FM Algebra

Name: Key

Graphing Word Problems

Date: ________________ Pd: ______

For each problem, graph the situation using a table, intercepts, or slope. Be sure to label any point you use to graph. Think through TAILS to make sure your graph is complete.

1. Small bottles have a refund value of 4 cents each and large bottles have a refund value of 8 cents each. Your friend returned a bag full of bottles and received \$2.56. This situation can be modeled by the equation $4S+8L=256$ where ***S*** is the number of small bottles and ***L*** is the number of large bottles.

A. On half a piece of graph paper, make a graph that shows the possible combinations of small and large bottles that were returned. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(S, L) $S=0$ $8L=256$ $L=32$ $(0, 32)$ Zero small bottles and 32 large bottles were returned.

$L=0$ $4S=256$ $S=64$ $(64, 0)$ Sixty-four small bottles and 0 large bottles were returned.

2. You can hike an average of 3 miles per hour. Your total hiking distance ***d*** (in miles) can be modeled by the function $d=3t$ where ***t*** is the time (in hours) you hike.

A. On half a piece of graph paper, make a graph that shows the possible combinations of hours and miles you could have hiked over a 3-day weekend. **Identify at least four solutions on your graph.**

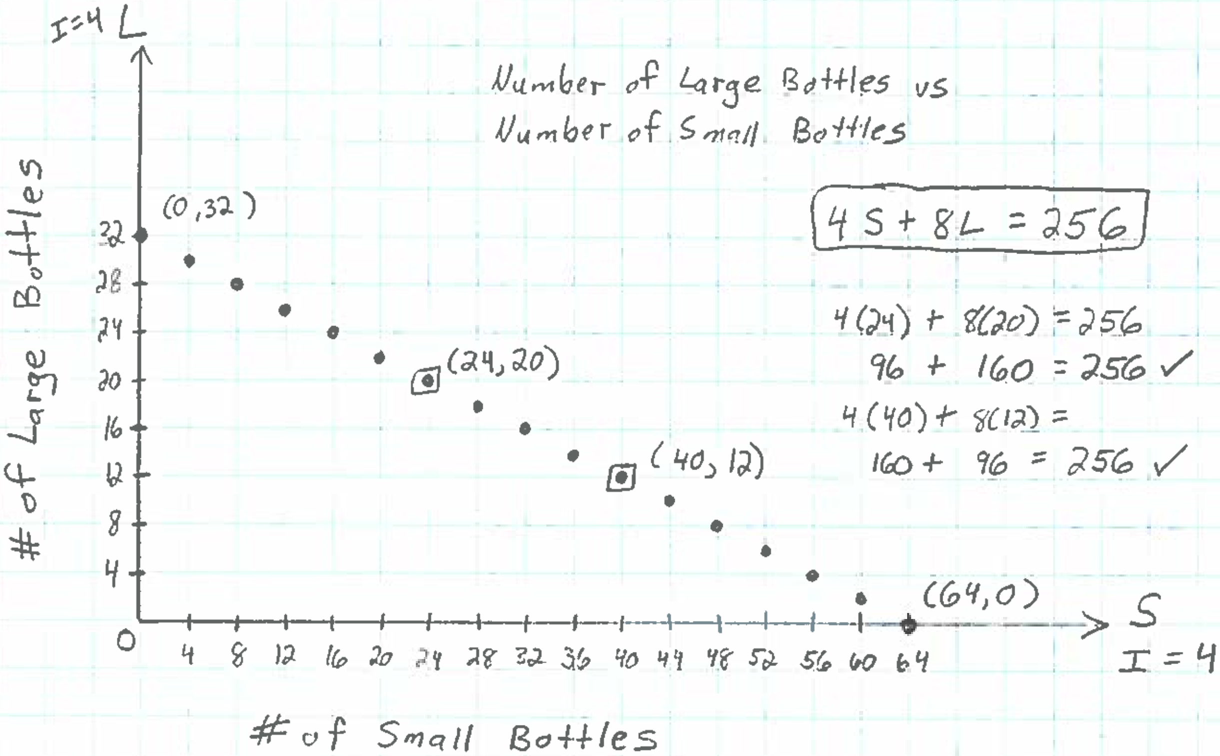
B. Identify and explain the meaning of the intercepts(s) for this problem.

(t, d) $t=0$ $d=0$ $(0, 0)$ After 0 hours, I will have hiked 0 miles.

Domain t	Range $d=3t$	Solution (t, d)
0	0	(0,0)
1	3	(1,3)
2	6	(2,6)
3	9	(3,9)

Graphing Word Problems

1.



$$\boxed{4S + 8L = 256}$$

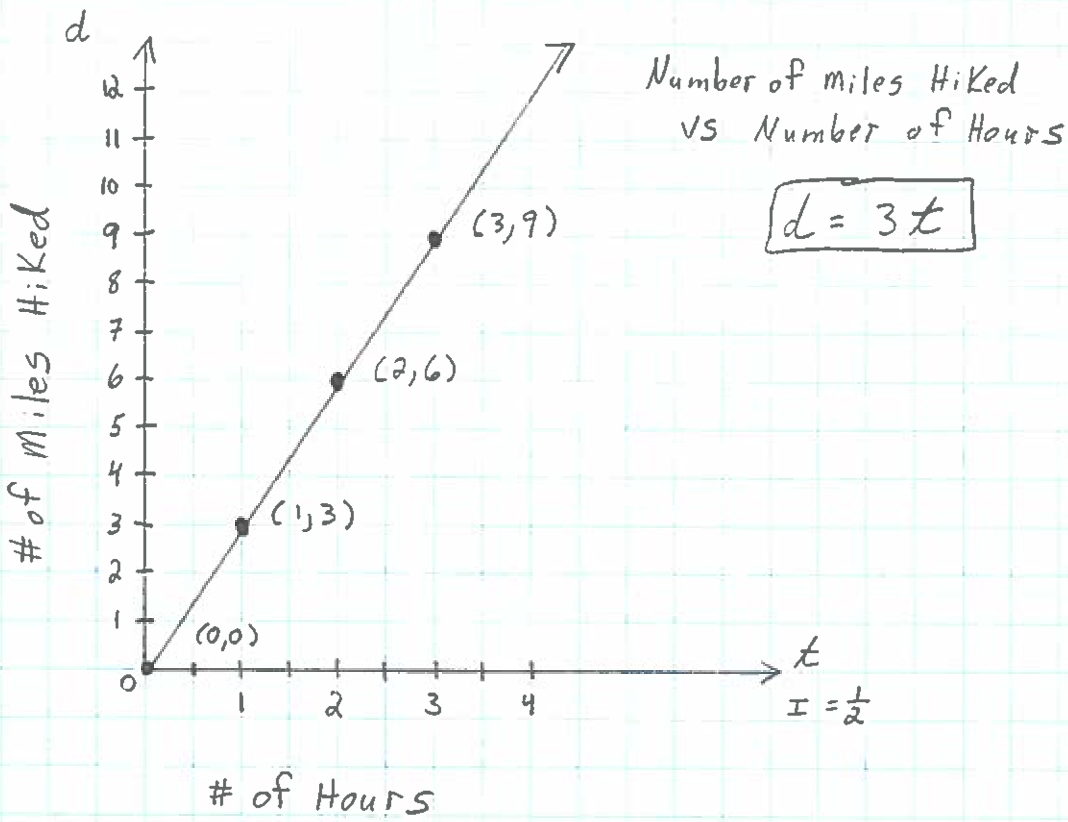
$4(24) + 8(20) = 256$

$96 + 160 = 256$ ✓

$4(40) + 8(12) =$

$160 + 96 = 256$ ✓

2.



$$\boxed{d = 3t}$$

3. On a 360 mile trip home from your grandparents house, your father drove on a local highway with a speed limit of 40 miles per hour and then on an interstate highway with a speed limit of 60 miles per hour. Assuming he was able to maintain the exact speed limit for the entire trip, this situation can be modeled by the equation $40L + 60I = 360$ where ***L*** is the number of hours driven on the local highway and ***I*** is the number of hours driven on the interstate.

A. On half a piece of graph paper, make a graph that shows the possible combinations of hours driven on each type of road. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(L, I) $L = 0$ $60I = 360$ $I = 6$ $(0, 6)$ my father drove 0 hours on the local highway and 6 hours on the interstate.

$I = 0$ $40L = 360$ $L = 9$ $(9, 0)$ my father drove 9 hours on the local highway and 0 hours on the interstate.

4. Before 1979, there was no 3-point shot in professional basketball. The only way players could score was by 2-point field goals and 1-point free throws. In a game before 1979, a team scored a total of 128 points. This situation can be modeled by the equation $2g + f = 128$ where ***g*** is the number of field goals and ***f*** is the number of free throws.

A. On half a piece of graph paper, make a graph that shows the possible combinations of field goals and free throws that could have been made in this game. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(f, g) $f = 0$ $2g = 128$ $g = 64$ $(0, 64)$ The team made 0 free throws and 64 field goals.

$g = 0$ $f = 128$ $(128, 0)$ The team made 128 free throws and 0 field goals.

3.

Number of Hours Driven on the Interstate vs Number of Hours Driven on the Local Highway

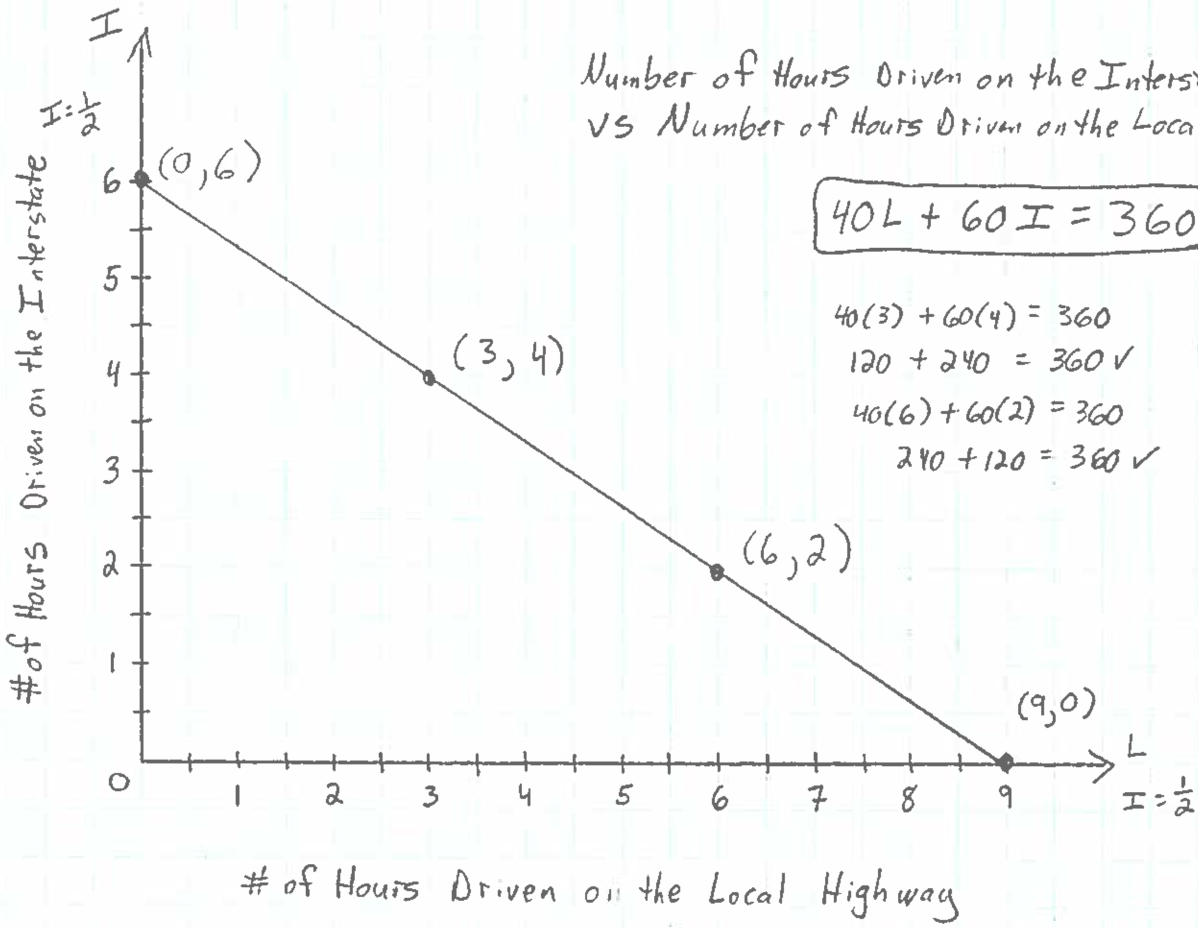
$$\boxed{40L + 60I = 360}$$

$40(3) + 60(4) = 360$

$120 + 240 = 360$ ✓

$40(6) + 60(2) = 360$

$240 + 120 = 360$ ✓



4.

Number of Field Goals vs Number of Free Throws

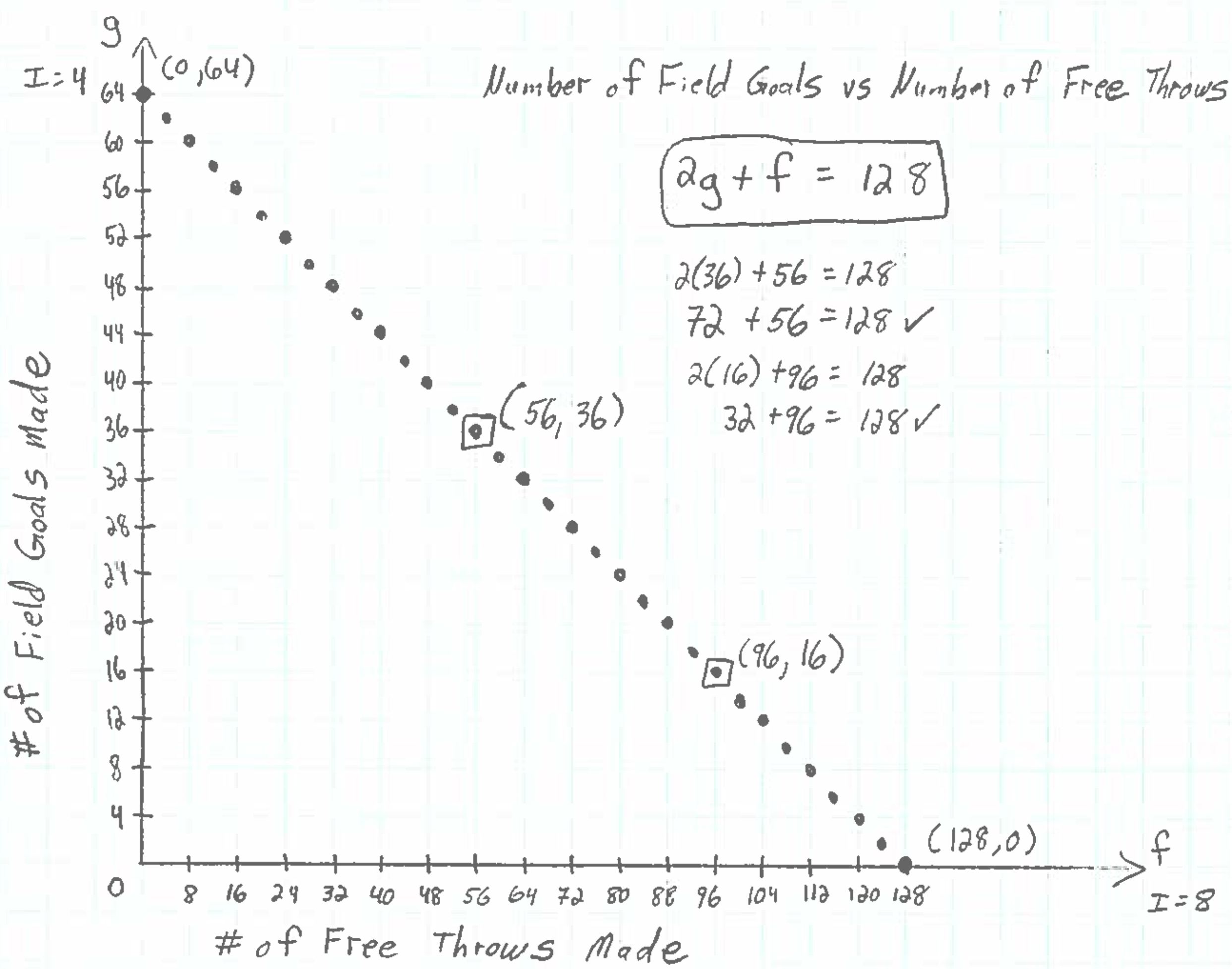
$$\boxed{2g + f = 128}$$

$2(36) + 56 = 128$

$72 + 56 = 128$ ✓

$2(16) + 96 = 128$

$32 + 96 = 128$ ✓



5. An amusement park charges $20 for an all-day pass and $10 for a pass after 5 pm. On Wednesday the amusement park collected $1000 in pass sales. This situation can be modeled by the equation $20D+10E=1000$ where ***D*** stands for the number of all-day passes sold and ***E*** stands for the number of evening-only passes sold.

A. On half a piece of graph paper, make a graph that shows the possible combinations of all-day passes and evening-only passes that were sold. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(E, D) $E=0$ $20D=1000$ $D=50$ $(0, 50)$ Zero evening passes and 50 day passes were sold.

$D=0$ $10E=1000$ $E=100$ $(100, 0)$ One hundred evening passes and 0 day passes were sold.

6. A public swimming pool that holds 45,000 gallons of water is going to be drained for maintenance at a rate of 100 gallons per minute. The amount of water ***w*** (in gallons) in the pool after ***t*** minutes can be modeled by the function $w=45000-100t$.

A. On half a piece of graph paper, make a graph that shows the possible combinations of water level and hours while the pool is being drained. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(t, w) $t=0$ $w=45{,}000$ $(0, 45{,}000)$ After 0 hours, the pool held 45,000 gallons.

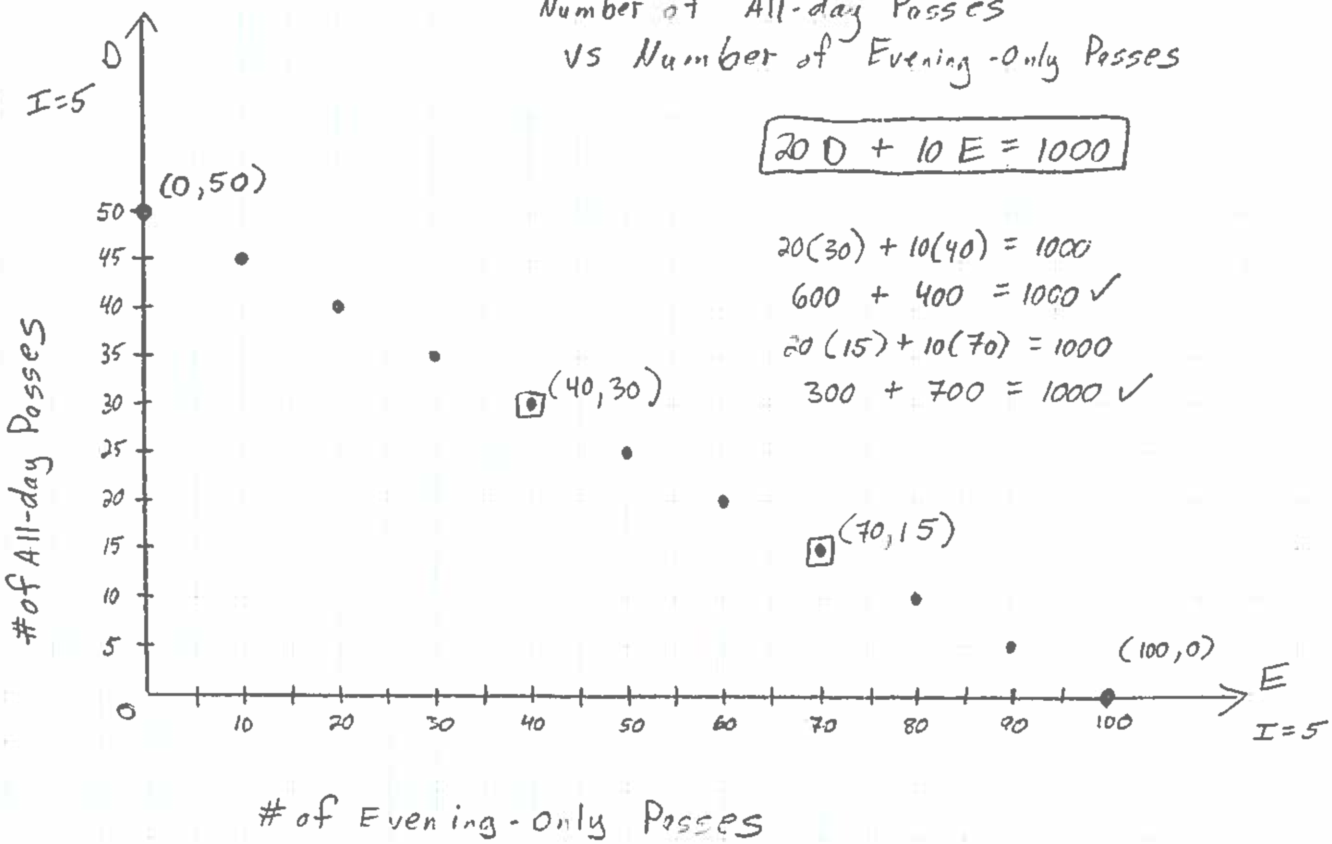
$W=0$ $0=45000-100t$ $100t=45000$ $t=450$ $(450, 0)$ After 450 minutes, the pool held 0 gallons.

5.

Number of All-day Passes
vs Number of Evening-Only Passes

$\boxed{20D + 10E = 1000}$

$20(30) + 10(40) = 1000$
$600 + 400 = 1000$ ✓
$20(15) + 10(70) = 1000$
$300 + 700 = 1000$ ✓



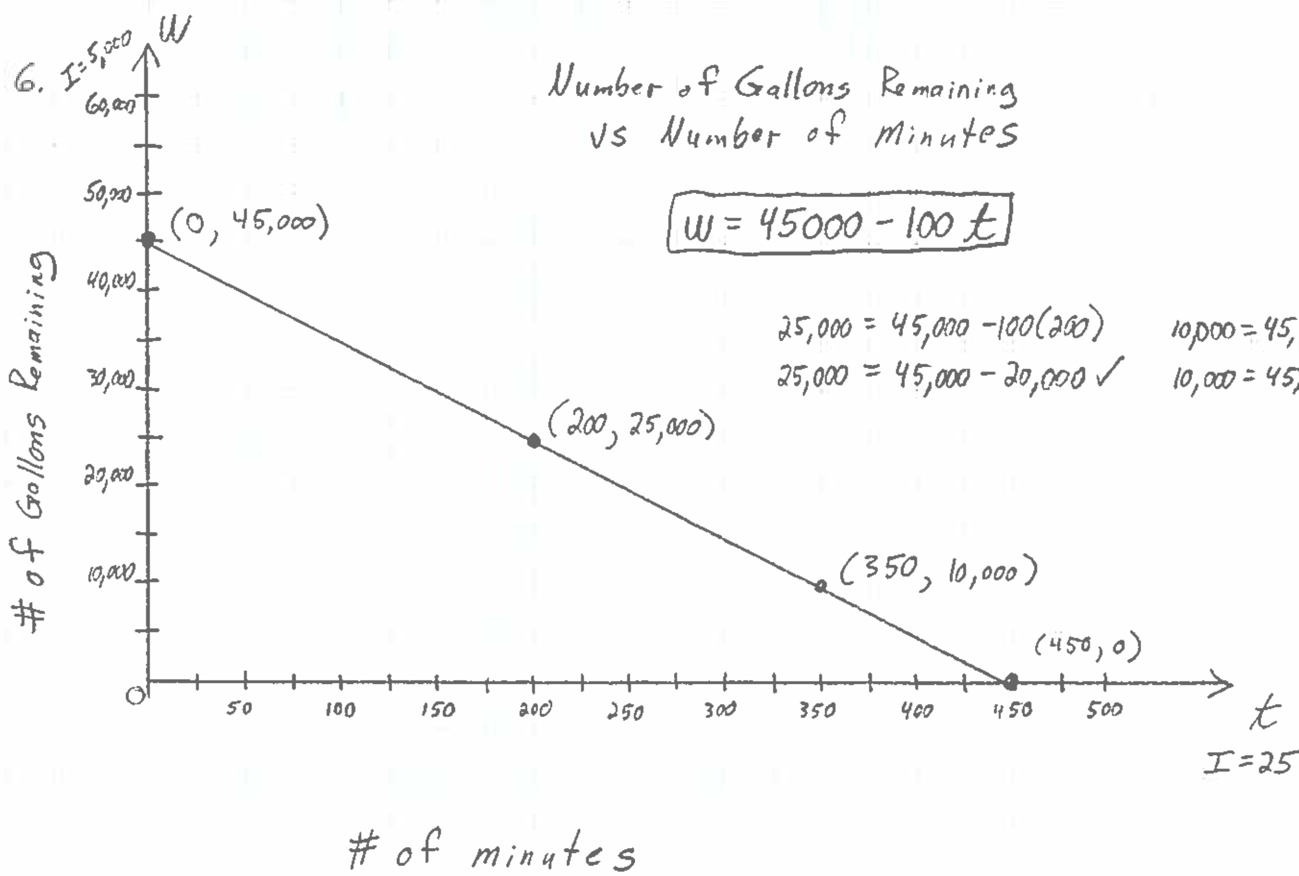
6.

Number of Gallons Remaining
vs Number of Minutes

$\boxed{W = 45000 - 100t}$

$25{,}000 = 45{,}000 - 100(200)$
$25{,}000 = 45{,}000 - 20{,}000$ ✓

$10{,}000 = 45{,}000 - 100(350)$
$10{,}000 = 45{,}000 - 35{,}000$ ✓



7. A family went to the zoo on Saturday and paid a total of \$80. They had to pay \$12 per person for a ticket to the zoo and parked in a garage that charged \$8 per hour. This situation can be modeled by the equation $8h+12t=80$ where ***h*** stands for the number of hours the family's car was parked in the garage and ***t*** stands for the number of tickets purchased.

A. On half a piece of graph paper, make a graph that shows the possible combinations of hours parked and tickets purchased. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(t, h) $t=0$ $8h=80$ $(0,10)$ The family bought 0 tickets and parked for 10 hours.

$h=10$

$h=0$ $12t=80$

$t=6\frac{2}{3}$ It is not possible to buy $6\frac{2}{3}$ tickets!

Domain #of Tickets (t)	Range #of hours (h)	Solution (t,h)
0	10	(0,10)
1	$8\frac{1}{2}$	$(1,8\frac{1}{2})$
2	7	(2,7)
3	$5\frac{1}{2}$	$(3,5\frac{1}{2})$
4	4	(4,4)
5	$2\frac{1}{2}$	$(5,2\frac{1}{2})$
6	1	(6,1)

8. Red oak trees grow at a rate of about 2 feet per year. You buy and plant a red oak trees that is 6 feet tall. The height ***h*** (in feet) of the tree can be modeled by the function $h=2t+6$ where ***t*** is the time (in years) since you planted the tree. There are power lines 22 feet above where you plant the tree. When the tree is tall enough to reach the power lines, the city requires that you cut down the tree.

A. On half a piece of graph paper, make a graph that shows the possible combinations of heights of the tree and years since you planted the tree. **Identify at least four solutions on your graph.**

B. Identify and explain the meaning of the intercept(s) for this problem.

(t, h) $t=0$ $h=2(0)+6$ $(0,6)$ After 0 years, the tree is 6 feet tall.

$h=6$

$h=0$ $0=2t+6$

$-6=2t$

$t=-3$ It is not possible for time to be negative.

Domain #of years (t)	Range #of feet $h=2t+6$	Solution (t,h)
0	6	(0,6)
2	10	(2,10)
4	14	(4,14)
8	22	(8,22)

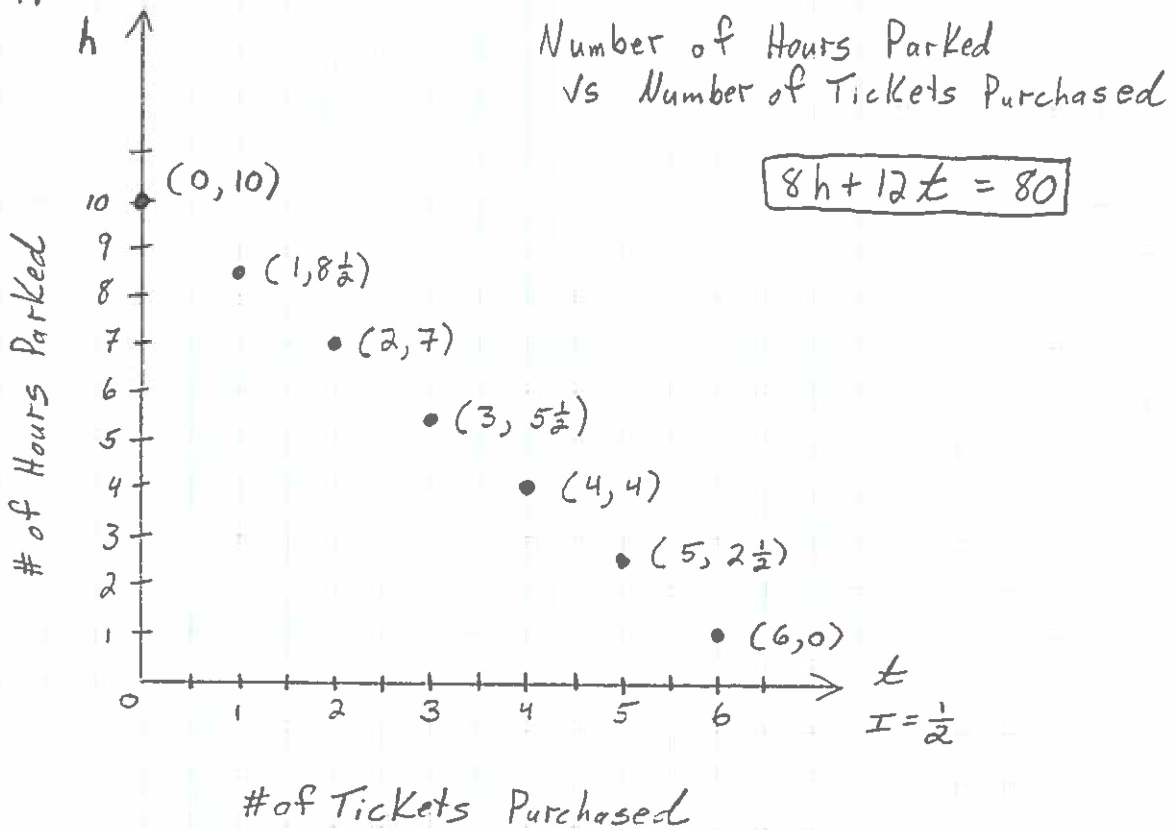
The tree is cut down when $h=22$.

$22=2t+6$

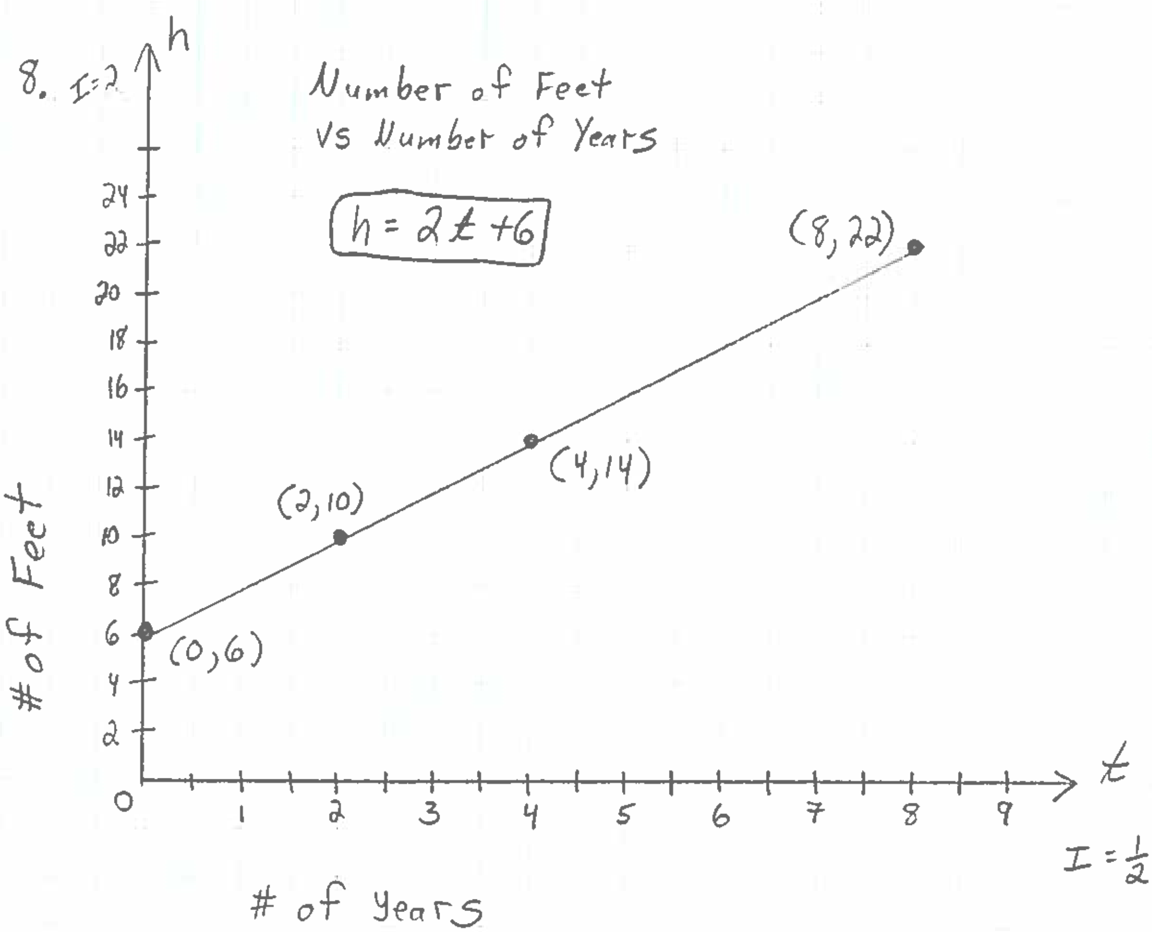
$16=2t$ $(8,22)$

$t=8$

7.


Number of Hours Parked
Vs Number of Tickets Purchased
8h + 12t = 80
h
t
I = 1/2
(0, 10)
(1, 8 1/2)
(2, 7)
(3, 5 1/2)
(4, 4)
(5, 2 1/2)
(6, 0)
# of Hours Parked
# of Tickets Purchased

8.


I=2
h
Number of Feet
Vs Number of Years
h = 2t + 6
(8, 22)
(4, 14)
(2, 10)
(0, 6)
t
I = 1/2
# of Feet
# of Years