MAT1275CO College Algebra and Trigonometry - Section D103
Exam 3 - Study Guide

The following topics from Chapters 1.3.3 - 2.2.1 will be covered on Friday's exam. The bullet points here are based on the titles of the sections from the course text (and the titles of the course slides).

- Rational Expressions

  - Adding and Subtracting Rational Expressions (Chapter 1.3.3)
  - Complex Rational Expressions (Complex Fractions) (Chapter 1.3.4)

- Radical Expressions

  - Simplifying Radical Expressions (Chapter 1. 4. 1 - 1.4.2)
  - Rational Exponents (Chapter 1.4.3)
  - Adding, Subtracting and Multiplying Radical Expressions (Chapter 1.4.4)
  - Dividing Radical Expressions (Chapter 1.4.5)
  - Complex Numbers (Chapter 1.4.6)

- Solving Linear Equations (Chapter 2.1)

- Solving Quadratic Equations

  - Solving Quadratic Equations Using the Zero-Product Property (Chapter 2.2.1)

NOTE: We learned that $\sqrt{-1} = i$ so we will no longer write "DNE" and/or "not real" when we have the square root of a negative number. Be careful!

Exam 3 will include the following types of problems.

1. Three problems simplifying rational expressions

   (a) $\frac{9x+14}{x+7} + \frac{x^2}{x+7}$

   (b) $\frac{x-4}{x} + \frac{4}{x^2}$

   (c) $\frac{4}{m+3} + \frac{3}{m+4}$

   (d) $\frac{8y}{y^2-16} - \frac{4}{y-4}$

   (e) $\frac{\frac{1}{x^2-7x+12}}{\frac{2}{x-4}}$

   (f) $\frac{\frac{1}{a}+\frac{1}{b}}{\frac{1}{a^2}-\frac{1}{b^2}}$

2. Eight problems simplifying radical expressions

   Simplify completely. Use absolute values and standard form $(a + bi)$ when appropriate. DO NOT list "DNE" or "not real" as an answer. Denominators of rational expressions should not contain radical signs nor imaginary numbers.

(a) $\sqrt{225}$

(b) $\sqrt{-225}$

(c) $\sqrt{16x^2y^6z^{10}}$

(d) $\sqrt{\frac{24p^3}{49}}$

(e) $\frac{\sqrt{48a^7}}{\sqrt{3a}}$

(f) $32^{\frac{1}{5}}$

(g) $\sqrt[3]{64}$

(h) $-25^{\frac{3}{2}}$

(i) $-25^{-\frac{3}{2}}$

(j) $x^{\frac{3}{4}} \cdot x^{\frac{5}{8}}$

(k) $(x^9)^{\frac{2}{9}}$

(l) $\frac{a^{\frac{1}{5}}}{a^{\frac{6}{5}}}$

(m) $\sqrt{20} - 3\sqrt{5}$

(n) $\sqrt{6}(1 + 3\sqrt{6})$

(o) $(2 - 3\sqrt{11})(4 - \sqrt{11})$

(p) $\frac{4}{\sqrt{3}}$

(q) $\frac{2}{4 - \sqrt{6}}$

(r) $(2 + 3i) + (7 - 5i)$

(s) $4i(5 - 3i)$

(t) $(3 - \sqrt{-12})(5 + \sqrt{-27})$

(u) $\frac{3 + 3i}{2i}$

(v) $\frac{1 + 6i}{6 - i}$

3. Four problems solving linear and quadratic equations.

(a) $8x + 10 = 4x + 2$

(b) $3(2 + x) - 9 = 0$

(c) $\frac{2}{3}x + 6 = 2$

(d) $\frac{x+1}{4} + \frac{5x}{12} = \frac{5}{6}$

(e) $(2m + 1)(m + 3) = 12m$

(f) $(3x - 4)(4x - 3) = 0$

(g) $9x^2 = 121$

(h) $u^2 - 5u - 14 = 0$

(i) $2x^2 + 30x = -100$

4. One problem identifying whether or not an equation is linear (or quadratic)

(a) Is the following equation a linear equation?

- $2y^2 + 4 = 2y^2 + 5x - 2$
- $5y + 2y + 6 = 7y + 8$
- $2y - 2 = 4 + 6y$

(b) Is the following equation a quadratic equation?

- $3c^2 = 10c - 8$
- $25q^2 = 16$
- $x^3 + 5x - 6 = x^3 + 15x$

5. One word problem similar to those from the **"Exam 3 - Word Problems (Solving Linear Equations) Practice"** document