Maths 10

Pre - Test 7

`subject:` *system of simultaneous equations*

25 January 2019

Problem 1

Solve the following systems of simultaneous equations :

1) by *substitution* $\begin{cases} x+3y=294 \\ 25x+y=-50 \end{cases}$ [5 marks]

2) by *combination* $\begin{cases} \frac{x}{2}+6y=17 \\ -x-\frac{3y}{2}=\frac{11}{4} \end{cases}$ [5 marks]

3) by *Cramer* $\begin{cases} \sqrt{27}x+\sqrt{2}y=-\sqrt{2} \\ \sqrt{8}x+\sqrt{3}y=\sqrt{12} \end{cases}$ [5 marks]

4) by the method you want $\begin{cases} 3x+5y+1=0 \\ 5x+7y+11=0 \end{cases}$ [5 marks]

5) by the method you want $\begin{cases} \pi x-3y=-8 \\ -2x+y=2 \end{cases}$ [5 marks]

Problem 2

i) What is a *singular* system ? [2 marks]

ii) Which of the three following systems is *singular* ? [3 marks]

A) $\begin{cases} x - \frac{1}{3}y = -8 \\ -3x + 2y = 2 \end{cases}$ B) $\begin{cases} \frac{\pi}{2}x - 3y = -8 \\ 0x + y = 2 \end{cases}$ C) $\begin{cases} 3x - 21y = 19 \\ -2x + 14y = -4 \end{cases}$

ii) Which of the three following *singular* systems has an *infinite number of solutions* ?

[3 marks]

A) $\begin{cases} 12x - 8y = 52 \\ 15x - 10y = 26 \end{cases}$ B) $\begin{cases} 3x - 21y = 26 \\ -2x + 14y = 52 \end{cases}$ C) $\begin{cases} -3x - 21y = -52 \\ 2x + 14y = 26 \end{cases}$

Problem 3

Solve the following system of simultaneous equations, giving x and y in terms of k

$$\begin{cases} x - ky = 1 \\ -3x + 2y = -6 \end{cases}$$

[8 marks]

Bonus

i) – Find the value of k (of problem 3) for having the solution $x = 3$.
– Hence what would be the value for y?

[+2 marks]

ii) – Find the value of k such that the system (as given in problem 3) is *singular*.
– How many solution(s) would have this singular system ? [+2 marks]

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