MATH 124 - Section 23, Fall 2007
Practice Exam 1

1. (Section 1.1) A school library opened in 1980. In January, 2000 they had 30,000 books. One year later, they had 30,480 books. Assuming they acquire the same number of books at the start of each month:

   (a) Find a linear function for the number of books, N, in the library as a function of the number of years t the library has been open.

   (b) How many books did they have in January, 2003?

2. (Section 1.2) Joe and Sam each invested \$20,000 in the stock market. Joe's investment increased in value by 5% a year for 10 years. Sam's investment decreased in value for 10% for 5 years and then increased by 10% for the next 5 years.

   (a) At the end of 10 years, whose investment was worth more?

   (b) If Sam's investment was \$30,000, but Joe's was still \$20,000, would that change whose investment would be worth more at the end of the 10 years?

3. (Section 1.3) Find the inverse of $y = \dfrac{2}{3x-7}$.

4. (Section 1.3) We have $f(x)$ and $g(x)$ defined by the following table:

x	-1	0	1	2	3
$f(x)$	2	1	4	0	1
$g(x)$	1	-1	6	-1	0

   (a) What is $g(-f(3))$?

   (b) What is $(g(2))^2$?

5. (Section 1.4) If $P = 20(1.8)^t$ approximate k (to three decimal places) so that $P = 20e^{kt}$.

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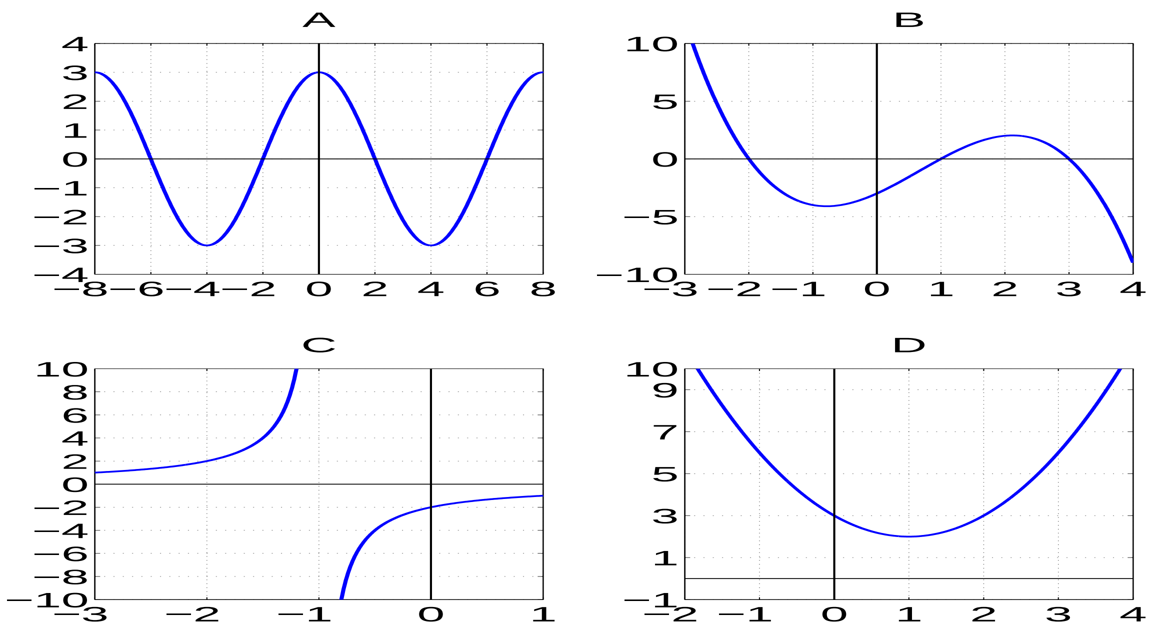
6. (Section 1.4) If the size of a bacteria colony doubles in 8 hours, how long will it take for the number of bacteria to be 5 times the original amount?

7. (Section 1.5) At high tide, the water level is 10ft below a certain pier. At low tide the water level is 26ft below the pier. Let $y = f(t)$ be the water level, relative to the pier, at time t. Assume the water level is -18ft at $t = 0$ and falling, until it reaches the first low tide at $t = .3$. Find a formula for $f(t)$.

8. (Section 1.6) Give a possible function for each of the following graphs:



9. (Section 1.7) Find an equation $y = f(x)$ for a function that is not continuous at $x = 3$ but is continuous at $x = 0$.

10. (Section 1.7) If $f(x)$ and $g(x)$ are continuous, is $f(x)/g(x)$ continuous?

11. (Section 1.8) Evaluate the following limits

    (a) $\displaystyle\lim_{h\to 0} \frac{\sqrt{9-h}-3}{h}$.

    (b) $\displaystyle\lim_{x\to -4^-} \frac{|x+4|}{x+4}$.

    (c) $\displaystyle\lim_{x\to -4^+} \frac{|x+4|}{x+4}$.

    (d) $\displaystyle\lim_{x\to -4} \frac{|x+4|}{x+4}$.

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12. (Section 2.1) The height of an object in feet above the ground is given in the following table:

t(sec)	0	1	2	3
y(feet)	10	45	70	85

(a) Compute the average velocity from $0 \leq t \leq 2$.

(b) Compute the average velocity from $1 \leq t \leq 3$.

13. (Section 2.2) Given the following data about a function f:

x	1	1.5	2	2.5
$f(x)$	0	-4	2	-1

(a) Estimate $f'(1.25)$.

(b) Use the tangent line to estimate $f(1.25)$.

14. (Section 2.3) What is the derivative of $2x^2 + x^\pi$?

15. (Section 2.3) Below is a function f. Sketch f' on the same axis.