# Math 3345
## Fundamentals of Higher Mathematics

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Ohio State University

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## Course Info

<table>
<thead>
<tr>
<th>Instructor - Nathan Broaddus</th>
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<tr>
<td>webpage</td>
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Reading for Wednesday, January 22
pgs. 19-23

HW5 Due Monday, January 27
- Section 2 Exercises: 15, 17, 19

Bonus Problem (Hand in any time before April 18)
Section 2 Exercise 18
Warm-up Problems

Problem 39

Solution to Problem 10a-d

Solving algebraic equations

We can apply logic to problem solving

Example 40

Question: For what real numbers $x$ is the following statement true?

$$x^2 + 3x - 4 = 0.$$ 

Answer:

$$x^2 + 3x - 4 = 0 \iff (x + 4)(x - 1) = 0 \iff x = -4 \text{ or } x = 1.$$ 

Thus $x = -4$ or $x = 1$ are the only real solutions to $x^2 + 3x - 4 = 0.$
Solving algebraic equations

For any real numbers $a, b, c$

\[
\frac{a}{b} = \frac{c}{b} \text{ implies } a = c
\]

Note that if $b = 0$ then $\frac{a}{b} = \frac{c}{b}$ cannot be true.

However for any real numbers $a, b, c$

\[
a = c \text{ does not imply } \frac{a}{b} = \frac{c}{b}.
\]

For example $3 = 3$ does not imply that $\frac{3}{0} = \frac{3}{0}$.

Similarly for any real numbers $a, b$

\[
\sqrt{a} = b \text{ implies } a = b^2
\]

However for any real numbers $a, b$

\[
a = b^2 \text{ does not imply } b = \sqrt{a}
\]

For example $4 = (-2)^2$ does not imply that $-2 = \sqrt{4}$. 