1. Solve the equation.
   \[ 2[2x - (3x - 2)] - 8(x - 2) = 0 \]
   a) \( \frac{6}{5} \)
   b) \( 2 \)
   c) \( -2 \)
   d) \( -\frac{6}{5} \)

2. Solve for the variable \( x \) in the equation shown below.
   \[ \frac{6}{x + 4} - \frac{9}{x - 4} = \frac{12}{x^2 - 16} \]
   a) \( 24 \)
   b) \( 72 \)
   c) \( -24 \)
   d) \( \sqrt{58} \)

3. Perform the indicated operations and write the result in standard form.
   \[ (6 + 7i)(4 - i) - (2 - i)(2 + i) \]
   a) \( 28 + 22i \)
   b) \( 26 + 34i \)
   c) \( 26 + 22i \)
   d) \( 36 + 22i \)

4. Solve the equation by the method of your choice.
   \[ x^2 + 7x - 18 = 0 \]
   a) \( \{-9, 1\} \)
   b) \( \{-2, 9\} \)
   c) \( \{9, 2\} \)
   d) \( \{-9, 2\} \)
5. Solve the polynomial equation by factoring and then using the zero product principle.

\[ x^3 + 7x^2 - x - 7 = 0 \]

a) \{49\}
b) \{-7,1,7\}
c) \{-7,-1,1\}
d) \{-7,7\}

6. Solve the absolute value equation or indicate that the equation has no solution.

\[ |2x + 4| + 7 = 9 \]

a) \{-3,-1\}
b) \{-\frac{3}{2}, -\frac{1}{2}\}
c) \emptyset
d) \{1,3\}

7. Solve the linear inequality and express the solution set in interval notation.

\[ -35x - 30 \leq -5(6x + 4) \]

a) \((-\infty,-2)\)
b) \([-2,\infty)\)
c) \((-2,\infty)\)
d) \((-\infty,-2]\)

8. Write an equation of the line which is passing through (2,-3) and parallel to the line whose equation is \(y = -2x + 3\). Write the equation in point-slope form.

a) \(y - 3 = -2(x - 2)\)
b) \(y - 2 = -2(x + 3)\)
c) \(y + 3 = -2(x - 2)\)
d) \(y + 3 = x - 2\)

9. Find the average rate of change of the function from \(x_1\) to \(x_2\).

\[ f(x) = -3x^2 - x \] \(x_1 = 5\) to \(x_2 = 6\)

a) \(-\frac{1}{6}\)
b) \(-34\)
c) \(-2\)
d) \(\frac{1}{2}\)

10. Find the domain of the function.

\[ f(x) = \sqrt{12 - x} \]

a) \((-\infty, 12]\)
b) \((-\infty, 24) \cup (24, \infty)\)
c) \((-\infty, 12) \cup (12, \infty)\)
d) \((-\infty, 24]\)
11. Given function \( f \) and \( g \), find \( f - g \).

\[
f(x) = 6x - 9, \quad g(x) = 3x - 6
\]

a) \( 9x - 15 \)
b) \( 3x - 15 \)
c) \( 3x - 3 \)
d) \( -3x + 3 \)

12. Find the \( y \)-intercept of the polynomial function.

\[
f(x) = -x^2 - 2x + 8
\]

a) \(-1\)
b) \(0\)
c) \(-8\)
d) \(8\)

13. Determine if the graph of the polynomial has \( y \)-axis symmetry, origin symmetry, or neither.

\[
f(x) = x^3 - 3x
\]

a) origin symmetry
b) \( y \)-axis symmetry
c) neither

14. Use synthetic division to show that the number given to the right of the equation is a solution of the equation, and then solve the polynomial equation.

\[
x^3 + 3x^2 - 10x - 24 = 0; \quad -2
\]

a) \{-4,-3,-2\}
b) \{-2,3,4\}
c) \{-4,-2,3\}
d) \{-3,-2,4\}

15. Evaluate the expression without using a calculator.

\[
e^{\ln 2x^3}
\]

a) \(2x^3\)
b) \(e^{2x^3}\)
c) \(\ln 2x^3\)
d) \(3\)
15. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expression.

\[ 8 \ln(x - 4) - 5 \ln x \]

a) \( \ln 40x(x - 4) \)
b) \( \ln x^8(x - 4)^8 \)
c) \( \frac{\ln 8(x - 4)}{5x} \)
d) \( \frac{\ln (x - 4)^8}{x^8} \)

17. Solve the logarithmic equation.

\[ \log_6(x^2 - 7x) = 1 \]

a) \{-1, 8\}
b) \{1\}
c) \{8\}
d) \{-8, 1\}

18. Solve the system by method of your choice.

\[
\begin{align*}
    x - 2y &= 8 \\
    -2x - 3y &= 26
\end{align*}
\]

a) \{(4, -5)\}
b) \{(-5, -5)\}
c) \{(-4, -6)\}
d) \emptyset

19. Give the order of the matrix, and identify the given element of the matrix.

\[
\begin{pmatrix}
    7 & 10 & -4 & -12 & -5 \\
    13 & -9 & 12 & -12 & 4 \\
    -3 & 6 & 1 & 12 & 5 \\
    1 & 0 & 7 & 0 & 7
\end{pmatrix}; \quad a_{34}
\]

a) \(4 \times 4; 1\)
b) \(4 \times 5; 12\)
c) \(5 \times 4; 7\)
d) \(20; 5\)
20. Let $A = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}$ and $B = \begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}$. Find $A \cdot B$.

a) $\begin{bmatrix} -5 \\ 15 \\ -10 \end{bmatrix}$  
b) $\begin{bmatrix} 5 \\ -6 \\ 4 \end{bmatrix}$  
c) $\begin{bmatrix} -3 \\ 9 \\ -6 \end{bmatrix}$  
d) $\begin{bmatrix} 5 \\ -15 \\ 10 \end{bmatrix}$

21. You inherit $56,000 from a very wealthy grandparent, with the stipulation that for the first year, the money must be invested in two stocks paying 4% and 10% annual interest, respectively. How much should be invested at each rate if the total interest earned for the year is to be $3,200?

22. The length of a rectangular room is 2 feet longer than twice the width. If the room's perimeter is 208 feet, what are the room's dimensions?

23. Find the sum of the 50 terms of the arithmetic sequence: -3, 4, 11, 18, ....

24. A new Hyundai Tiburon has a book value of $22,000, and after 2 years a book value of $14,000. What is the car's value in 4 years? Apply the formula $A = A_0 e^{rt}$. Round to the nearest hundred.
FINAL EXAM
Mathematics 1320/1420, Spring 2014
Group B

Name:

Follow the instructions given to you by your instructor. The test consists of 20 multiple choice problems and 4 problems to be worked out completely.

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   a) \{49\}
   b) \{-7,1,7\}
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   \[ |2x + 4| + 7 = 9 \]
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   b) \{-\frac{3}{2}, -\frac{1}{2}\}
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3. Solve the linear inequality and express the solution set in interval notation.
   \[ -35x - 30 \leq -5(6x + 4) \]
   a) \(-\infty, -2\)
   b) \([-2, \infty)\)
   c) \([-2, \infty)\)
   d) \(-\infty, -2\]

4. Write an equation of the line which is passing through (2,-3) and parallel to the line whose equation is \(y = -2x + 3\). Write the equation in point-slope form.
   a) \(y - 3 = -2(x - 2)\)
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\[ 2[2x - (3x - 2)] - 8(x - 2) = 0 \]
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6. Solve for the variable \(x\) in the equation shown below.
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\[ f(x) = x^3 - 3x \]
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10. Use synthetic division to show that the number given to the right of the equation is a solution of the equation, and then solve the polynomial equation.

\[ x^3 + 3x^2 - 10x - 24 = 0; \quad -2 \]

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b) \{-2, 3, 4\}
c) \{-4, -2, 3\}
d) \{-3, -2, 4\}

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\[ e^{\ln 2x^3} \]

a) \(2x^3\)
b) \(e^{2x^3}\)
c) \(\ln 2x^3\)
d) 3

12. Give the order of the matrix, and identify the given element of the matrix.

\[
\begin{bmatrix}
7 & 10 & -4 & -12 & -5 \\
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-3 & 6 & 1 & 12 & 5 \\
1 & 8 & 7 & 0 & 7 \\
\end{bmatrix}; \quad a_{34}
\]

a) \(4 \times 4; 1\)
b) \(4 \times 5; 12\)
c) \(5 \times 4; 7\)
d) \(20; 5\)

13. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expression.

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\[ f(x) = \sqrt{12 - x} \]

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c) \((-\infty, 12) \cup (12, \infty)\)
d) \((-\infty, 24]\)

16. Given function \(f\) and \(g\), find \(f-g\).

\[ f(x) = 6x - 9, \quad g(x) = 3x - 6 \]

a) \(9x - 15\)
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\[ f(x) = -x^2 - 2x + 8 \]

a) \(-1\)
b) \(0\)
c) \(-8\)
d) \(8\)

18. Solve the logarithmic equation.

\[ \log_b(x^2 - 7x) = 1 \]

a) \((-1, 8)\)
b) \(\{1\}\)
c) \(\{8\}\)
d) \((-8, 1)\)

19. Let \(A=\begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}\) and \(B=\begin{bmatrix} -1 \\ 3 \\ -2 \end{bmatrix}\). Find \(-4B\).

a) \[ \begin{bmatrix} -5 \\ 15 \\ -10 \end{bmatrix} \]
b) \[ \begin{bmatrix} 5 \\ -6 \\ 4 \end{bmatrix} \]
c) \[ \begin{bmatrix} -3 \\ 9 \\ -6 \end{bmatrix} \]
d) \[ \begin{bmatrix} 5 \\ -15 \\ 10 \end{bmatrix} \]
20. Solve the system by method of your choice.
\[
\begin{align*}
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a) \{(4,-5)\}

b) \{(-5,-5)\}

c) \{(-4,-6)\}

d) \emptyset

21. Find the sum of the 50 terms of the arithmetic sequence: -3,4,11,18…..

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