Name: _____ **Period:** _____

Bench Mark 1 Review: Due on Tuesday 8/30

System of Equations: Explain which method you would choose to solve for each system and solve 2 systems.

1. $2x = 2 - 9y$
$21y = 4 - 6x$

$-3(2x+4y=2)$
$6x+21y=4$
$-6x-27y=-6$
$-6y=-2$

$21\left(\frac{1}{3}\right)=4-6x$
$7=4-6x$
$3=-6x$
$y=\frac{1}{3}$
$x=\frac{-1}{2}$

2. $2x = 3 - y$
$y = 4x - 12$

$2x=3-(4x-12)$
$2x=3-4x+12$
$6x=15$
$x=\frac{15}{6}=\frac{5}{2}, y=-2$

$y=4\left(\frac{5}{2}\right)-12$
$=10-12$
$=-2$

3. $y = 1.5x + 4$
$0.5x + y = -2$

$0.5x+(1.5x+4)=-2$
$2x+4=-2$
$2x=-6$
$x=-3$
$y=1.5(-3)+4=-.5$

4. $6y = 2x - 14$
$x - 7 = 3y$

$6y-2x=-14$
$2(-3y+x=7)$ infinite sol'n
$6y-2x=-14$
$6y+2x=14$
$0=0$

5. $3y = -6x - 3$
$y = 2x - 1$

$3(2x-1)=-6x-3$
$6x-3=-6x-3$
$0=0$
infinite sol'n

6. $2x = 3y - 12$
$x = 4y + 5$

$2(4y+5)=3y-12$
$8y+10=3y-12$
$\frac{5y}{5}=\frac{-22}{5}$
$y=\frac{-22}{5}$

$x=4\left(\frac{-22}{5}\right)+5$
$x=\frac{-88}{5}+5$
$x=\frac{-88+25}{5}$
$x=\frac{-63}{5}$

7. $2x + 3y = 11$
$3x - 5y = -21$

$5x=-10$
$x=-2$
$-2-4=-7$
$-y=-5$
$y=5$

8. $3y = 3x - 6$
$y = x - 2$

$3(x-2)=6x-6$
$3x-6=6x-6$
$-3x=0$
$x=0$
$y=-2$

9. $y = x + 9$
$2y - x = 1$

$2(x+9)-x=1$
$2x+18-x=1$
$x=-17$
$y=-17+9$
$y=-8$

You are required to solve the above systems of equations, which problem(s) is/are easier if you have to use substitution method? Explain your reason and then select 2 problems and solve them.

Place a number beside each box below indicating the order of the steps taken for solving system of equations by elimination method. Select 2 systems of equations and solve them.

5 Combine the two equations together to eliminate one variable and solve for the remaining variable.

3 Select a variable to eliminate from the system of equations.

4 Use substitution and solve for the other variable.

1 If necessary. reorganize the system of equations in which the variables are on one side of the equation and the constant is on the other side of the equation for the system.

7 Verify your solution.

2 Vertically align the like term such as x variable of one equation is align directly above the other x variable of the second equation.

6 If necessarily. multiply the selected variable in one equation by a negative value so they have the same quantity but opposite sign.

Create a system of equations for each of the situation, explain which method you would use to solve the system, and solve for problem.

10. The concession stand is selling hot dogs and hamburgers during a game. At halftime, they sold a total of 78 hot dogs and hamburgers and brought in $105.50. How many of each item did they sell if hamburgers sold for $1.50 and hot dogs sold for $1.25?

$-1.5(h + d = 78) \Rightarrow -1.5h - 1.5d = -117$

$1.5h + 1.25d = 105.50$

$1.5h + 1.25d = 105.50$

$-.25d = 11.5$

$d = 46$

$h + 46 = 78$

$h = 32$

11 A chemist is mixing one solution that is 32% sodium and another solution that is 12% sodium. How many liters of each type should the chemist use to produce 50 liters of the solution that is 20% sodium?

$A + B = 50$

$.32A + .12B = .2(50)$

$20A = 350$

$A = 17.5$

$B = 32.5$

$A + B = 50$

$.32A + .12B = 16$

$-12A - 12B = -600$

$32A + 12B = 1000$

$20A = 400$

$A = 20$

$B = 30$

12. A student invested $5000 in two different savings accounts. The first account pays an annual interest rate of 3%. The second account pays an annual interest rate of 4%. At the end of one year, she had earned $185 in interest. How much money did she invest in each account?

$-.03(A + B = 5000)$

$.03A + .04B = 185$

$.01B = 35$

$A = 2500$

$B = 2500$

$A + B = 5000$

$.03A + .04B = 185$

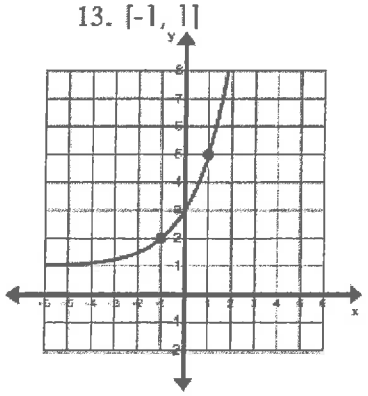
$-.03A - .03B = -150$

$.01B = 35$

$B = 2500$

Find the average rate of change for each of the following graphs over the given interval.

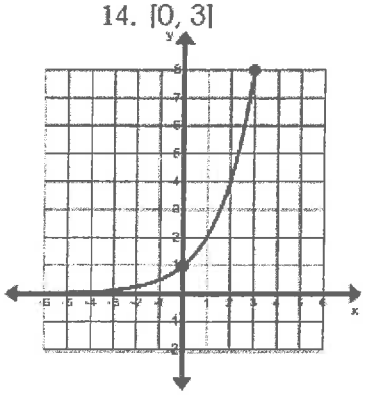
13. [-1, 1]



$(-1, 2), (1, 5)$

$\frac{5-2}{1-(-1)} = \frac{3}{2}$

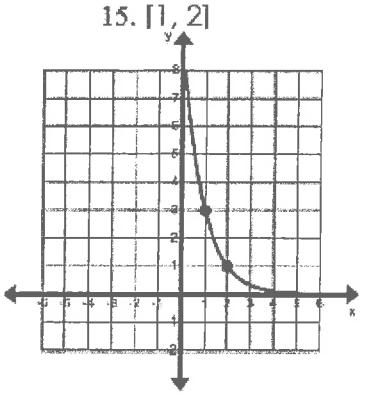
14. [0, 3]



$(0, 1), (3, 8)$

$\frac{8-1}{3-0} = \frac{7}{3}$

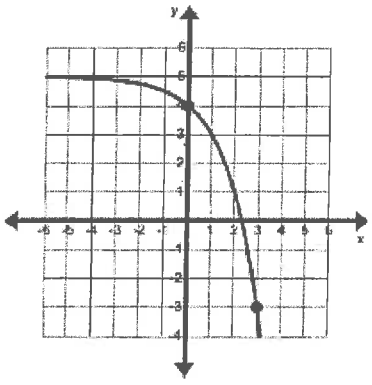
15. [1, 2]



$(1, 3), (2, 1)$

$\frac{3-1}{1-2} = -\frac{2}{1} = -2$

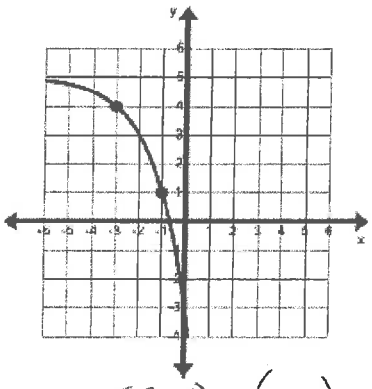
16. [0, 3]



(0, 4), (3, -3)

$\frac{4-(-3)}{0-3} = \frac{7}{3}$

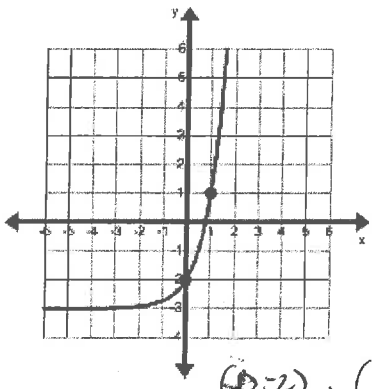
17. [-3, -1]



(-3, 4), (-1, 1)

$\frac{4-1}{-3-(-1)} = \frac{3}{-2} = -\frac{3}{2}$

18. [0, 1]



(0, -2), (1, 1)

$\frac{-2-1}{0-1} = \frac{-3}{1} = 3$

19. Which rule could represent the function shown by the table at the right?

A. $y = -x^3$

B. $y = x^2 + 1$

C. $y = -x^2 + 1$

D. $y = -x - 1$

x	y
-2	-3
-1	0
0	1
1	0
2	-3

20. **Suppose 25 flour beetles are left undisturbed in a warehouse bin. The beetle population doubles in size every week. The equation $P(x) = 25 \bullet 2^x$ can be used to determine the number of beetles after x weeks. Complete the table.**

Week	Population
0	
1	
2	
3	
4	
5	

A. Calculate the average growth rate between weeks 1 and 3.

(1, 50) (3, 200)

$P(1) = 25 \cdot 2^1 = 50$

$P(3) = 25 \cdot 2^3 = 200$

$\frac{200-50}{3-1} = \frac{150}{2} = 75$

B. Calculate the average growth rate for the first five weeks [0, 5].

$P(0) = 25 \cdot 2^0 = 25 \Rightarrow (0, 25)$

$P(5) = 25 \cdot 25 = 800 \quad (5, 800)$

$\frac{800-25}{5-0}$

C. Which average growth rate is higher? Why do you think it is higher?

B - Exponential Growth

$\frac{775}{5} = 155$

21. Writing Explain how you can determine if a sequence is arithmetic.

if there is a common difference in the sequence

Determine whether each sequence is arithmetic. Justify your answer. If the sequence is arithmetic, write a recursive and an explicit formula to represent it.

22. 22, 16, 10, 4, . . .

-6 -6 yes

$A_n = 22 + (n-1)(-6)$

23. 6, 12, 24, 48, . . . ← not Arithmetic it's Geometric

×2 ×2 ×2

$a_n = 6(2)^{n-1}$

24. –18, –9, 0, 9, . . .

+9 +9 +9

$a_n = -18 + (n-1)(9)$

25. 1.5, 2.1, 2.7, 3.3, . . .

+.6

$a_n = 1.5 + (n-1)(.6)$

What is the summation formula for arithmetic series?

$$\sum_{i=1}^{n} a_i = \left(\frac{n}{2}\right)(a_1 + a_n)$$

27. Reasoning The initial term of an arithmetic sequence is 5. The eleventh term is 125. What is the common difference of the arithmetic sequence?

$a_1 = 5$

$a_{11} = 125$

$\frac{125-5}{11-1} = \frac{120}{10} = 12 = d$

28. Writing Explain how you can determine if a sequence is geometric.

if there exist a common ratio in the sequence

Determine whether each sequence is geometric. Justify your answer. If the sequence is arithmetic, write a recursive and an explicit formula to represent it.

29. 22, 16, 10, 4, . . .

30. 6, 12, 24, 48, . . .

31. –18, –9, 0, 9, . . .

32. 1.5, 2.1, 2.7, 3.3, . . .

Ref 22-25

33. What are the first five terms of the sequence?

$$a_n = 3^n - 1$$

(A) 2, 5, 8, 11, 14
(C) 2, 8, 26, 80, 242
(B) 3, 9, 27, 81, 243
(D) 2, 4, 8, 16, 32

34. The formula $a_n = 3n + 2$ best represents which sequence?

(F) 3, 6, 9, 12, 15
(H) 4, 7, 10, 13, 16
(G) 5, 8, 11, 14, 17
(I) 5, 9, 29, 83, 245

35. Which pattern can be represented by $a_n = n^2 - 3$?

(A) −1, 0, 5, 12, 21 (B) 4, 7, 12, 19, 28 (C) 1, 4, 9, 16, 25 (D) −2, 1, 6, 13, 22

36. What is the 10th term of the geometric sequence 1, 4, 16, . . .? 4^{n-1} $n=10$

(A) 40 (B) 180,224 (C) 262,144 (D) 2,883,584 $a_{10} = 4^9$

37. Which sequence is a geometric sequence?

(F) 1, 3, 5, 7, 9, . . . +2
(H) 2, 4, 8, 16, 32, . . . ×2
(G) 12, 9, 6, 3, 0, . . . −3
(I) −2, −6, −10, −14, −18, . . . −4

38. Which could be the missing term of the geometric sequence 5, __, 125, . . .?

(A) 25 (B) 50 (C) 75 (D) 100

39. What could be the missing term of the geometric sequence −12, __, $-\frac{3}{4}$, . . .?

(F) −4 (G) −6.375 (H) 3 (I) 4

40. In each successive round of a backgammon tournament, the number of players decreases by half. If the tournament starts with 32 players, which rule could predict the number of players in the nth round?

(F) $32 = (0.5)^n$ (G) $32 = 0.5r^{n-1}$ (H) $a_n = 15^{n-1}$ (I) $a_n = (32)(0.5)^{n-1}$

41. What is the summation formula for geometric series?

$$\sum_{i=1}^{n} a_i = a_1\left(\frac{1-r^n}{1-r}\right)$$