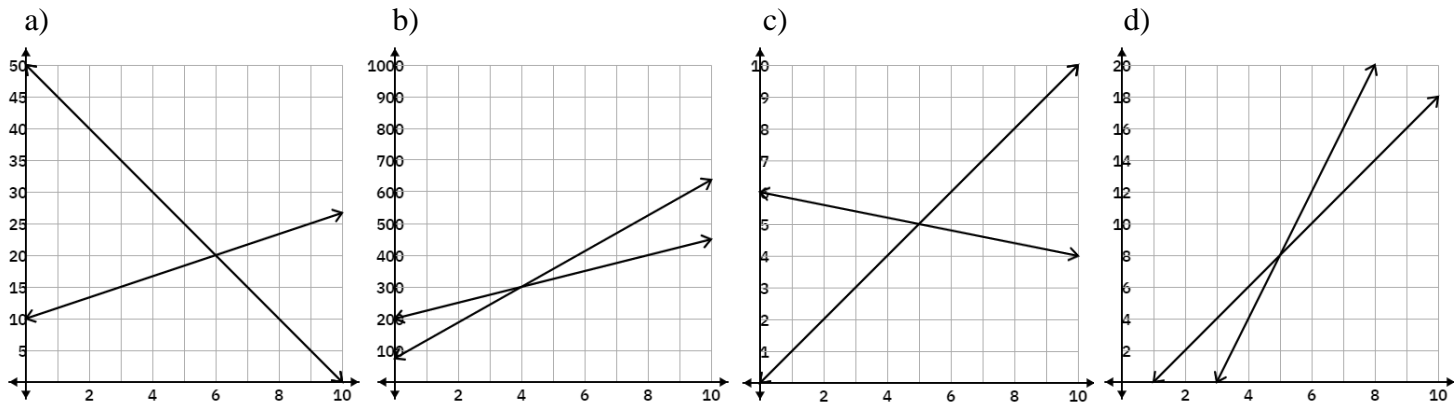


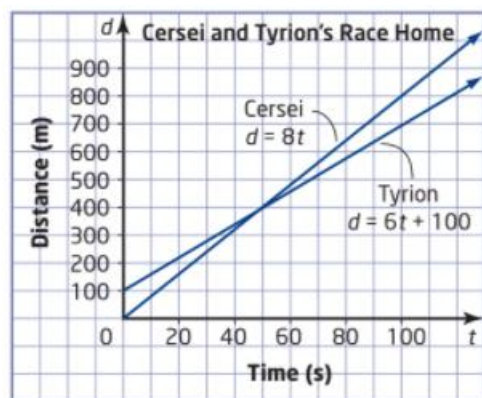
3.9 HOMEWORK HANDOUT – LINEAR SYSTEMS BY GRAPHING

PART A

1) Determine the solution to the following linear systems.



2) Cersei and her brother Tyrion decide to race home. Cersei is a faster runner than Tyrion, so she gives him a head start. Their distance-time graphs are shown in the graph to the right.



- How much of a head start did Tyrion get?
- For what distance of race will each runner win?
- Explain the significance of the solution of this linear system.



3) A couple has budgeted some money for their wedding reception. They are considering two hotels which have their costs shown in the table below.

- Use the tables of values to graph the lines (make your horizontal axis go to at least 100 guests).
- What is the solution to the system of equations and what does it represent?
- Which hotel offers the better deal, and under which conditions?

Waverly Inn	
# of guests	Cost (\$)
10	1200
20	1600
30	2000

Hotel Niagara	
# of guests	Cost (\$)
10	1900
20	2200
30	2500

RATES

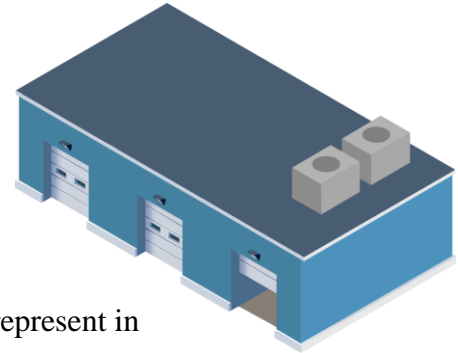
Standard Rate:
\$50 per day and
no registration fee

Frequent Extremist:
\$100 registration
plus \$40 per day

PART B

- 4) Mike wants to join a ski club for the winter season. They are considering the two options shown in the poster to the right.
- Determine an equation for each option.
 - Complete a table of values (at least three rows) for each option.
 - Graph both linear relations.
 - Solve the linear system. What does the solution to this system represent in this scenario?
 - How should Mike make their decision on which option to choose?

- 5) Two companies are offering deals to rent a storage locker. UStore is offering their locker for \$25 per month. LockIt is offering theirs for \$15 per month, but charges a mandatory \$40 flat fee for maintenance.
- Determine an equation for each option.
 - Complete a table of values (at least three rows) for each option.
 - Graph both linear relations.
 - Solve the linear system. What does the solution to this system represent in this scenario?
 - How should you make your decision on which company to choose?



- 6) You are going on a road trip and want to rent a car. You need to decide which agency to rent a car from. Agency A charges \$50 plus 10 cents (0.10 dollars) for each kilometer you drive. Agency B charges \$30 plus \$0.20 per kilometer.
- Determine an equation for each option.
 - Complete a table of values (at least three rows) for each option.
 - Graph both linear relations.
 - Solve the linear system. What does the solution to this system represent in this scenario?
 - How should you make your decision on which agency to choose?



- 7) A recording artist is offered two deals for their fourth album's release:

- **Royalty Only:**
\$1 per album sold
- **Partial Royalty:**
\$2000 fixed plus \$0.50 per album sold

- Graph both linear relations on the same grid.
- Find the solution to the linear system and explain what it means.
- Sales figures for the artist's first three albums are shown below. Which deal do you think the artist should choose? Explain your reasoning.

Album	Copies Sold
Moods EP	1500
Backyard Sessions	3500
Revival	6000

ANSWERS

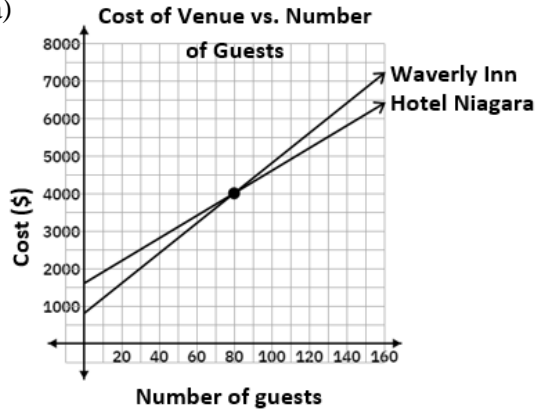
1) a) (6, 20) b) (4, 300) c) (5, 5) d) (5, 8)

2) a) 100m

b) Tyrion wins for races that are less than 400m. Cersei wins races that are longer than 400m.

c) The solution to this linear system represents the length of race where they tie.

3) a)



b) The solution is (80, 4000). The solution represents the point where both venues cost the same amount (\$4000 for 80 guests).

c) They should choose the Waverly Inn if they plan to have fewer than 80 guests, and Hotel Niagara if they have more than 80 guests.

4) a) Let C be the cost and n be the number of days.

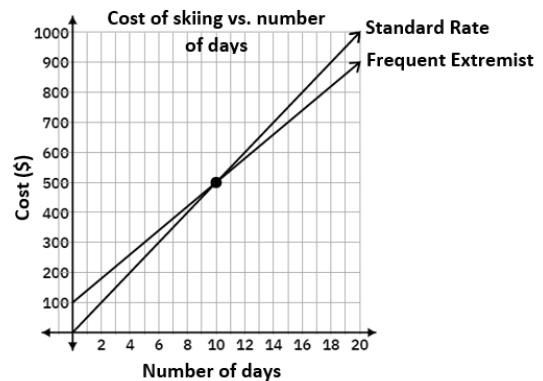
Standard Rate: $C = 50n$ **Frequent Extremist:** $C = 40n + 100$

b)

Standard Rate	
# days	Cost (\$)
1	50
2	100
3	150

Frequent Extremist	
# days	Cost (\$)
1	140
2	180
3	220

c)



d) The solution is (10, 500). This represents where the two plans have the same cost. Both plans cost \$500 for 10 days of skiing.

e) Mike should choose the standard rate if they plan to ski fewer than 10 times. If they plan to ski more than 10 times, they should choose the Frequent Extremist plan. There is no difference between plans for going exactly 10 times.

5) a) Let C be the cost and n be the number of months.

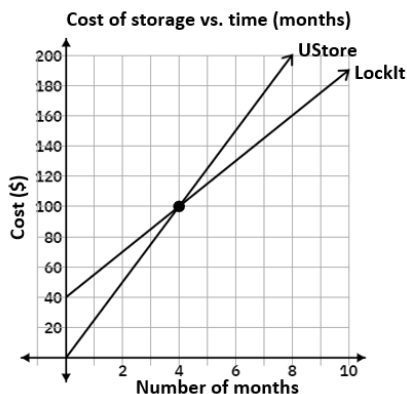
UStore: $C = 25n$ **LockIt:** $C = 15n + 40$

b)

UStore	
# months	Cost (\$)
1	25
2	50
3	75

LockIt	
# months	Cost (\$)
1	55
2	70
3	85

c)



d) The solution is (4, 100). It represents where the cost of renting a storage locker has the same cost for the same amount of time. They both cost \$100 for 4 months of storage.

e) You should choose UStore if you need storage for fewer than 4 months and should choose LockIt if you need storage for more than 4 months. There is no difference between companies for going exactly 4 months.

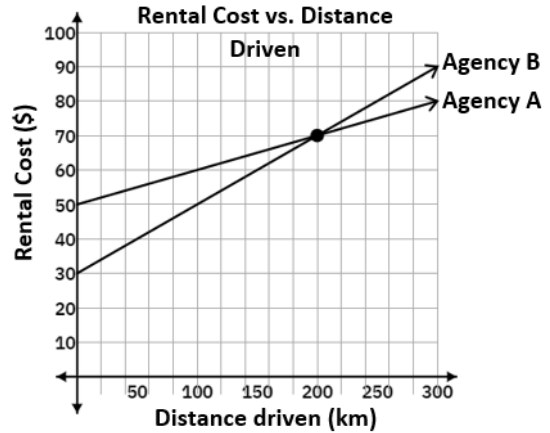
6) a) Let C be the cost of renting the car (in \$) and n be the number of kilometers driven.

Agency A: $C = 0.10n + 50$ **Agency B:** $C = 0.20n + 30$

b)

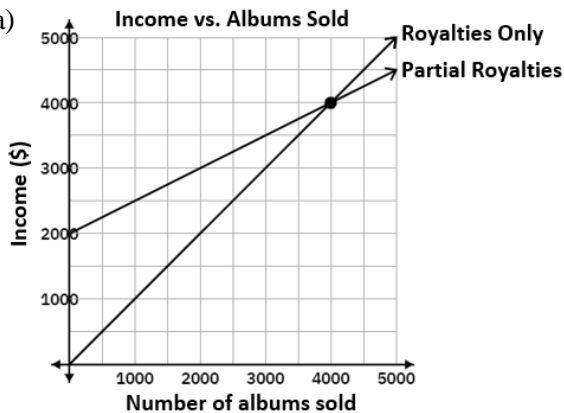
Agency A	
Distance (km)	Cost (\$)
0	50
50	55
100	60

Agency B	
Distance (km)	Cost (\$)
0	30
50	40
100	50



- d) The solution is (200, 70). The solution represents the point where both agencies cost the same amount for the same number of km driven. Both agencies cost \$70 for 200km.
- e) You should choose Agency A if you are planning to drive fewer than 200km, and Agency B if you are planning to drive more than 200km. There is no difference if you are driving exactly 200km.

7) a)



- b) The solution is (4000,4000). It is the point where the artist earns the same amount (\$4000) for the same number of albums sold (4000 copies) for both the Royalty Only and Partial Royalty deals.
- c) The artist seems to be getting more popular over time (sold 6000 copies for their last album). They should choose the royalty only plan because they would earn more money if their sales exceed 4000 copies.