Intersection Points

Suggested time: 100 minutes

What's important in this lesson:
In this lesson you will examine the intersection point of two linear relations. Interpreting the point from the graph and a table of values will be explored.

Complete these steps:

1. Read through the lesson portion of the package independently.
2. Complete any of the examples in the lesson.
3. Check your lesson answers with the lesson key your teacher has.
4. Seek assistance from the teacher as needed.
5. Complete the Assessment and Evaluation and submit for evaluation. Be sure to ask for any assistance when experiencing difficulties.

Hand-in the following to your teacher:

1. Assessment and Evaluation

Questions for the teacher:

Diagnostic/Introductory Activity:
Unit 3 Lesson 6

1. Convert the written expressions into an equation.

   (a) A hall is rented for a wedding. There is a $250 fixed cost and a variable cost of $25. Write an expression for the total cost of the rental.

   (b) A trucking company pays its employees $0.35 per km. The drivers are also paid a fixed rate of $25 for a deliver. Write an expression for to represent the pay for a delivery.

2. Provide a written description for each equation. Be as creative as possible.

   (a) $C = 50n + 150$

   (b) $P = 15\ h + 10$

Graphing a Decision

Often in life, we need to choose between options that are presented to us. Some factors that influence our decision are time and money. Below we will examine a situation using our graphing skills to select the most appropriate option.

Example

You are looking into renting movies and two options are available.

Option A
Flicks and Fun • no membership fee • $ 4 per rental

Option B
Discography • charges a $ 10 membership fee per year • $2 per movie rental

1. Create a table of values for each option.

2. Plot both options on the same graph.

3. Which option would you recommend to a friend if they rent 4 movies per year?

4. When would you recommend each option? Be as specific as possible in your explanation.

Solution

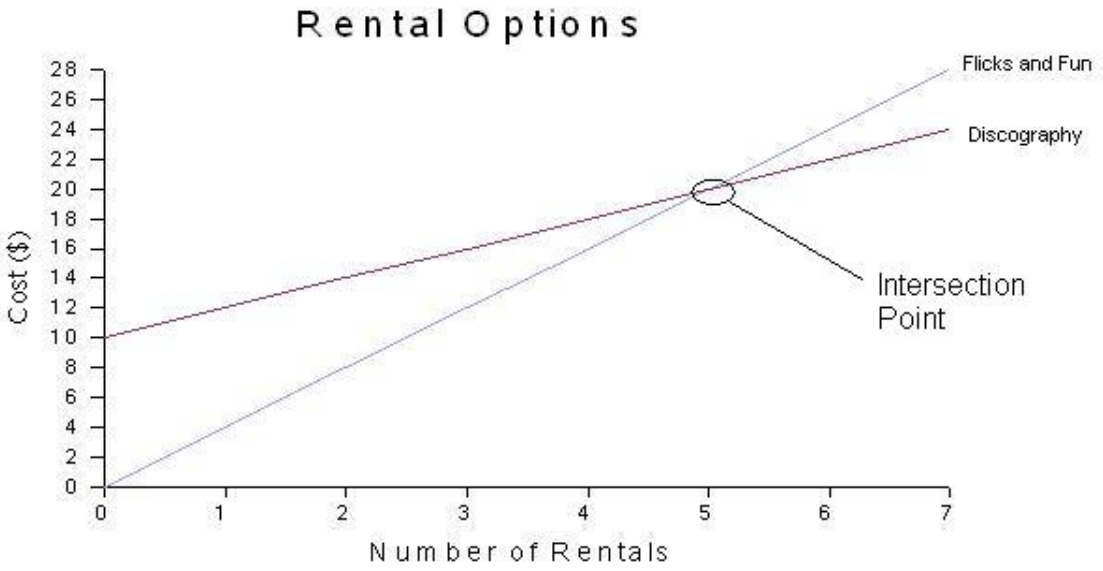
1. Create a table of values for each option.

Flicks and Fun	
Rentals	Cost ($)
0	0
1	4
2	8
3	12
4	16
5	20
6	24
7	28

Intersection Point

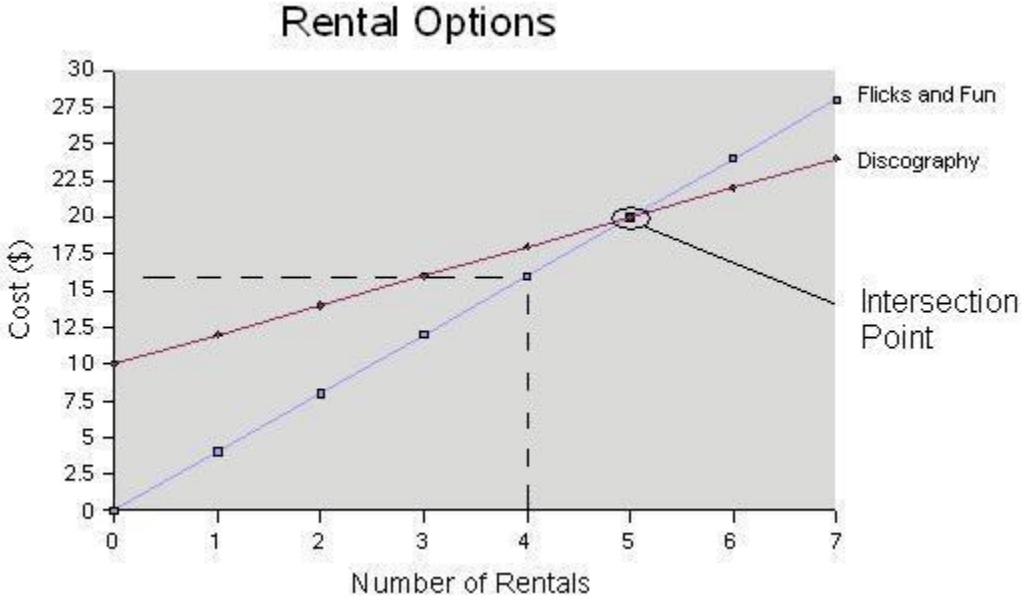
Discography	
Rentals	Cost ($)
0	10
1	12
2	14
3	16
4	18
5	20
6	22
7	24

2. Plot both options on the same graph.



3. Which option would you recommend to a friend if they rent 4 movies per year?

*I would recommend the friend choose **Flicks and Fun.** By reading the graph, we can recognize that Flicks and Fun's graph is lower than Discography at the point when 4 movies are rented.*



4. When would you recommend each option? Be as specific as possible in your explanation.

The **intersection point** has been labelled on both the graph and the table of values. This point represents the instance when both options are equally priced. In other words, when you rent 5 movies Flicks and Fun it will cost the same amount as when you rent 5 movies from Discography. If you rent more than 5 movies Discography is cheaper and if you rent less than 5 movies Flicks and Fun is cheaper. The recommendation depends on the number of movies rented.

Exercise.

(A) The EZ Ride Taxicab Company charges $1.50 plus $1.20/km. The Comfycab Taxi Company charges $1.75 and a rate of $1.15/km.
(a) Complete the table of values for each company.

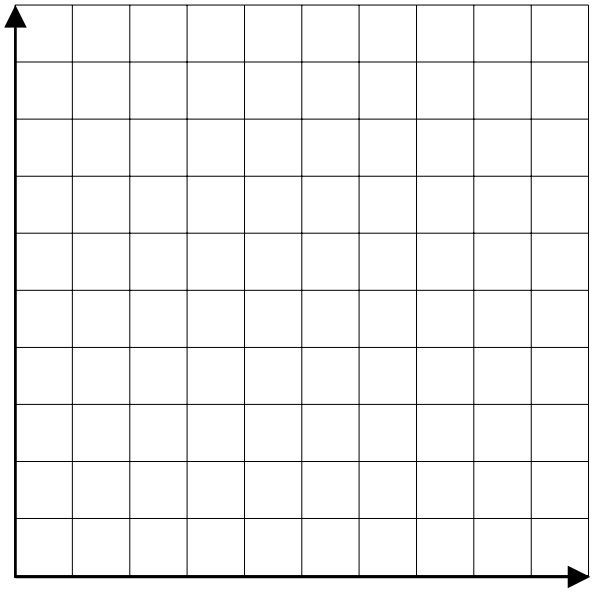
EZ Ride

Distance (km)	Cost ($)
0	
1	
2	
3	
4	
5	
6	
7	
8	

Comfycab

Distance (km)	Cost ($)
0	
1	
2	
3	
4	
5	
6	
7	
8	

(b) Display the data on the grid below. Label carefully and use a different colour for each company.



(c) Which company would you recommend to a friend if they needed to travel a distance of 7 km? Justify your answer.

(B) A construction company is investigating the cost f renting a cement mixer. They find that Company A charges a fixed amount of $50 plus $10/day. Company B charges a fixed amount of $40 plus $12/day.
(a) Complete the table of values for each company.

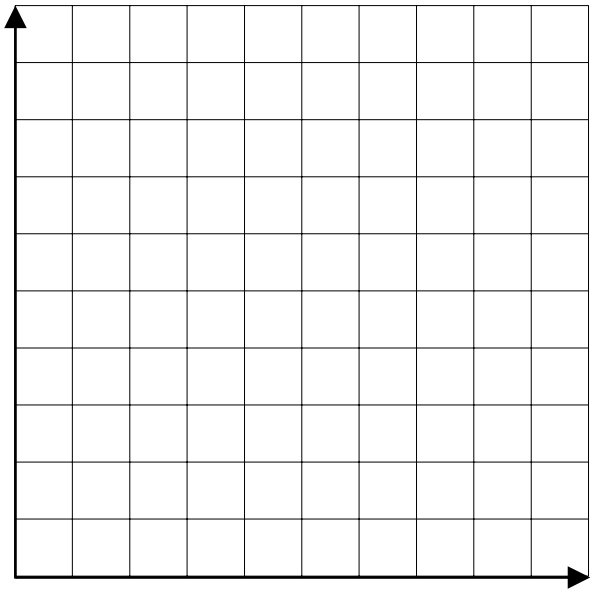
Company A

Days	Cost ($)
0	
1	
2	
3	
4	
5	
6	
7	
8	

Company B

Days	Cost ($)
0	
1	
2	
3	
4	
5	
6	
7	
8	

(b) Display the data on the grid below. Label carefully and use a different colour for each company.



(c) After how many days would the cost of renting the cement mixer be the same?

(d) What is the cost when it is the same for both companies?

(e) What is the difference in cost if the mixer is rented for 8 days?

(C) A manufacturer of hockey sticks uses a sanding machine to for the blade of each stick. The daily cost, $C, of operating this machine per day is represented by C=6n+1000, where n is the number of hockey sticks sanded. A new machine would allow the company to manufacture sticks according to the equation C=4.5n+1600.

(a) Complete the table of values for each company.

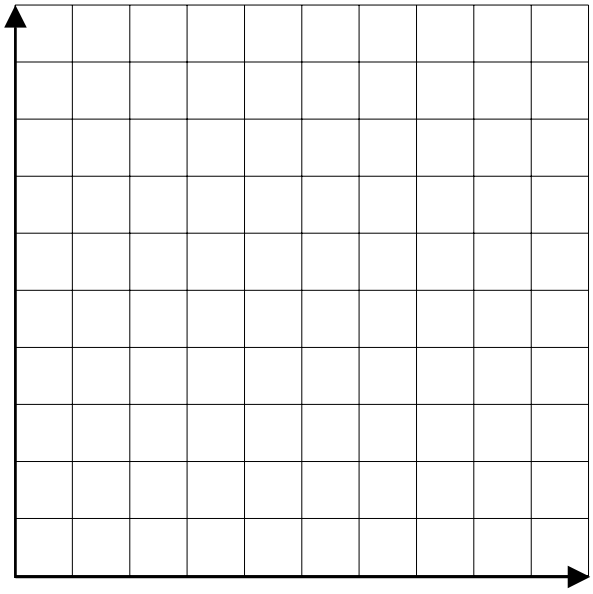
C=6n+1000

Number of Sticks	Cost ($)
0	
100	
200	
300	
400	
500	
600	

C=4.5n+1600

Number of Sticks	Cost ($)
0	
100	
200	
300	
400	
500	
600	

(b) Display the data on the grid below. Label carefully and use a different colour for each.



(c) What does the point of intersection represent?

(d) For what number of sticks produced per day would it be economical to use the new machine?

(e) What is the difference in cost if the company produces 300 sticks a day? 1000 sticks a day?

A law office plans to do some landscaping around their building. They have two estimates:

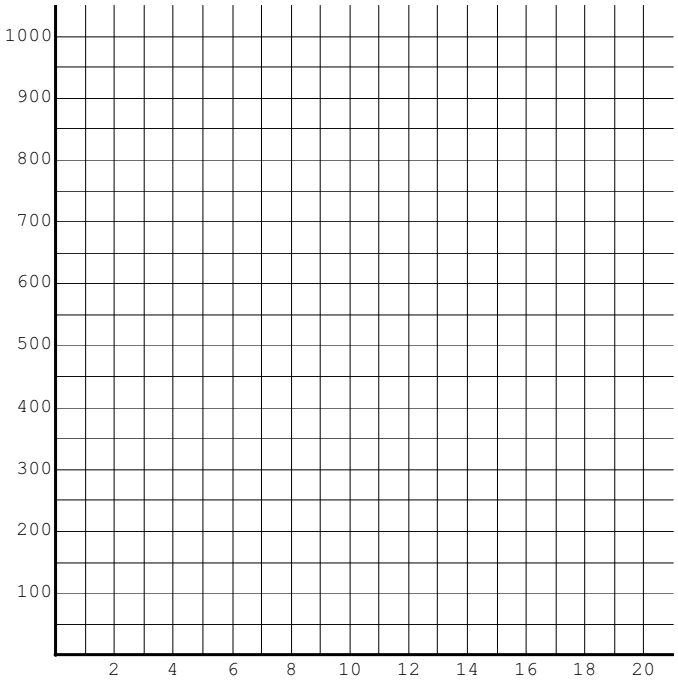
Company A: $240 for a full landscape plan plus $30 per hour to do the work
Company B: $60 per hour to do the work (which includes the landscape plan)

1. Complete the tables of values for each company.

Company A	
Time (h)	**Cost ($)**
0	
2	
4	
6	
8	
10	
12	
14	
16	
18	
20	

Company B	
Time (h)	**Cost ($)**
0	
2	
4	
6	
8	
10	
12	
14	
16	
18	
20	

2. Display this data on the grid below.
   Label carefully and use a different colour for each company.



3. Make a recommendation on which company you would choose. Be sure to outline under which conditions you would recommend each company.