MPM2D0 -

UNIT 1 TEST

Name:

Date: Oct 1st

Knowledge	Application	Thinking/Inquiry	Communication
19 /24	14 /14	5 /7	5 /5

- Show full solutions for full marks.
- Communication marks will be based on proper form and use of symbols.

(KNOWLEDGE)

1. Determine if the point (3,5) is on the line 2x - 3y = 10. 2 /2

$2(3) - 3(5) = 10$

$6 - 15 = 10$

$-9 = 10$

LS $\neq$ RS

$2x - 10 = 3y$

$\frac{2}{3}x - \frac{10}{3} = y$

$\therefore$ Point (3, 5) is not on the line $2x - 3y = 10$

2. Solve the following system **GRAPHICALLY**. 4 /4

y = 2x - 2
x - 2y = 4

(L2) $x - 2y = 4$

$-2y = -x + 4$

$\frac{-2y}{-2} = \frac{-x}{-2} + \frac{4}{-2}$

$y = \frac{1}{2}x - 2$

$m = \frac{1}{2}$

$b = -2$

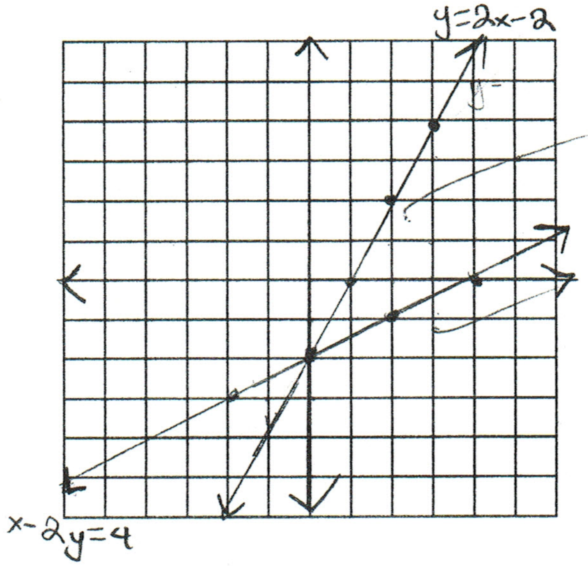
(L1) $y = 2x - 2$

$m = \frac{2}{1}$

$b = -2$

(0, 2)

$\therefore$ (0, -2) is the solution to the following system.



3. Solve the following system by **SUBSTITUTION**. 4 /4

2x + 5y = 4
x + 3y = 3

(L2) $x = -3y + 3$

$2x + 5y = 4$

$2(-3y + 3) + 5y = 4$

$-6y + 6 + 5y = 4$

$-6y + 5y = 4 - 6$

$-y = -2$

$y = 2$

$x + 3y = 3$

$x + 3(2) = 3$

$x + 6 = 3$

$x = 3 - 6$

$x = -3$

(-3, 2)

$\therefore$ (-3, 2) is the solution to the following statment.

x+3y	3
(-3)+3(2)	3
-3+6	3
3	3
✓	✓

LS=RS

2x+5y	4
2(-3)+5(2)	4
-6+10	4
4	4
✓	✓

LS=RS

10

4. Solve the following system by **ELIMINATION**. 4/4

$3x + 4y = 3$
$5x - 2y = 31$

L1 $3x+4y=3$ $(5,-3)$

$3(5)+4y=3$
$15+4y=3$
$4y=3-15$
$4y=-12$
$y=-3$

L2 $5x-2y=31$
$(5x-2y=31)(-2)$
$-10x+4y=-62$

L1 $3x+4y=3$
L2 (-) $-10x+4y=-62$
$13x+\cancel{0}y=65$
$13x=65$
$x=5$

$\therefore (5,-3)$ is the solution to the following system.

$3x+4y$	3
$3(5)+4(-3)$	3
$15-12$	3
3	3
✓	✓

LS = RS

$5x-2y$	31
$5(5)-2(-3)$	31
$25+6$	31
31	31
✓	✓

LS = RS

5. Solve the following system using substitution <u>or</u> elimination. 5/5

$$\frac{x}{2}+\frac{y}{3}=\frac{5}{6}$$
$2(6x - y) = 10$

L1 $\frac{x}{2}+\frac{y}{3}=\frac{5}{6}$
$\frac{1}{2}x+\frac{1}{3}y=\frac{5}{6}$

L1 $\frac{1}{2}x+\frac{1}{3}y=\frac{5}{6}$
$\left(\frac{1}{2}x+\frac{1}{3}y=\frac{5}{6}\right)(-6)$
$\frac{-6}{2}x+\frac{-6}{3}y=\frac{-30}{6}$
$-3x-2y=-5$

L2 $2(6x-y)=10$
$12x-2y=10$

L1 $-3x-2y=-5$
(-) L2 $12x-2y=10$
$-15x+0y=-15$
$-15x=-15$
$x=1$

$(1,1)$

$12x-2y=10$
$12(1)-2y=10$
$12-2y=10$
$-2y=10-12$
$-2y=-2$
$y=1$

$\therefore (1,1)$ is the solution to the following system.

$12x-2y$	10
$12(1)-2(1)$	10
$12-2$	10
10	10
✓	✓

LS = RS

$\frac{1}{2}x+\frac{1}{3}y$	$\frac{5}{6}$
$\frac{1}{2}(1)+\frac{1}{3}(1)$	$\frac{5}{6}$
$\frac{3}{6}+\frac{2}{6}$	$\frac{5}{6}$
$\frac{5}{6}$	$\frac{5}{6}$
✓	✓

LS = RS

$10x-8y-24=0$
$\frac{10x-24}{8}=\frac{8y}{8}$
$=\frac{5}{4}x-3=y$
$x-0.8y-2.4=0$

$\therefore$ This is gonna have infinite solutions.

$5x-4y$
$5x-12=4y$
$\frac{5}{4}x-3=y$
$m=\frac{5}{4}$ $b=-3$

6. Without solving, determine the number of solutions to each linear system.

a) $y = 3x - 4$ 0/2
$x + y = 7$

1 solutions.

$x+(3x-4)=7$
$x+3x-4=7$
$4x=7+4$
$4x=11$

$\therefore$ Since you can get a value for X the system has 1 solution

$y=3x+4$
$m=3$
$b=-4$

$x+y=7$
$y=-x+7$
$m=-1$
$b=7$

This is going to have 1 solutions.

WITHOUT SOLVING!

b) $5x - 4y = 12$ 0/3
$x - 0.8y - 2.4 = 0$

Infinite Solutions

L2 $x-0.8y-2.4=0$
$(x-0.8y-2.4=0)(10)$
$10x-8y-24=0$

L1 $-4y=-5x+12$
$y=\frac{5}{4}x-3$

L2 $10x-8\left(\frac{5}{4}x-3\right)-24=0$
$10x-10x+24-24=0$
$0x=24+24$
$0x=0$

$\therefore$ Since I got $0x=0$ I know that this system has infinite solutions.

9

(APPLICATION)

7. One late night Mr. Serpe decided to go for a 25km run from his condo to LP. He started off running at 10km/h but then he picked up the pace to 15km/h. He got to LP in 2 hrs. For how long did Mr. Serpe run at:
(a) 15km/h (b) 10km/h

6/6

Let x = Time spent in hours running at 10km/h
Let y = Time spent in hours running at 15km/h

$x+y=2$
$10x+15y=25$
$y=-x+2$
$10x+15(-x+2)=25$
$10x-15x+30=25$
$-5x=25-30$
$-5x=-5$
$x=1$

$x+y=2$
$1+y=2$
$y=2-1$
$y=1$

1 hour at 10km/h
1 hour at 15km/h

a) ∴ Mr. Serpe ran at 15km/h for 1 hour

b) ∴ Mr. Serpe ran at 10km/h for 1 hour.

8. Mr. Serpe bought practice balls and game balls for the Spartan soccer team. The total cost was $1500. The practice balls cost $25 each while the game balls cost $50 each. Mr. Serpe bought a total of 50 balls altogether. How many practice balls and games balls did he buy?

6/6

Let x = practice balls
Let y = game balls

$x+y=50$
$25x+50y=1500$
$y=-x+50$
$25x+50(-x+50)=1500$
$25x-50x+2500=1500$
$-25x=1500-2500$
$\frac{-25x}{-25}=\frac{-1000}{-25}$
$x=40$

$x+y=50$
$40+y=50$
$y=50-40$
$y=10$

$25x+50y=1500$
$25(40)+50(10)=1500$
$1000+500=1500$
$1500=1500$
✓ ✓
LS=RS

∴ Mr. Serpe bought 40 practice balls and 10 game balls

12

9. One of the lines in a linear system has an equation y = 7x - 1. Create another equation such that the linear system will have: (a) one solution (b) no solution

2/2

a) $\boxed{y=\frac{1}{2}x+3}$ ∴ ~~Since~~ the Slope is different the lines will cross 1 time giving it 1 solution.

b) $\boxed{y=7x+5}$ ∴ Since the slope is the same and y-intercept are different the ~~we~~ lines will never met.

(TIPS)

10. A student solves a linear system by using elimination, performing all necessary steps correctly. They eventually get to the line 0x = 17. What can they conclude about the linear system?

2/2

They can conclude that this linear system will have no Sol~~tions~~ (parallel) because since there was no value for x the Solution must have either no solutions or infinite Solutions. Since the 17 is a 17, not a 0 that means it must have no solutions because the lines will not go over each other all the way. There are no solutions (parallel.)

12. Create a linear system that has infinite solutions including the point (1,1).

1/3

$y=2x-1$

$-2x+y=-1$

~~See the~~ the two equations are the same they will have infinite solutions because since the slope is the same and the y-intercept is the same, they will be on top of each other.

$y=2x-1$

$2y=4x-2$

∴ Since these lines are the same they will have infinite Solutions.

13. The points (0,3) and (2,4) are both solutions to a linear system. Does the system have any other solutions? Explain your answer.

2/2

The System has more Solutions because since it has ~~more~~ than 1 Solutions the 2 lines must be the same and there are will have infinite solutions. ~~the~~ there will be many more Solutions since this is the case.

5