Math 1031, Lec 020
Study Guide for Final Exam

Topics on the final exam include:

1. Solving equations: linear, quadratic, rational, radical, quadratic form, exponential, logarithmic
2. Solving inequalities: linear, quadratic, rational, absolute value
3. Coordinate Geometry: distance between points, points of division, equations and graphs of lines, circles, ellipses
4. Graphing techniques: symmetry, intercepts, restrictions, table, plot
5. Functions: vertical line test, domain, range, composition of functions, inverse functions
6. Basic Curves: $y = x^2$, $y = x^3$, $y = x^4$, $y = |x|$, $y = \sqrt{x}$, $y = b^x$, $y = \log_b x$: know three good points!
7. Transformation of curves: translation (shifting), stretching, shrinking, reflecting
8. Graphing higher degree polynomials: factor, find x-intercepts, and use test points
9. Applications/word problems: linear, quadratic (max/min), exponential growth, exponential decay, compound interest
10. Counting techniques: fundamental principal of counting, permutations, combinations
11. Probability: basic definition, complementary events, unions (or), mutually exclusive events, conditional probability, independent events, dependent events, binomial probability experiments

Here is a list of formulas that will be given to you on the exam. Make sure you know how to use them.

1. Interest compounded n times per year: $A = P\left(1 + \frac{r}{n}\right)^{nt}$
2. Interest compounded continually: $A = Pe^{rt}$
3. Probability: $\mathrm{P(E)} = \dfrac{\mathrm{n(E)}}{\mathrm{n(S)}}$
4. Independence: $\mathrm{P(E \cap F)} = \mathrm{P(E)} \cdot \mathrm{P(F)}$
5. Unions: $\mathrm{P(E \cup F)} = \mathrm{P(E)} + \mathrm{P(F)} - \mathrm{P(E \cap F)}$
6. Complementary Events: $\mathrm{P(E')} = 1 - \mathrm{P(E)}$
7. Binomial Probability Experiment: $\mathrm{P}(x \text{ successes}) = \mathrm{C}(n, x)\, p^x\, (1-p)^{n-x}$
8. Conditional Probability $\mathrm{P(E|F)} = \dfrac{\mathrm{P(E \cap F)}}{\mathrm{P(F)}}$ or $\mathrm{P(E \cap F)} = \mathrm{P(F)} \cdot \mathrm{P(E|F)}$
9. Expected Value $E_v = x_1 p_1 + \cdots + x_n p_n$

Here's a list of some things you should have at the tip of your fingers for the exam. Write them out in the space provided. Memorize them if you don't know them already.

From Chapter 0 (see summary on page 85)

1. Properties of Exponents:
   (a) $b^n\, b^m =$

   (b) $(b^n)^m =$

   (c) $\dfrac{b^n}{b^m} =$

   (d) $(ab)^n =$

   (e) $\left(\dfrac{a}{b}\right)^n =$

2. Properties of Radicals
   (a) $\sqrt[n]{ab} =$

   (b) $\sqrt[n]{\dfrac{a}{b}} =$

From Chapter 1 (see summary on page 172)

3. Quadratic Formula:

4. Equation of a line (point-slope form):

5. Equation of a line (slope-intercept form):

6. Distance formula:

7. Midpoint formula:

8. Slope formula:

9. Equation of a circle centered at the origin:

10. Equation of a circle centered at (h, k):

11. Equation of an ellipse centered at the origin:

From Chapter 2 (see summary on page 233)

12. Definitions of
    (a) an even function

    (b) an odd function:

13. Vertex of a parabola:

From Chapter 5 (see summary on page 311)

14. Easy values of exponential functions
    (a) $b^0 =$

    (b) $b^1 =$

    (c) $b^{-1} =$

15. Easy values of logarithmic functions

    (a) $\log_b(1) =$

    (b) $\log_b(b) =$

    (c) $\log_b(1/b) =$

16. Properties of logarithmic functions:

    (a) $\log_b(xy) =$

    (b) $\log_b\left(\dfrac{x}{y}\right) =$

    (c) $\log_b(x^r) =$

17. Change of base formula:

From Chapter 10 (see summary on page 677)

18. Number of r-element permutations of n objects:

    $\mathrm{P}(n, r) =$

19. Number of permutations of n objects, r_1 of one kind, r_2 of another kind, $\ldots$, r_k of k^{th} kind:

20. Number of r-element combinations of of n objects

    $\mathrm{C}(n, r) =$