NAME: SOLUTIONS

TEST 1 BONUS QUIZ

Dawson College
Applied Math (201-943-DW S1)
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Question 1. *(5 marks)*
Solve the following system of equations.

$x+y-z=4$
$x-2y+3z=-6$
$2x+3y+z=7$

① ISOLATE A VARIABLE

1st EQUATION: $x = 4-y+z$

② SUB IN OTHER 2 EQUATIONS

$x-2y+3z=-6$
$4-y+z-2y+3z=-6$
$\boxed{-3y+4z=-10}$ A

$2x+3y+z=7$
$2(4-y+z)+3y+z=7$
$8-2y+2z+3y+z=7$
$\boxed{y+3z=-1}$ B

③ SOLVE THE TWO VARIABLE SYSTEM (EQUNS A&B)

$-3y+4z=-10$ A
$y+3z=-1$ B

$y=-1-3z$ SUB IN A $-3(-1-3z)+4z=-10$
$3+9z+4z=-10$
$13z=-13$
$z=-1$

$z=-1$ $y=-1-3z$
$=-1-3(-1)$
$=2$

④ NOW SOLVE FOR REMAINING VARIABLE

$x=4-y+z$
$=4-2+(-1)=1$ SOLN $\boxed{x=1 \quad y=2 \quad z=-1}$

Question 2. *(3 marks)*
Given the formula for the sum of cubes: $A^3+B^3=(A+B)(A^2-AB+B^2)$.
Factor completely x^3+27. $A=x$
$B=3$

$$x^3+27=(x+3)(x^2-3x+9)$$

Question 3. *(2 marks)*
Suppose you were faced with the previous question and I hadn't given you the formula! To make matters worse, all you could remember from the formula was that $(A^3+B^3)=(A+B)$multiplied by something?!?!?!?!

Using a technique that we have previously seen in class (not the sum of cubes formula) demonstrate how you could still figure out how to factor the sum of cubes x^3+27!

You can use Long division

We know $x^3+27=(x+3)\cdot ?$

$$\begin{array}{r|l} & x^2-3x+9 \\ \hline x+3 & x^3+27 \\ & -(x^3+3x^2) \\ \hline & -3x^2+27 \\ & -(-3x^2-9x) \\ \hline & 9x+27 \\ & -(9x+27) \\ \hline & 0 \end{array}$$

So $\dfrac{x^3+27}{x+3}=x^2-3x+9$

Therefore $x^3+27=(x+3)(x^2-3x+9)$!