

# Math 1030 Review: Final Exam

Final Exam is on Wednesday, April 30 in LCB 225 (Note: this is NOT the usual room)

## Diagnostic Quiz

Some of the problems on the final exam will strongly resemble problems from the diagnostic quiz. This might be a good place to spend an hour or two studying (but not all of your study time should be spent here).

## 1C: Sets and Venn Diagrams

- Understand set relationships: subsets, disjoint sets, and overlapping sets.
- Understand the categorical propositions:
  - All  $S$  are  $P$ ;
  - No  $S$  are  $P$ ;
  - Some  $S$  are  $P$ ;
  - Some  $S$  are not  $P$ .
- Uses of Venn diagrams:
  - illustrating set relationships;
  - organizing information.

**Study Problems:** 39–95

## 2A: The Problem-Solving Power of Units

- Identify units with key words such as “per,” “square,” or “cubic,” etc.
- Write conversion factors between various units.
- Use units to check answers and help solve problems.

**Study Problems:** 1–10, 17–22, 37–77, 83–86

## 2B: Standardized Units: More Problem-Solving Power

- Understand and convert basic USCS and metric units.
- Know the important metric prefixes.
- Know temperature units and convert between  $^{\circ}F$  and  $^{\circ}C$ .
- Understand energy units and power units. What do the words “energy” and “power” mean?
- Apply the concept of density to materials, population, and information.
- Apply the concept of concentration to pollution, etc.

**Study Problems:** 1–10, 53–81

## 3A: Uses and Abuses of Percentages

- Understand absolute change and relative change.
- Understand the difference between the words “of” and “more than” when dealing with percentages.
- Understand the difference between the words “(percentage) points” and “percent” when dealing with changes in percentages (one is an absolute change, the other is a relative change).
- Solve percentage problems.
- Identify common abuses of percentages.

**Study Problems:** 55–98

#### **4A: Taking Control of Your Finances**

- Understand budget and cash flow.

**Study Problems:** 23–40.

#### **4B: The Power of Compounding**

- Calculate simple interest and compound interest on an account with a single (initial) deposit (the principle).
- Use the compound interest formula for accounts that are compounded more than once per year.
- Solve for the principle, or solve for the *APR* in this formula.
- Use *APY* (Annual Percentage Yield) to compare two different investments.

**Study Problems:** 41–44, 47–64

#### **4C: Savings Plans**

- Use the savings plan formula to compute the balance on a savings account with regular monthly deposits.
- Calculate the total return and the annual return on an investment.
- Use the annual return to compare two different investments.

**Study Problems:** 45–66

#### **4D: Loans, Credit Cards, and Mortgages**

- Use the loan payment formula to calculate the monthly payment on a loan such as for an automobile or home mortgage.
- Understand some of the secondary considerations in choosing a mortgage, such as closing costs, points, and fixed rate versus adjustable rate mortgages.

**Study Problems:** 25–34, 39–42, 47–54

#### **8A: Exponential Growth**

- Understand the impact of doublings and why exponential growth cannot continue (in the real world) indefinitely.

**Study Problems:** 19–36

#### **8B: Doubling Time and Half-Life**

- Understand doubling time, half-life, and the rule of 70.
- Calculate the new value of an exponentially growing quantity using the exponential growth formula.
- Know how and when to use the approximate doubling time formula to estimate how long it takes for an exponential quantity to double.
- Know how and when to use the exact doubling time formula. This includes knowing how to calculate logarithms.
- Calculate the new value of an exponentially decaying quantity using the exponential decay formula.
- Know how and when to use the approximate half-life formula to estimate how long it takes for an exponential quantity to halve.
- Know how and when to use the exact half-life formula. This includes knowing how to calculate logarithms.

**Study Problems:** 35–44, 47–62

## 9B: Linear Modeling

We didn't cover this section, but it is a good idea for you to try to read this on your own. There are about 10 pages of reading, and most of this material should be familiar from Math 1010. Devote less than an hour toward this section. If you have any questions, please email me.

- Rate of change for a linear function.
- General equation for a linear function.
- Algebraic equation of a line.
- Slope from two data points.

**Study Problems:** 1–10, 27–44, 53–58

## 10A: Fundamentals of Geometry

We didn't cover this section either. Some of this material should be familiar to you, but some might not be. Devote less than an hour toward this section. Again, if you have any questions, email me.

- Understand the basic concepts of geometry.
- Know and use area and perimeter formulas for two-dimensional figures.
- Know and use surface area and volume formulas for three-dimensional figures.
- Understand and use the scaling laws and scaling factors:
  - Lengths scale with the scaling factor;
  - Areas scale with the *square* of the scaling factor;
  - Volumes scale with the *cube* of the scaling factor.

**Study Problems:** 41–52, 63–67, 70–74