MATH 100 Solutions: QUIZ VIII 8 November 2018

*To earn full credit, please show your reasoning.*

1. *[4 pts]* Find the solution to the following linear system by using your method of choice. Give both coordinates of the solution:

 2x + 4y = –14

 y = 6x – 23

***Solution:*** *Rewrite the second equation in standard form: 6x – y = 23*

*Multiply the first equation by -3:*

*-6x - 12y = 42*

*Now, to solve the system*

*6x + 12y = -42 and*

*-6x + y = -23*

*we add the two equations to obtain:*

*13y = -65*

*And so y = -5*

*Hence* ***x = 3****.*

*Substituting x = 3 in either equation yields* ***y = -5****.*

1. *[4 pts]* Using the method of Gaussian elimination, solve the following system. Give both coordinates of the solution:

 x + 3y = –3

4x – 5y = 22

***Solution:*** *Multiply the first equation by -4 to obtain the new system:*

 *-4x – 12y = 12*

 *4x – 5y = 22*

*Adding yields: - 17y = 34.*

*Hence* ***y = -2****. Substituting in either equation above yields* ***x = 3****.*

1. *[4 pts]* Using the method of Gaussian elimination, solve the following system. Give both coordinates of the solution:

7x + 8y = 37

10x – 3y = 125

***Solution:*** *Multiply the first equation by 10 and the second equation by -7 to obtain the system:*

70x + 80y = 370

-70x + 21y = -875

*Adding yields: 101y = - 505. Hence* ***y = -5****. Substituting in either equation yields* ***x = 11****.*

1. *[3 pts]* Give an *example* of a system (in two unknowns) that is inconsistent.

*Answer: 3x + y = 1 and 3x + y = 3*

1. *[4 pts]* Solve the following problem by introducing two variables and then solving.  *Do not forget to introduce your variables! Little or no credit will be given for guessing.*

The sum of the ages of Jack and Jill is 61 years. Twenty years from now Jill will be 26 years less than twice Jack’s age. Find their current ages.

***Solution:*** *Let x = Jack’s age now, and let y = Jill’s age now.*

*Twenty years from now Jack will be x+20 years old, and Jill will be y+20 years old.*

The sum of their current ages is 61: x + y = 61

Twenty years from now Jill will be 26 years *less* than twice Jack’s age.

Thus y + 20 = 2(x + 20) $-$ 26.

Simplifying: y + 20 = 2x + 40 $-$ 26 $⇒2x-y=$ 6

Next, we solve the system:

x + y = 61

$2x-y=$ 6.

Adding the two equations yields: 3x = 67. Thus x = 22.5. Since x + y = 61, y = 38.5.

**Therefore, Jack currently is 22.5 years old, and Jill is 38.5 years old.**

1. *[4 pts]* Establish the solution to the following problem using *two unknowns*, but ***do not solve****! Do not forget to introduce your variables!*

Albertine has $11.25 in quarters and dimes. If the number of dimes is 9 less than twice the number of quarters, how many coins of each type does she have?

***Solution:*** *Let d = the number of dimes that Albertine has and let q = the number of quarters that Albertine has.*

*We are given that* ***d = 2q – 9****.*

*Since each dime is worth 0.1 dollars, and each quarter is worth 0.25 dollars, we have:*

**0.1 d + 0.25 q = 11.25**

[*One never reaches home, but wherever friendly paths intersect the whole world looks like home for a time.*](http://www.brainyquote.com/quotes/quotes/h/hermannhes387130.html)
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