Topics for the semester exam

Mr. Neeman. 10B, Nov. 18, 2011

Note: For all the types of functions we did, you need to know things like how to find images and preimages, identifying the domain and the range, monotonicity, concavity, finding intersections with the axes, sketching the graphs, injectivity, surjectivity, bijectivity. Below I indicate additional points specific to the type of function.

1. Quadratic functions (including finding the vertex, the equation of the axis of symmetry).
2. Power laws.
3. Exponential functions (including identifying whether a function is exponential or not, identifying the equation of the asymptote and finding the range given a non-maximal domain or finding the domain given the range).
4. Exponential equations (you can leave out those requiring a substitution which yields a quadratic equation, such as $3^{2x+1} = 2 - 5(3^x)$).
5. Logarithmic functions (including identifying the equation of the asymptote and finding the range given a non-maximal domain or finding the domain given the range).
6. e and the natural logarithm.
7. The fact that the exponential and logarithmic functions are inverses, being able to use that to simplify expressions (e.g. $\log_a(a^b) = b$ and $a^{\log_a b} = b$).
7. Using the logarithm laws, change of base.
8. Logarithmic equations.
9. Trigonometry with triangles: SOHCAHTOA, sine rule, cosine rule, area of a triangle.
10. Angles: radians and degrees, standard position, coterminal angles, quadrants, quadrantal angles, reference angles.
11. Using the trigonometric circle to calculate trigonometric functions.
12. Graphs of sine, cosine, tangent.
13. Reciprocal trigonometric functions (secant, cosecant, cotangent).
14. Cofunction relations (e.g. $\sin(90^\circ - \alpha) = \cos\alpha$).
15. Finding preimages of trigonometric functions.
16. Trigonometric equations.
17. Trigonometric identities (knowing the basic ones and using them to prove others).
18. Using trigonometric identities to solve trigonometric equations.
19. Properties of sine, cosine, tangent (the usual things for functions: range, monotonicity, injectivity, etc., including for non-maximal domains).
20. Sets and set operations (including the sets $\mathbb{R}, \mathbb{Q}, \mathbb{I}, \mathbb{Z}, \mathbb{N}, \mathbb{N}^*$).