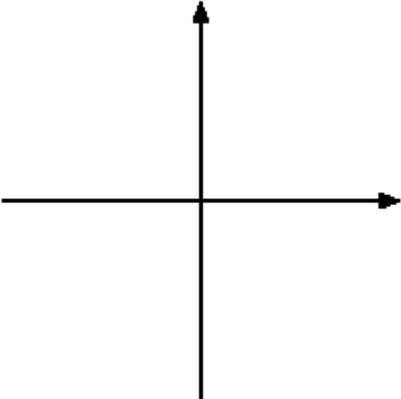
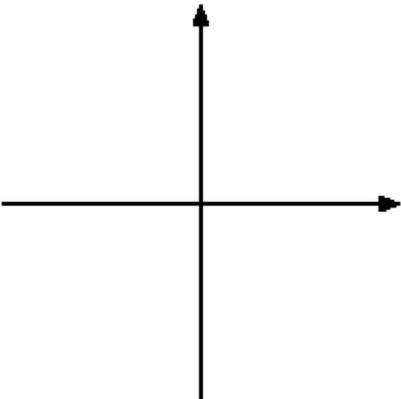


Final Exam Review Questions
Math 1432
Spring 2007

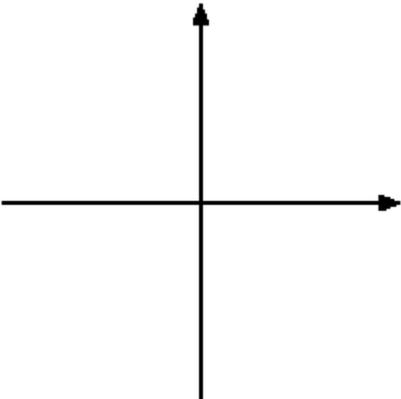
1. $f(x) = e^x$

<p>Graph $f(x)$</p> 	Domain of $f =$
	Range of $f =$
	$f'(x) =$
	$\int f(x)dx =$

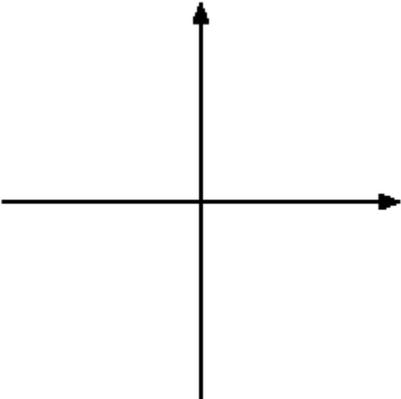
2. $f(x) = \ln(-x)$

<p>Graph $f(x)$</p> 	Domain of $f =$
	Range of $f =$
	$f'(x) =$
	$f^{-1}(x) =$

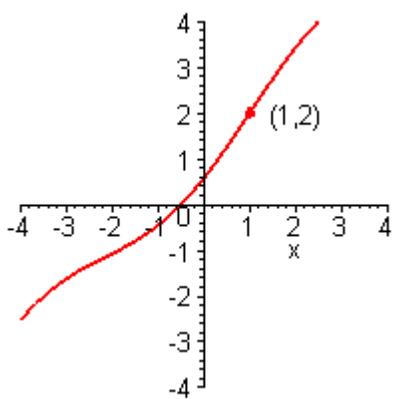
3. $f(x) = \arcsin(x)$

<p>Graph $f(x)$</p> 	Domain of $f =$
	Range of $f =$
	$f'(x) =$
	$\cos(f(1)) =$

4. $f(x) = \cosh(x)$

<p>Graph $f(x)$</p> 	Domain of $f =$
	Range of $f =$
	$f'(x) =$
	$\int f(x)dx =$

5. The graph of $f(x)$ is shown below and $\frac{d}{dx} f^{-1}(2) = \frac{5}{6}$.

<p>Graph $g(x)$ along with $f(x)$</p> 	$f'(1) =$
	$f(-2) = -1$ and $f'(-2) = 1/2$. Give $\frac{d}{dx} f^{-1}(-1)$.

6. Simplify $\tan(\arcsin(3x))$ for $0 < x < 1/3$.	
7. Find the largest interval containing $x = -2$ on which the function $f(x) = x^3 - 9x^2 + 24x$ is invertible	
8. Compute $\int_0^2 \sqrt{4-x^2} dx$	
9. Compute $\int \frac{\arctan(x)}{1+x^2} dx$	

10. Compute $\int \frac{\cosh(x)}{1 + \sinh(x)} dx$	
11. Compute $\int e^x \sin(e^x) dx$	
12. Compute $\int_0^\pi \sin(x) \cos^2(x) dx$	
13. A culture of bacteria is growing in such a way that the number of bacteria is changing at a rate proportional to the number of bacteria. If there are initially 10,000 bacteria, and 12,000 bacteria are present six hours later, what is the doubling time for the culture? (give your answer in terms of \ln)	
14. Give the solution to $\frac{dy}{dx} = -3y$, $y(0) = -2$	
15. Identify the geometric shape given by the parameterization $x(t) = -2 + 3 \cos(t)$, $y(t) = 1 + 3 \sin(t)$	
16. Give a parameterization for the line segment from the point (1,6) to the point (-3,1).	
17. Use long division to rewrite $\frac{x^4}{x^3 + x^2 + 1}$	
18. Give a parameterization for the curve given in polar coordinates by $r = 1 + \sin(\theta)$.	
19. Write the line $y = x$ in polar coordinates.	
20. Give the limit of the sequence $\{n \sin(1/n)\}$	

<p>21. Give the limit of the sequence</p> $\left\{ \left(\frac{n-1}{n} \right)^n \right\}$	
<p>22. Give the formula for the arc length of a curve parameterized by $x(t) = \cos(t)$, $y(t) = t^2$ for $0 \leq t \leq 1$.</p>	
<p>23. Give the partial fraction decomposition for</p> $\frac{2x+1}{(x-1)^2(x^2+1)}$	
<p>24. Give the greatest lower bound of the set $\{x \mid x^2 + 3x - 10 < 0\}$.</p>	
<p>25. Give the exact value of</p> $\sum_{n=2}^{\infty} \frac{\cos(n\pi)}{4^n}.$	
<p>26. Give the exact value of</p> $\sum_{n=2}^{\infty} \frac{1}{n(n+1)}.$	
<p>27. Suppose $f(x) = \sum_{n=0}^{\infty} \frac{x^{2n-1}}{(2n)!}$. Give the 13th derivative of f at $x = 0$.</p>	
<p>28. Give the 5th degree Taylor polynomial for e^x centered at 0.</p>	
<p>29. Give the 6th degree Taylor polynomial for $\cos(x)$ centered at 0.</p>	
<p>30. Give the Taylor series expansion for $f(x) = e^{-x}$ centered at 0.</p>	

<p>31. Give the value for the integral</p> $\int_{-2}^0 \frac{1}{x+1} dx .$	
<p>32. Does $\sum_{n=2}^{\infty} \frac{10n^2 + n - 2}{2n^6 + 7n - 1}$ converge or diverge?</p>	
<p>33. Does $\sum_{n=1}^{\infty} \frac{n^2 + 3n - 2}{\sqrt{4n^9 + n - 1}}$ converge or diverge?</p>	
<p>34. Does $\sum_{n=2}^{\infty} \frac{(-1)^n}{3n + 2}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>35. Does $\sum_{n=0}^{\infty} \frac{(-1)^n 10n^2}{3^n}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>36. $f(1) = -1, f'(1) = 2, f''(1) = -1$. Give the 2nd degree Taylor polynomial for f centered at 1.</p>	
<p>37. Rewrite $f(x) = x^3 + 2x^2 - x + 1$ in powers of $(x + 1)$.</p>	
<p>38. Give the interval of convergence for the power series $\sum_{n=1}^{\infty} \frac{x^n}{2^n}$.</p>	
<p>39. Give a power series representation for $\arctan(2x)$ and give the radius of convergence.</p>	

<p>40. Give a value of n so that the Taylor polynomial of degree n for $f(x) = \sin(x)$ centered at 0 can be used to approximate $f(x)$ within 10^{-4} on the interval $\left[-\frac{1}{2}, \frac{1}{2}\right]$.</p>	
<p>41. Does $\sum_{n=2}^{\infty} \frac{(-1)^n n!}{(n+1)!}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>42. Does $\sum_{n=2}^{\infty} \frac{(-1)^n 3^n}{n!}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>43. Does $\sum_{n=2}^{\infty} \frac{(-1)^n}{n^2 + 3n + 2}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>44. Does the sequence $\left\{\frac{1}{n \ln(n)}\right\}$ converge or diverge?</p>	
<p>45. Does $\sum_{n=2}^{\infty} \frac{\cos(\pi n) n^n}{n!}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>46. Does $\sum_{n=2}^{\infty} \frac{1}{n(\ln(n))^2}$ converge absolutely, converge conditionally, or diverge?</p>	
<p>47. Does the sequence $\left\{\frac{2n^2 + 1}{3n^3 + 4n^2 + 6}\right\}$ converge or diverge?</p>	
<p>48. Give a power series expansion for $f(x) = \ln(x)$ centered at 1.</p>	

49. Give a power series expansion for $f(x) = \sin(3x)$ centered at 0.	
50. Give a power series expansion for $f(x) = \frac{1}{(1+x)^2}$ centered at 0.	