Lab 0
Due: at the end of class

1 Exercises

Write out solutions to the exercises in the space provided. You may use any computer resources for calculating or plotting. Turn in one sheet for your entire group. Please include your names.

NOTE: all instances of $lg(x) \equiv log_2(x)$ in this course.

1. For the following pairs of functions, **calculate a table** of values for $n = 1, 10, 20, 30, 40, 50, 100, 1000$. Observe how the values of the two functions grow with respect to each other:

   $f(n) = 8 \lg n, g(n) = 2n$

	1	10	20	30	40	50	100	1000
$f(n)$								
$g(n)$								

   $f(n) = n \lg n, g(n) = 9n + 9$

	1	10	20	30	40	50	100	1000
$f(n)$								
$g(n)$								

   $f(n) = n^2 + 6n + 5, g(n) = 2n^2$

	1	10	20	30	40	50	100	1000
$f(n)$								
$g(n)$								

   $f(n) = 2n \lg n + 4n, g(n) = n^2 + 1$

|	1	10	20	30	40	50	100	1000
$f(n)$								
$g(n)$								

2. For the following pairs of functions, **calculate a table** of values for $n = 1, 20, 40, 60, 80, 100$ and **draw a hand plot** for each pair of functions. The plots don't have to be as accurate as computer-generated results but should show important properties like how a function curves (concave, flat, or convex) and relative growth of the two functions. Pick and **mark axis values** that fit **both** functions in a plot over the entire n axis.

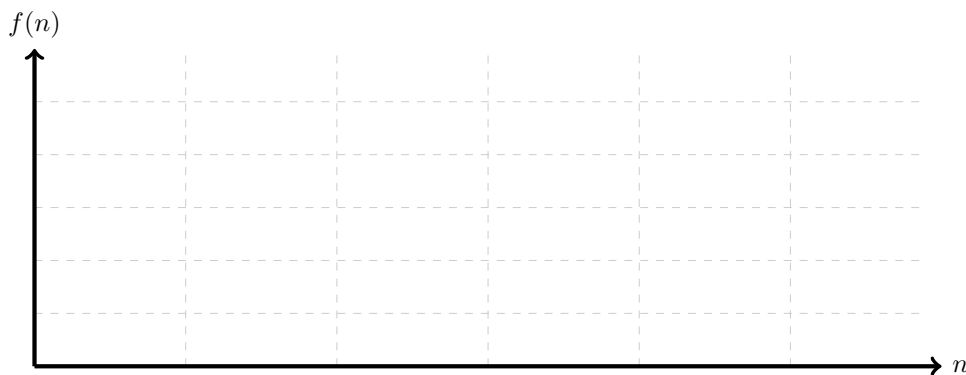**Label** which is the faster-growing function in each $f(n)/g(n)$ pair.

$f(n) = 10 \lg n, g(n) = n$

	1	20	40	60	80	100
$f(n)$						
$g(n)$						

$f(n)$

n
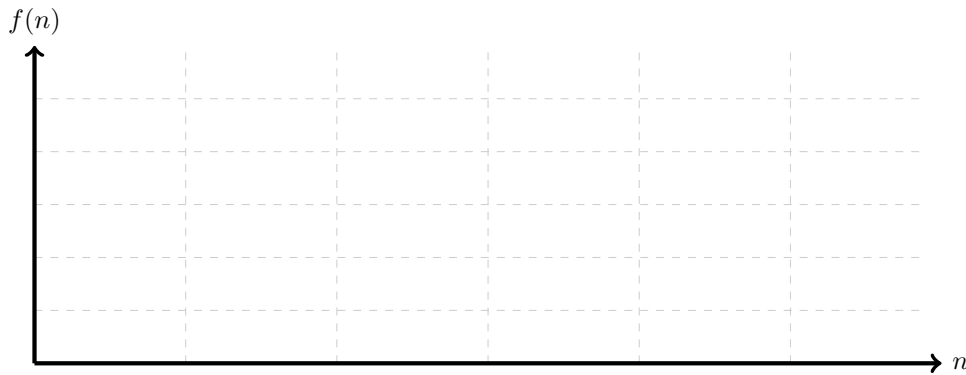
$f(n) = 2n \lg n, g(n) = n^2 + 2$

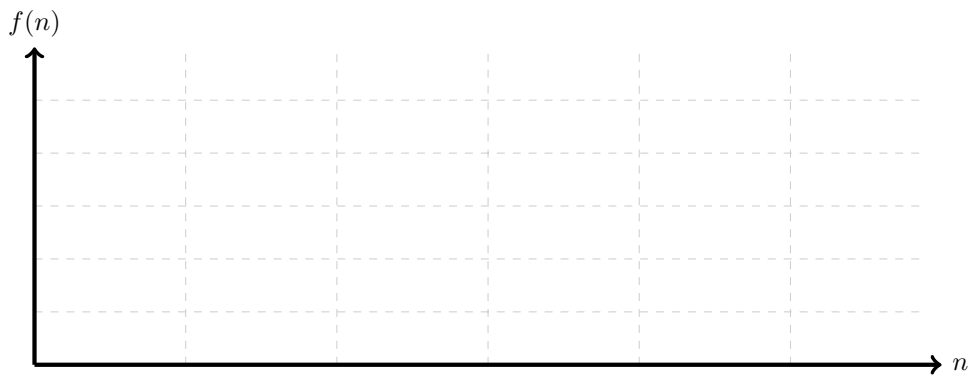|	1	20	40	60	80	100
$f(n)$						
$g(n)$						

$f(n)$

n

Label which is the faster-growing function in each $f(n)/g(n)$ pair.

$f(n) = n^2 + 60n + 1, g(n) = 2n^2$

	1	20	40	60	80	100
$f(n)$						
$g(n)$						

$f(n)$

n

$f(n) = n^2 + 2, g(n) = 30n \lg n + 10n$

	1	20	40	60	80	100
$f(n)$						
$g(n)$						

$f(n)$

n