	✗	0.00	
Total		0.00 / 1.00	

Question 10

Exactly two of the statements below are correct. Select the two correct statements.

Your Answer		Score	Explanation
☐ $\cosh 2x$ is in $O(x^n)$ for all $n \geq 0$ as $x \to +\infty$.	✓	0.00	
☐ $7\sqrt{x}$ is in $O(x^4)$ as $x \to 0$.	✓	0.00	
☑ $\sqrt{16x^4 - 2}$ is in $O(x^2)$ as $x \to +\infty$.	✓	0.50	
☐ e^{x^2} is in $O(x^2)$ as $x \to +\infty$.	✓	0.00	
☐ $3x^4 - 14$ is in $O(x^2)$ as $x \to +\infty$.	✓	0.00	
☐ $7x^3$ is in $O(x^4)$ as $x \to 0$.	✓	0.00	
☐ e^x belongs to $O(\ln x)$ as $x \to +\infty$.	✓	0.00	
☑ $\ln(1 + x + x^2)$ is in $O(x^n)$ for all $n \geq 1$	✓	0.50	

as $x \to +\infty$.

Total	1.00 / 1.00