Unit Review of 1: Linear Systems
Grade 10 Mathematics – MPM 2D1-1

NAME: ________________________________

Communication

Indicate whether the following are true or false. (1 mark each)

____  1.  The point (1,1) is on the line given by y = x.
____  2.  Two equations that are multiples of each other are equivalent equations.
____  3.  The linear system y = 2x + 5 and y = 3x + 5 has solution (0,5).
____  4.  The linear system y = 3x + 5 and y = -3x + 2 has no solutions.
____  5.  The linear system y = 3x + 2 and 3x – y + 2 = 0 has no solutions.
____  6.  The graphing method in solving equation is best suited for precise answers.
____  7.  Linear Graphs with same slopes but different y-intercepts have no solutions.
____  8.  Given three linear equation y = 3x + 2, and y = -5x + 2 and y = 2x + 2, the solution is (0,2).

1. **List** the **three** possible METHODS of solving a linear system.  

2. **Explain** how you would decide whether to use substitution or elimination to solve the following linear system: 
   \[
   \begin{align*}
   3x - y &= 4 \\
   2x + 6y &= 14
   \end{align*}
   \]

3. List 3 types of possible SOLUTION you can obtain when solving a linear system of equation:

4. Explain how you would decide whether to use substitution or elimination to solve the following linear system:
   \[
   \begin{align*}
   2x - 3y &= 6 \\
   3x + 6y &= 12
   \end{align*}
   \]

5. If (0,1) and (3,1) are both solutions to a system of two linear equations, does the system have any other solutions?  Explain?
Knowledge/Understanding

1. Solve the following linear system using elimination. Check your solution. [6]
   \[ 2x - 3y = 2 \]
   \[ 5x + 6y = 5 \]

2. Solve the following linear system using substitution. [4]
   \[ 5x - 3y - 2 = 0 \]
   \[ 7x + y = 0 \]

3. Solve the following linear system by graphing: [5]
   \[ x - y = 4 \]
   \[ x + y = 2 \]
Application/Thinking

1. Solve the following by ANY method:
\[ \frac{x}{6} + \frac{y}{4} = 6 \quad \text{and} \quad \frac{5x}{6} - \frac{y}{3} = 11 \]

** For questions #2, #3, #4, and #5 introduce variables and set up the system of equations ONLY. **DO NOT SOLVE!!**

2. **Number Question:** The mass of two blenders have a difference of 10. Together, their total mass is 28kg. Find the mass of each blender.

3. **Mixture Problem:** Samuel won $2000 in a chess competition. He invested part of it at 9% per annum, and the remainder at 10% per annum. If the total interest earned was $191 for the first year, how much did Samuel invest at each rate?

4. **Mixture Problem:** One type of granola is 30% fruit, and another type is 15% fruit. What mass of each type of granola should be mixed to make 600g of granola that is 21% fruit?

5. **Distance, Time, Speed Problem:** Maria drove from Owen Sound to Ottawa, a distance of 550 km. The trip took 7h. Maria drove at 70 km/h for part of the trip, and at 85 km/h for the remainder of the trip. How far did Maria travel at each speed?
** SOLVE the following systems (Show the full solution and do not use trial and error)**

6. **Money Question**: The total receipts from 550 people attending a play were $9184. If tickets cost $20 for adults and $12 for students, how many adult and student tickets were sold?

7. **Distance, Time, Speed Problem**: A small plane took 3 h to fly 960 km from Ottawa to Halifax with a tail wind (tail wind pushes plane forward). On the return trip, flying into the wind (head wind), the plane took 4 h. Find the wind speed and the speed of the plane in still air.

8. Solve:
   a) $3(x + 1) - 4(y - 1) = 13$ and $5(x + 2) + 2(y + 3) = 0$
b) \( \frac{t-5}{3} + \frac{w+1}{2} = 1 \) and \( \frac{t-1}{5} + \frac{w+2}{3} = 2 \)