Collect Post-Test Analysis (10am class for the first time)

Announcements:
1. Formulas Test 1: Tuesday, How to study
2. Math Center Assignment: Ch 3 Lab Activity

- All of §5.8: Solving Equations by Factoring and Problem Solving (pp 71-72)

- Start §6.1: Rational Functions and Multiplying and Dividing Rational Expressions (pp 73-77)

- More Activity (coaching) & Add in Line App

Workshops for next week:

Monday-Thursday: 9:00 - 10:00
Monday to Thursday: 1:00 - 2:30

Formulas Test 1 is Tuesday!

Prof’s Website → Intermediate Algebra → Test File → How to study for Formulas Test 2
You must memorize what’s inside the blue boxes

Chapter 5.8, p 71

To solve polynomial equations, there are 4 steps described in page 31
- Collect Post-Test Analysis (10am class for the first time)

- Announcements:
  1. Formulas Test 1: Tuesday; How to study
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- All of § 5.8: Solving Equations by Factoring and Problem Solving (pp 71-72)

- Start § 6.1: Rational Functions and Multiplying and Dividing Rational Expressions (pp 73-72)

- Maria Angelica (coach) -> Add in Line App Workshops for next week:
  Mon & Wed - 9:00 - 10:00
  Mon to Thu - 1:00 - 2:30

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Chapter 5.8 P 71

To solve polynomial equations, there are 4 steps, described in page 71
Steps

1) Put it in standard form
2) factor the non-zero side
3) Use the zero product property
4) solve the resulting equation

5.8.11 Put \( x(5x+6) = 6 \) in standard form:

\[
5x^2 + 7x = 6 \\
\underline{-6} \hspace{1cm} \underline{-6} \\
5x^2 + 7x - 6 = 0 \rightarrow \text{standard form}
\]

5.8.15 Put \( \frac{2x^2 - 7y}{6} = 12 = 0 \) in standard form

\( \frac{2x^2 - 7y}{6} \) is already in standard form

(there's nothing to be done)

5.8.15 Put \( 9z \sqrt{z + 6} = 9z^2 + 54z - 2 \) in standard form

\[
9z^2 + 54z = 9z^2 + 54z - 2 \\
-9z^2 \hspace{1cm} -9z^2
\]

\[
54z = 54z - 2 \\
-54z \hspace{1cm} -54z
\]

\[
0 = -2 \rightarrow \text{standard form}
\]

Thus is false

No real solution!
Now, let's do all 4 steps for these same problems:

5.8.11 Solve \( x(5x+3) = 6 \)

\[
5x^2 + 3x = 6
\]

\[
\begin{align*}
5x^2 + 3x - 6 &= 0 & \text{standard form (Step 1)} \\
(5x-3)(x+2) &= 0 & \text{Step 2}
\end{align*}
\]

\[
\begin{align*}
5x-3 &= 0 & x+2 &= 0 & \text{Step 3}
\end{align*}
\]

\[
\begin{align*}
5x &= 3 & x &= -2 \\
& \quad +3 \\
& x = \frac{3}{5}
\end{align*}
\]

\( x = \frac{3}{5} \)

---

5.8.15 \( \rightarrow \) Already solved (no real solution)

5.8.15 Solve \( \frac{x^2 - 7x - 12}{2} = 0 \) \( \rightarrow \) Step 1

\[
\begin{align*}
\text{LCD} &= 6 \\
6 \left( \frac{x^2 - 7x - 12}{2} \right) &= 0 \\
6 \left( \frac{x^2 - 7x - 12}{6} \right) &= 0 \\
(x^2 - 7x - 12) &= 0 \\
(x - 3)(x - 4) &= 0 \\
1. \ x^2 - 3x - 12 = 0 & \quad 2. \ x^2 - 21x - 32 = 0 \\
(2 - 24)(2 + 3) &= 0 \\
2 - 24 &= 0 & 213 &= 0 \\
+24 & \quad +24 & -3 & \rightarrow \\
2 &= 24 & 2 & = -3
\end{align*}
\]

Final answers
\[ W(x) = 0.5x^2 \]

The number of servings of side of square cake (\# of people)

\[
50 = 0.5x^2
\]

\[
-50 = -50
\]

\[
10 \quad 10 = (0.5x^2 - 50)^{10}
\]

\[
0 = 5x^2 - 500
\]

\[
0 = 5(x+10)(x-10)
\]

\[
5 = 0 \quad x+10 = 0 \quad x-10 = 0
\]

No real solution

\[
x = -10 \quad x = 10
\]

\[
\text{GCF} 5
\]

\[
5 \left[ x^2 - 100 \right]
\]

We have to clear the denominators - we have to multiply both sides by 10

Sidetrack:

Difference of squares

\[
5(x+10)(x-10)
\]

\[
5 \left[ x^2 - 100 \right]
\]

\[
X \text{ represents "inches" in this problem, so in real world we can't have a negative number for inches, so we just consider the positive number}
\]

\[
x = -10 \text{ is extraneous in this case}
\]

Chapter 6 - Rational Functions

This is the most difficult chapter in this semester

Domain: \( x \)

Range: \( y \)
6.1.11 Identify the domain of \( \frac{x+3}{x^2-4} \)

\( x^2-4 \neq 0 \) (we need the denominator not to be zero)

\[
(x+2)(x-2) \neq 0
\]

\[
\begin{align*}
x+2 &\neq 0 \quad x-2 \neq 0 \\
-2 &\neq 0 \quad +2 &\neq 0
\end{align*}
\]

Answer in set build notation:

\[
\left\{ x \mid x \text{ is real, } x \neq 2, x \neq -2 \right\}
\]

If \( x \) was 2, we would have:

\[
\frac{x+3}{x^2-4} = \frac{2+3}{2^2-4} = \frac{5}{0} \rightarrow \text{undefined}
\]

“Zero under the line is undefined”

If \( x \) was -2, we would have

\[
\frac{x+3}{x^2-4} = \frac{-2+3}{(-2)^2-4} = \frac{5}{0} \rightarrow \text{undefined}
\]

6.1.11

\[
\frac{(x-6)(x^2+6x+36)}{3(x+6)} = \frac{x^2+6x+36}{3}
\]

We have 4 factors:

\[
\begin{cases}
1 \cdot (x-6) \\
(x^2+6x+36) \\
3 \\
(x+6)
\end{cases}
\]

6.1.2

\[
\frac{(a^2+1)(a+6)(2)(3)(5)(a+4)(a)(a)}{5 \cdot (a+1)(3)(3)(5)(a+6)(a-6)} \rightarrow 14 \text{ factors}
\]

\[
\frac{2a}{5(a-b)} \quad \text{final answer}
\]
6.1.3 \[ \frac{(2x+1)+y}{(2x+1)(y)} \rightarrow 3 \text{ factors } \{ \frac{(2x+1)+y}{(2x+1)}, \frac{y}{(2x+1)(y)} \} \]

Nothing can be cancelled in this problem.

We can only simplify it.

\[ \frac{2x+1+y}{1(2x+1)(y)} \rightarrow \text{ final answer} \]

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**Simplify Rational Expressions**

\[ \frac{PR}{QR} = \frac{P}{Q} \] (Traditional cancelling rule)

**Steps:**
1. Factor
2. Cancel out and simplify

6.1.23 Simplify: \[ \frac{x^2-16}{4-x} \]

4 factors \( \rightarrow \)

\[ (x+4)(x-4) \]

\[ \frac{x^2-16}{4-x} = \frac{(x+4)(x-4)}{4-x} \]

\[ - \frac{(x+4)}{1} = \frac{(x+4)}{-(x+4)} \rightarrow \text{ final answer} \]
Simplify \( \frac{x^3 - 216}{3x - 18} \)

4 factors \( (x - 6)(x^2 + 6x + 36) \)

\( \frac{x^2 + 6x + 36}{3} \)

Final answer

Obs: \( x^2 + 6x + 36 \) is prime. (Whenever we used the difference of cubes and had taken \( x = 6 \) in step 2, this would always be prime.

What do you have to cube to create \( x^3 \)?

\( \text{"a"} = x \)

What do you have to cube to create 216?

\( \text{"b"} = 6 \)

\[ a^3 - b^3 = (a-b)(a^2 + ab + b^2) \]

\[ x^3 - 6^3 = (x - 6)(x^2 + 6x + 36) \]

\[ x^3 - 216 = (x - 6)(x^2 + 6x + 36) \]

\[ 3(x - 6) \]