1. Solve the system of equations shown below.

$$y = 2x + 8$$

$$3y - 6x = 24$$

Describe what happened when you tried to solve the system.

Predict what the graph of these two lines would look like.

2. Solve the system of equations shown below.

$$2y = x + 7$$

$$y - \frac{1}{2}x = 10$$

Describe what happened when you tried to solve the system.

Predict what the graph of these two lines would look like.

3. Solve these systems of equations using any method.

$y = 2x + 5$
$y = -4x + 17$

$2x - 3y = 10$
$-x + y = -5$

$x = y - 8$
$2x + 6y = -4$

4. Mike is going up a flight of stairs, while Cooper is on the 24th stair and going down that same flight of stairs. If Mike goes up the stairs 1 step every second and Cooper goes down the stairs 2 steps every second, will the two boys ever be on the same step at the same time? If so, which step would it be?

5. Solve for x.

a. $4x - 21 = 3x + 15$

d. $\dfrac{x}{4} = \dfrac{21}{14}$

b. $-2(3x - 5) = 8x - 4$

e. $EX + T = RA$

c. $(x - 2)(x + 4) = x^2 + 4$

f. $x + \dfrac{x}{2} = 8$

6. Solve the equations in parts (a) and (b) for y. Then state the slope and the y-intercept of each equation in part (c).
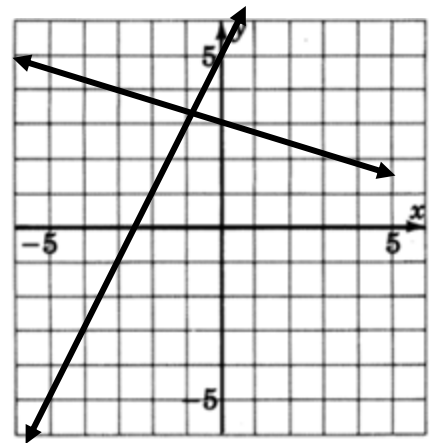
      a. $-3x - 8y = 32$

      b. $2x^2 + 3y = 9x + 2x^2 - 3$

      c. For each of the two solved equations, find the y-intercept and slope. Justify your answers.

7. Leo solved a system of equations by graphing and the graph is shown at right.

    Estimate the solution from the graph.

    What is the equation of each line in the system?

    Solve the system algebraically. How accurate was your estimate?

8. Because his teachers are so great, Kenny wants to buy "spring break" gifts for all 7 of his teachers. He can buy sunglasses for $25 and suntan lotion for $8. Kenny has only $124 to spend. If Kenny wants to spend all of his money, how many of each type of gift can he buy?

    Write a system of equations representing this problem.

    Solve your system of equations and figure out how many of each type of gift Kenny should buy.

9. Simplify each expression to one without zero or negative exponents.

    a. 8^{-2}

    c. $\dfrac{x^{-6}}{x}$

    b. $a^2 b^{-6}(b^{-1})^4$

    d. $\dfrac{a^{-4}b}{ab^{-5}}$

10. Determine if the following sequences are arithmetic, geometric, or neither. Then write an explicit **or** recursive equation for each sequence.

    a. $-7, -4, -1, 2, 5, \ldots$

    c. $25, 16, 9, 4, 1, \ldots$

    b. $-64, -32, -16, -8, \ldots$

    d. $0, 2, 4, \ldots$

11. Find an explicit equation to represent each table as a sequence and write in the value for $t(4)$.

n	$t(n)$
1	4
2	1
3	-2
4	

n	$t(n)$
1	6
2	7.2
3	8.64
4	

12. Solve the following systems algebraically.

A. $2x + y = 6$
    $-2x + y = 2$

D. $6x - y = 4$
    $6x + 3y = -16$

B. $2x - 3y = -9$
    $x+y = -2$

E. $y - x = 4$
    $2y + x = 8$

F. $3x + 2y = 12$
    $5x - 3y = -37$

C. $6x - 2y = -16$
    $4x + y = 1$

13. Simplify each expression. Your answer should contain only positive exponents.

a. $(-4x)^2$

b. $(-4x)^{-2}$

c. $\dfrac{(3x)^{-2}}{(3x)^2}$

d. $\dfrac{(3x)^{-2}}{(3x)^{-2}}$

13. Which expressions below are equivalent to $(5x)^{-2}$?

$$\dfrac{5}{x^2} \qquad \dfrac{0}{25x^2} \qquad \dfrac{1}{25x^2} \qquad -10x^{-2} \qquad -25x^{-2} \qquad \dfrac{1}{25}x^{-2} \qquad \dfrac{25}{x^2}$$

14. Write the first 5 terms of each sequence described below.

a. t(n)= 5n·2

b. t(n)= -3n+5

c. t(n)= -15+12n

d. t(n)= 5+ 3(n-1)

e. t(n)= 5·2n

f. t(n)= 36 ·(-⅓)^n

g. t(1)= 5, t(n+1)= t(n)·3

h. t(1)=100, t(n+1)= t(n)·½

15. Create an explicit equation for each recursively-defined sequence below.

a. $a_1 = 10,\ a_{n+1} = a_n - 3$

b. $t(1) = 5,\ t(n + 1) = 4 \cdot t(n)$

16. A rectangle is three times as long as it is wide. The perimeter of the rectangle is 36. Write and solve a system of equations to determine the length and width of the rectangle.

17. Many people believe that students who are strong in music are also strong in mathematics. But the principal at University High School wonders if the same connection exists between music and English. The principal went through the records for the past year and found 10 students who were enrolled in both Advanced Placement Music and Advanced Placement English. he compared their final exam scores. His findings are shown to the right.

Final Exam Scores	
AP Music	AP English
88	63
74	96
82	86
64	90
97	68
90	90
82	78
72	74
78	96
62	79
checksum 789	*checksum 820*

a. Make a scatterplot on graph paper and describe the association.

b. Calculate the LSRL and then sketch the line of best fit on your scatterplot. Round to the nearest tenth.

c. Calculate the residual for a student who scores a 74 on his or her music exam. Explain what the residual means in this context.

18. Consider the principal's findings from the previous problem.

    a. Use your equation to predict about the English score of a person who scores a 95 on his or her music exam.

    b. Sarah, a music student actually scored a 95 on her Music Exam and she scored a 92 on her English Exam. Use this information and your work in part (a) to calculate the residual when the music score is 95.

    c. Which data point from question 17 has the largest residual? Use this to determine the equations for both the upper and lower bound lines of your scatter plot.

19. Consider the principal's situation from problem 17. Calculate and interpret the correlation coefficient.

18. Solve each equation for the indicated variable.

$2x + 3y = 6$ (for x) $FM - 3 = Q$ (for F) $\frac{r}{s} + a = 2b$ (for r)

19. In 2012 the average cost for a new, midsized car was about \$31,000. New car prices tend to go up about 2% every year.

    a. What is the multiplier for this situation?

    b. If this trend continues, what will be the cost in 4 years?

    c. Write an equation that represents the cost in n years.

20. Elliot's dad bought a new car for \$31,000 in 2012. Elliot read that a new car loses about 15% of its value each year. Make a table for the predicted value of the car for the first 5 years, then write a function that represents the value in t years.

21. Match a correlation coefficient to its corresponding scatter plot.

$r = 0$ $r = 1$ $r = -1$ $r = -.95$ $r=-.35$ $r=.97$