Chapter 12 and 14 Review

ALL PROBLEMS MUST BE DONE ON SEPARATE PAPER OTHERWISE; THE REVIEW WILL NOT BE GRADED. SHOW ALL WORK FOR CREDIT. REVIEW IS DUE ON TEST DAY.

1. Complete the table of values (to 5 decimal places) and use the table to estimate the value of the limit.

   a. $\lim_{x\to 4}\dfrac{\sqrt{x}-2}{x-4}=$

x	3.9	3.99	3.999	4.001	4.01	4.1
F(x)						

   b. $\lim_{x\to 1}\dfrac{x-1}{x^3-1}=$

x	.9	.99	.999	1.001	1.01	1.1
F(x)						

2. For the function f whose graph is given, state the value of the given quantity if it exists.
   a. $\lim_{x\to 2^+} f(x)$
   b. $\lim_{x\to 2^-} f(x)$
   c. $\lim_{x\to 2} f(x)$
3. Graph the piecewise-defined function and use your graph to find the values of the limes, if they exist.

   a. $f(x)=\begin{cases}-x+3 & \text{if } x<-1\\ 3 & \text{if } x\geq -1\end{cases}$

      i. $\lim_{x\to -1^-} f(x)$
      ii. $\lim_{x\to -1^+} f(x)$
      iii. $\lim_{x\to -1} f(x)$

   b. $f(x)=\begin{cases}2x+10 & \text{if } x\leq -2\\ -x+4 & \text{if } x>-2\end{cases}$

      i. $\lim_{x\to -2^-} f(x)$
      ii. $\lim_{x\to 2^+} f(x)$
      iii. $\lim_{x\to -2} f(x)$
4. Suppose that $\lim_{x\to a} f(x)=-3$, $\lim_{x\to a} f(x)=0$, and $\lim_{x\to a} f(x)=8$. Find the value of the given limit.
   a. $\lim_{x\to a}\left[f(x)+h(x)\right]$
   b. $\lim_{x\to a}\left[f(x)\right]^2$
   c. $\lim_{x\to a}\sqrt[3]{h(x)}$
   d. $\lim_{x\to a}\dfrac{1}{f(x)}$
   e. $\lim_{x\to a}\dfrac{f(x)}{h(x)}$
   f. $\lim_{x\to a}\dfrac{g(x)}{f(x)}$
   g. $\lim_{x\to a}\dfrac{f(x)}{g(x)}$
   h. $\lim_{x\to a}\dfrac{2f(x)}{h(x)-f(x)}$
5. Evaluate the limit.

a. $\lim_{x\to 4}\left(5x^2-2x+3\right)$

b. $\lim_{x\to 0}\dfrac{(2+h)^3-8}{h}$

c. $\lim_{x\to 0}\dfrac{\sqrt{1+h}-1}{h}$

6. Find the slope of the tangent line to the graph of f at the given point.

a. $f(x)=3x+4 \text{ at } (1,7)$

b. $f(x)=4x^2-3x \text{ at } (-1,7)$

c. $f(x)=\dfrac{1}{x^2} \text{ at } (-1,1)$

7. Find the derivative of the function at the given number.

a. $f(x)=1-3x^2 \text{ at } 2$

b. $f(x)=\dfrac{1}{\sqrt{x}} \text{ at } 4$

8. If an arrow is shot upward on the moon with a velocity of 58 m/s, its height (in meters) after t seconds is given by $H=58t-0.83t^2$.

a. Find the velocity of the arrow after one second.

b. Find the velocity of the arrow when $t=a$.

c. At what time t will the arrow hit the moon.

d. With what velocity will the arrow hit the moon.

9. Find the limit.

a. $\lim_{x\to\infty}\dfrac{2x+1}{5x-1}$

b. $\lim_{x\to\infty}\dfrac{x^2+2}{x^3+x+1}$

10. If the sequence is convergent, find its limit. If it is divergent, explain why.

a. $a_n=\dfrac{n^2}{n+1}$

b. $a_n=\dfrac{3}{n^2}\left[\dfrac{n(n+1)}{2}\right]$

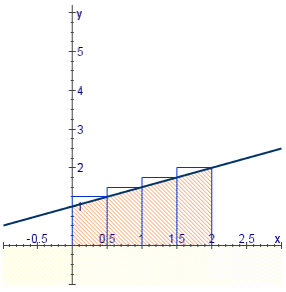
11. Find the area of the region that lies under the graph of f over the given interval.

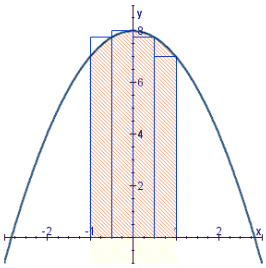
a. $f(x)=4x^3,\ 0\le x\le 2$

b. $f(x)=x+x^2,\ 0\le x\le 1$

12. Approximate the area of the shaded region under the graph of the given function by using the indicated rectangles. (The rectangles have equal width.)

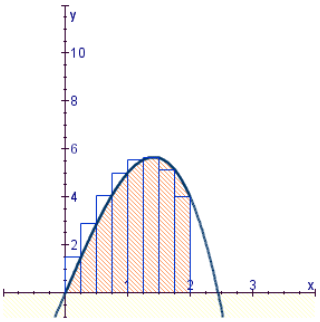
a. $f(x)=\dfrac{1}{2}x+1$





b. $f(x)=8-x^2$

c. $f(x)=6x-x^3$



13. Determine the common difference, the fifth term, the *n*th term, and the 100th term of the arithmetic sequence.

1, 6, 11, 16, ...

14.Find the partial sum S_n of the arithmetic sequence that satisfies the given conditions: a=1, d = 3, n=22

15.Determine the common ratio, the fifth term, and the *n*th term of the geometric sequence. $2, \frac{8}{3}, \frac{32}{9}, \frac{128}{27}, \ldots$

16. Find the partial sum S_n of the geometric sequence that satisfies the conditions $a = \frac{2}{3}, r = \frac{1}{3}, n = 5$

17.Use the Binomial Theorem to expand the expression $(2x + y)^5$

18. Find the term containing x^8 in the expansion of $(x + 3y)^{10}$.