Review for Final Exam

Appendix A and Chapter 1

Math 1051 - Precalculus I
Solve:

\[ 2e^{2x-1} = 2^{x+2} \]
Solve:

\[2e^{2x-1} = 2^{x+2}\]

Ans:

\[x = \frac{1 + \ln(2)}{2 - \ln(2)} \approx 1.3\]
Exam 4 is being graded right now and will be returned in discussion next Tuesday.
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You will get another progress report next Monday.
Final Exam
Friday, Dec 14
1:30pm - 4:30pm
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Locations
DIS 21, 23: Mechanical Engineering, Room 18
DIS 22, 27: Mechanical Engineering, Room 108
DIS 24: Mechanical Engineering, Room 212
DIS 26: Mechanical Engineering, Room 102
Final Exam
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Exam Format
14 Multiple Choice, 5 “Essay” questions
Solve \( x^2 + 5x + 6 = 0 \)
Solve \( x^2 + 5x + 6 = 0 \)

Then, add the two answers to get one of the following:

a. \(-1\)
b. \(2\)
c. \(-5\)
d. \(6\)
e. none of the above
A.2 Geometry

- Pythagorean Theorem
A.2 Geometry

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- Area, perimeter, volume
A.2 Geometry

- Pythagorean Theorem
- Area, perimeter, volume
- Similar triangles
A.3 Polynomials

Definitions
A.3 Polynomials

- Definitions
- Factoring
A.3 Polynomials

- Definitions
- Factoring
- Special factoring formulas
A.3 Polynomials

- Definitions
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- Special factoring formulas
- Long Division
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A.3 Polynomials

- Definitions
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- Long Division

Factor: $10x^3 + 14x^2 - 12x$
A.5 Rational Expressions

- Reduce
A.5 Rational Expressions

- Reduce
- Multiply and Divide

Simplify:
\[
\frac{3x^2}{2} - \frac{1}{2} - \frac{2x^2}{x}
\]

Simplify:
\[
\frac{x + 1}{2} + \frac{1}{x - 1}
\]
A.5 Rational Expressions

- Reduce
- Multiply and Divide
- Add and Subtract

Simplify:
\[\frac{3x^2 - 1 - 2x^2}{x - 1}\]
A.5 Rational Expressions

- Reduce
- Multiply and Divide
- Add and Subtract
- Simplify complex expressions

Simplify:

\[ \frac{x^2 - 1}{x^2 - x} \]

Simplify:

\[ \frac{x + 1}{2 + \frac{1}{x}} - \frac{1}{x} \]
A.5 Rational Expressions

- Reduce
- Multiply and Divide
- Add and Subtract
- Simplify complex expressions

Simplify:
\[
\frac{3x^2}{x^2} - \frac{1}{x^2} - \frac{2x}{x^2} - \frac{x}{x^2}
\]

Simplify:
\[
\frac{x + 1}{2} + \frac{1}{x} - \frac{1}{x}
\]
A.5 Rational Expressions

- Reduce
- Multiply and Divide
- Add and Subtract
- Simplify complex expressions

Simplify:

\[
\frac{3}{x^2 - 1} - \frac{2}{x^2 - x}
\]
A.5 Rational Expressions

- Reduce
- Multiply and Divide
- Add and Subtract
- Simplify complex expressions

Simplify:

\[
\frac{3}{x^2 - 1} - \frac{2}{x^2 - x}
\]

Simplify:

\[
\frac{\frac{x+1}{2} + 1}{x - \frac{1}{x}}
\]
A.6 Solving Equations

- Linear
A.6 Solving Equations

- Linear
- Quadratic and higher

Solve:
\[ x^4 = 2 + x^2 \]

Solve:
\[ 2 - 3|x - 1| = -7 \]
A.6 Solving Equations

- Linear
- Quadratic and higher
- Absolute value
A.6 Solving Equations

- Linear
- Quadratic and higher
- Absolute value
- Complete the square
A.6 Solving Equations

- Linear
- Quadratic and higher
- Absolute value
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- Quadratic equation

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- Linear
- Quadratic and higher
- Absolute value
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Solve: $x^4 = 2 + x^2$
A.6 Solving Equations

- Linear
- Quadratic and higher
- Absolute value
- Complete the square
- Quadratic equation

Solve: $x^4 = 2 + x^2$

Solve: $2 - 3|x - 1| = -7$
How many gallons of a 25% acid solution must be mixed with 5 gallons of a 10% solution to obtain an 18% solution?
A.8 Word Problems

How many gallons of a 25% acid solution must be mixed with 5 gallons of a 10% solution to obtain an 18% solution?

- Interest: \( I = Prt \)
- Mixture Problems
- Distance = (rate)(time)
A.10 Roots, Radicals, and Exponents

- Simplify radicals
- Add and subtract radicals
- Rationalize denominators of radicals
- Solve radical equations
- Rational exponents
A.7 Complex Numbers

Definition $i = \sqrt{-1}$
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Powers of $i$: $i^2 = -1, i^3 = -i$, etc.
A.7 Complex Numbers

- Definition $i = \sqrt{-1}$
- Powers of $i$: $i^2 = -1$, $i^3 = -i$, etc.
- Complex conjugation
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- Definition $i = \sqrt{-1}$
- Powers of $i$: $i^2 = -1$, $i^3 = -i$, etc.
- Complex conjugation
- Simplifying complex numbers
A.7 Complex Numbers

- Definition \( i = \sqrt{-1} \)
- Powers of \( i \): \( i^2 = -1 \), \( i^3 = -i \), etc.
- Complex conjugation
- Simplifying complex numbers
- Square root of a negative number \( \sqrt{-N} = \sqrt{N}i \)
1.1 Coordinates, Distance, and Midpoint

- \((x, y)\)-coordinates

Distance formula

\[d(P_1, P_2) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}\]

Midpoint formula

\[x_{\text{midpoint}} = \frac{x_1 + x_2}{2}, \quad y_{\text{midpoint}} = \frac{y_1 + y_2}{2}\]
1.1 Coordinates, Distance, and Midpoint

- (x, y)-coordinates
- Distance formula

\[ d(P_1, P_2) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]
1.1 Coordinates, Distance, and Midpoint

- $(x, y)$-coordinates
- Distance formula
  
  \[ d(P_1, P_2) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]

- Midpoint formula
  
  \[ x_{\text{midpoint}} = \frac{x_2 + x_1}{2} \quad y_{\text{midpoint}} = \frac{y_2 + y_1}{2} \]
1.2 Graphs

- Graph by plotting points
1.2 Graphs

- Graph by plotting points
- What are the intercepts?
Graph by plotting points
What are the intercepts?
Test for symmetry: x-axis, y-axis, origin
Slope of a line. How to find it and use it.
1.3 Lines

- Slope of a line. How to find it and use it.
- Equations of vertical and horizontal lines
1.3 Lines

- Slope of a line. How to find it and use it.
- Equations of vertical and horizontal lines
- Point-slope form
1.3 Lines

- Slope of a line. How to find it and use it.
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- Find equation of a line given two points
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- Slope of a line. How to find it and use it.
- Equations of vertical and horizontal lines
- Point-slope form
- Find equation of a line given two points
- Slope-intercept form
1.3 Lines

- Slope of a line. How to find it and use it.
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- Find equation of a line given two points
- Slope-intercept form
- General form
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- Slope of a line. How to find it and use it.
- Equations of vertical and horizontal lines
- Point-slope form
- Find equation of a line given two points
- Slope-intercept form
- General form
- Parallel and perpendicular lines

Find the equation of a line that passes through the point $(5, 0)$ and which is perpendicular to the line that passes through $(2, 3)$ and $(1, -5)$. 
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1.4 Circles

- Standard Form: \((x - h)^2 + (y - k)^2 = r^2\)
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- Standard Form: \((x - h)^2 + (y - k)^2 = r^2\)
- General Form: \(x^2 + y^2 + ax + by + c = 0\)
1.4 Circles

- **Standard Form:** \((x - h)^2 + (y - k)^2 = r^2\)
- **General Form:** \(x^2 + y^2 + ax + by + c = 0\)
1.4 Circles

- Standard Form: $(x - h)^2 + (y - k)^2 = r^2$
- General Form: $x^2 + y^2 + ax + by + c = 0$

Find the center and radius of $x^2 + y^2 - 2x + 4y - 6 = 0$