1. Do WebAssign 8.5. Remember that the WebAssign will be reopened three days before Exam III for you to review the problems. You will be allowed to improve your score by a maximum or three points. Additional attempts will not be given.

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2. A water tank is in the form of a right circular cylinder with height 20 ft and radius 6ft. If the tank is half full of water, find the work required to pump all of it over the top rim. (Water weighs 62.4 lb/ft^3.)

   Now suppose the the tank is completely full of water. Find the work required to pump all of it to a point 10 ft above the top of the tank.

3. How much work is required to lift a 1000-kg satellite from the surface of the earth to an altitude of $2 \cdot 10^6$ m? The gravitational force is $F = GMm/r^2$, where M is the mass of the earth, m is the mass of the satellite, and r is the distance between the center of the earch and the satellite. The radius of the earth is $6.4 \cdot 10^6$m, its mass is $6 \cdot 10^{24}$ kg, and in these units, the graviational constant, G is $6.67 \cdot 10^{-11}$.

Sequences

Section 9.1
October 13, 2016

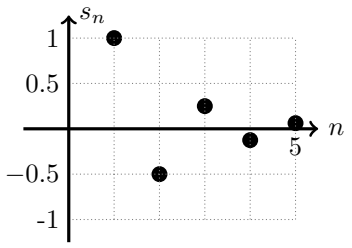
Name:
Math 129 - 01

Understand	Calculate terms in a sequence given s_n either by a formula or recursively.
Understand	Visualize a sequence either on (n, s_n) axes or on a number line.
Understand	Know the factorial function: $n! = n(n-1)(n-2)\cdots 3 \cdot 2 \cdot 1$ for $n \geq 1$ and $0! = 1$.
Apply	Given several terms in a sequence of numbers, find a formula or recursion relation for s_n.
Apply	Given a sequence, determine whether the sequence converges or diverges.
Apply	Know and use the Monotone Convergence Theorem.
Synthesize	Use limits from section 1.8 to calculate the limit of a convergent sequence.

1. Find the first five terms of the sequences given below from the formula for s_n, $n \geq 1$. Then sketch the sequence by plotting points with n on the horizontal axis and s_n on the vertical axis (see Figure 9.1 for an example). The first one is done for you.

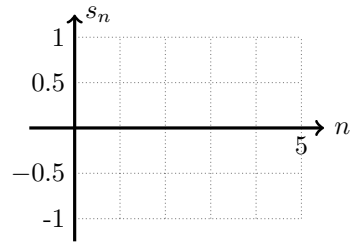
$s_n = (-1)^{n+1}\left(\frac{1}{2}\right)^{n-1}$

$s_1 = \quad 1$
$s_2 = -\frac{1}{2}$
$s_3 = \quad \frac{1}{4}$
$s_4 = -\frac{1}{8}$



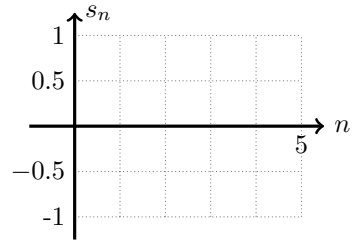
$s_n = (-1)^{n+2}\frac{n}{n+1}$

$s_1 =$
$s_2 =$
$s_3 =$
$s_4 =$



$s_n = \left(1 - \frac{1}{n+1}\right)^{n+1}$

$s_1 =$
$s_2 =$
$s_3 =$
$s_4 =$



2. We are going to find the first few terms of a sequence pictorially. The term s_n counts the number of ways that n sets of parentheses () can be arranged, so that each open parenthesis (is matched with a closed parenthesis).

   Here's an example of 4 sets of parentheses which <u>are</u> matched: (()(())). Here's an example of 4 sets of parentheses which are <u>not</u> matched: ()))((). Do you see the difference?

$s_1 =$ _____ = number of ways to arrange 1 set of ()

$s_2 =$ _____ = number of ways to arrange 2 sets of ()

$s_3 =$ _____ = number of ways to arrange 3 sets of ()

$s_4 =$ _____ = number of ways to arrange 4 sets of ()

Bonus points if you can get this next one!

$s_5 =$ _____ = number of ways to arrange 5 sets of ()

Quiz (Leave this space blank)