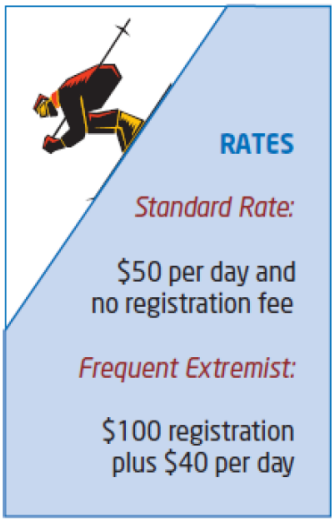
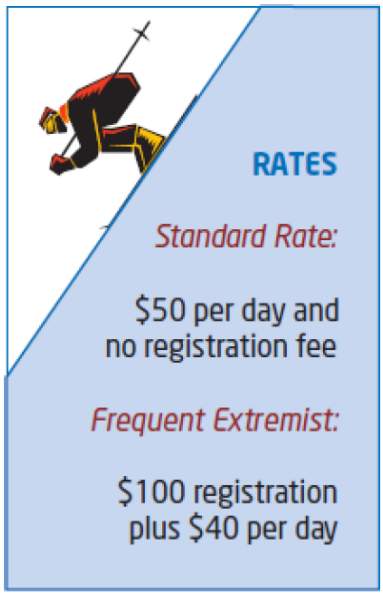
This add shows the cost of two different seasons pass options at a local ski hill.



Write an equation that relates the **total cost**, C, in dollars, and the **number of days**, n, that a person goes skiing for each of the rates.



Standard Rate

$C = 50n$

Rate of change

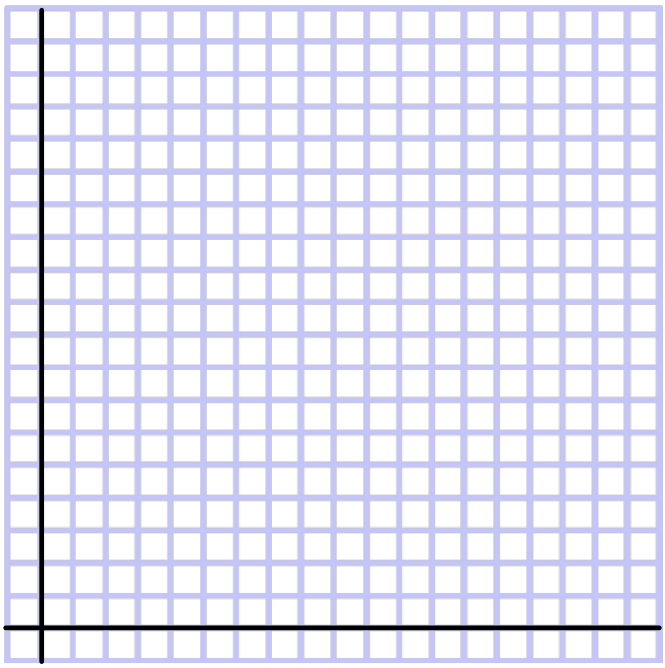
Frequent Extremist

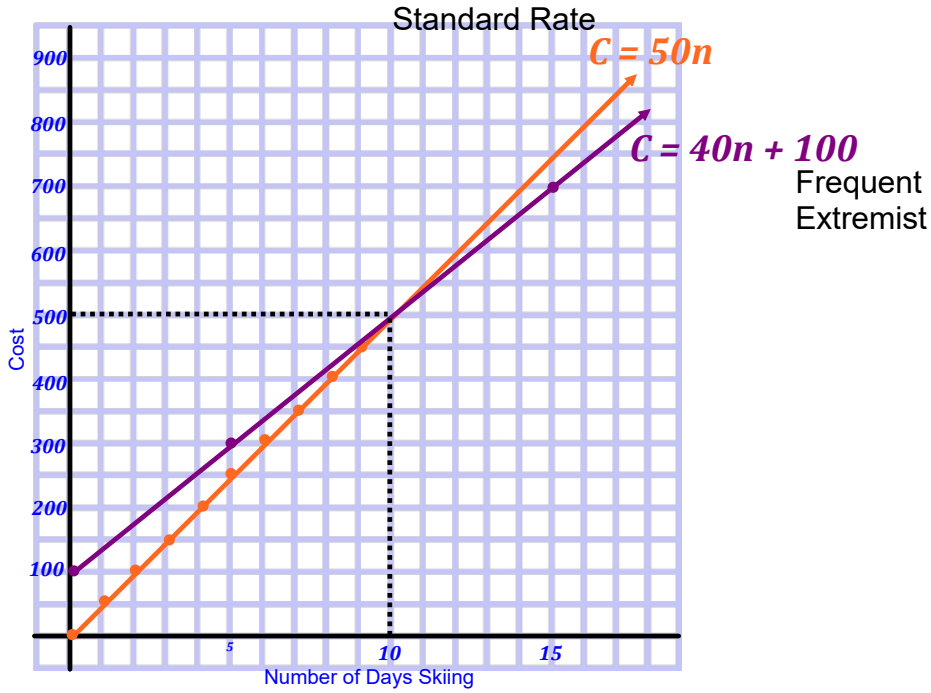
$C = 100 + 40n$

Initial value

where C = Cost ($) and n = number of days skiing.

Graph both relations on the same grid.
Use two different colours, one for each line.
Make sure to label each equation.





10 days of skiing would cost $500 using either of the rates.

MTH1W Grade 9 Mathematics

3.6 Solving Problems with Linear Relations

Goal(s) ***- To write an equation to represent a linear relationship and solve the equation to determine a piece of information.***

- Explain the meaning of the point of intersection of two linear relationships.

- Solve real-world problems involving linear relationships

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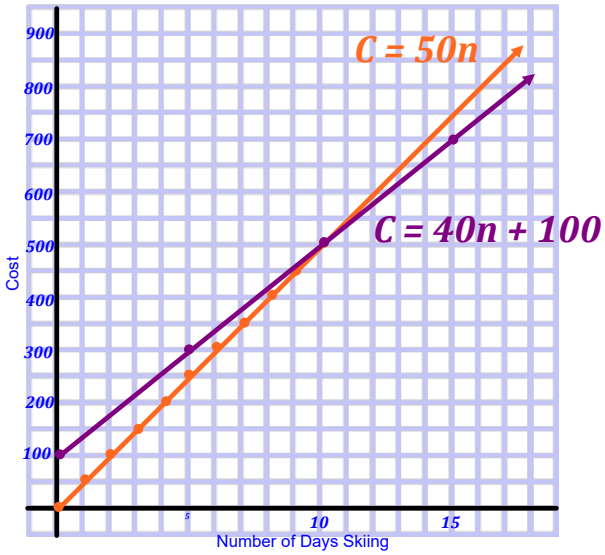
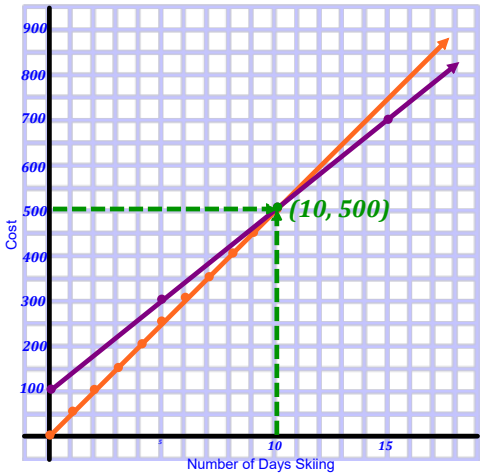
A **linear system** is created when two or more linear equations are considered at the same time.



The point of intersection represents the **solution** to the system.
It is a set of ordered pairs that make all equations in the system true.



Solution: ***(10, 500)***

$C = 50n$

$RS = C$ $LS = 50n$

$500 = 50(10)$

$500 = 500$ ✓

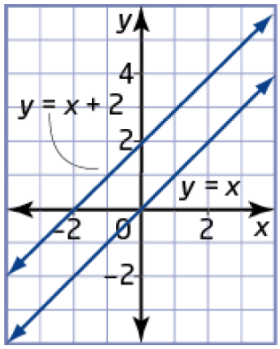
$C = 40n + 100$

$RS = C$ $LS = 40n + 100$

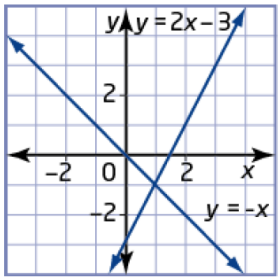
$500 = 40(10) + 100$

$500 = 400 + 100$

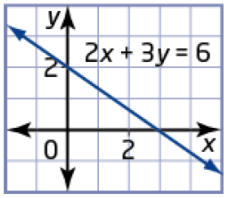
$500 = 500$ ✓

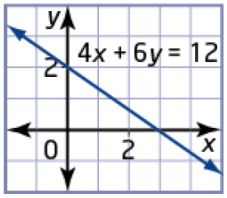


A linear system with ***two parallel*** lines will have ***no solution***.



A linear system with ***two non-parallel lines*** will have **one solution**.

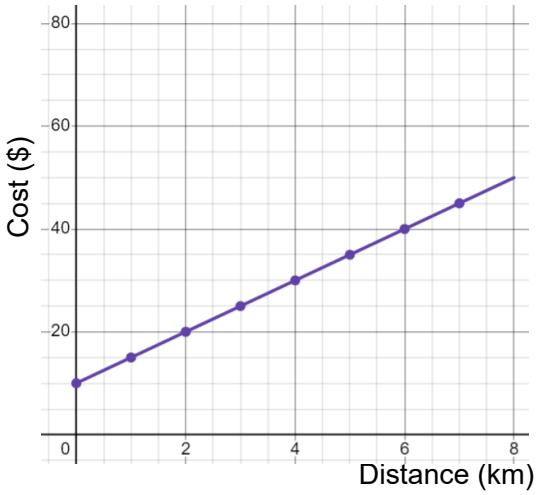




A linear system with ***two identical lines*** will have an **infinite number of solutions**.

The graph below shows the cost of renting a moving truck from **Strong Movers**. The initial cost of their competitors, **Pack-n-Haul**, is $10 ***more***, but they ***charge half as much per kilometre***.

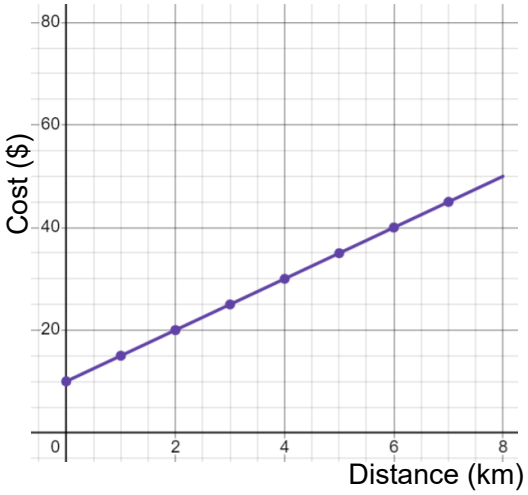
a) How would the graph of **Pack-n-Haul** compare to the graph for **Strong Movers**?
b) Write an **equation** to represent the cost (C) of renting from Pack-n-Haul for d kilometres.
c) Determine by graphing, when the cost to rent a moving truck is the same for both companies.
d) If your move is $47\ km$ away, which company should you call?



The graph below shows the cost of renting a moving truck from **Strong Movers**. The initial cost of their competitors, **Pack-n-Haul**, is $10 ***more***, but they ***charge half as much per kilometre***.

a) How would the graph of **Pack-n-Haul** compare to the graph for **Strong Movers**?

Graph will start at $20, but the rate of change (steepness) will be half as much.



The graph below shows the cost of renting a moving truck from **Strong Movers**. The initial cost of their competitors, **Pack-n-Haul**, is ***$10*** ***more***, but they ***charge half as much per kilometre***.

b) Write an **equation** to represent the cost (C) of renting from Pack-n-Haul for d kilometres.

Strong Movers

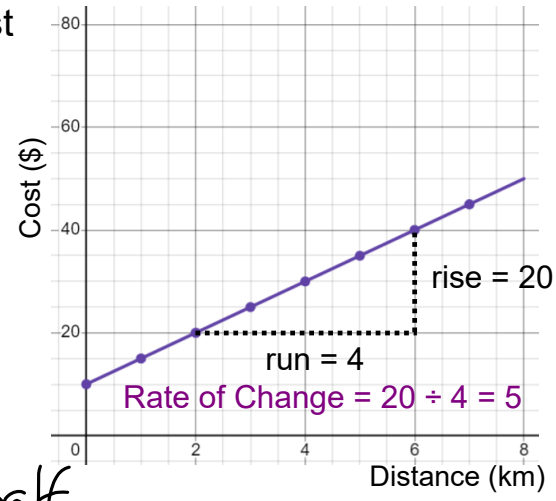
→ C = 10 + 5d

Pack-n-Haul

→ C = 20 + 2.5d

$10 more initially

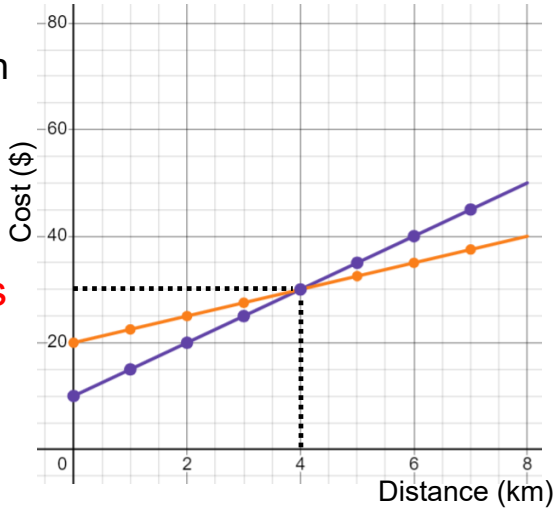
rate is half as much



The graph below shows the cost of renting a moving truck from **Strong Movers**. The initial cost of their competitors, **Pack-n-Haul**, is ***$10*** ***more***, but they ***charge half as much per kilometre***.

c) Determine by graphing, when the cost to rent a moving truck is the same for both companies.

It looks like that when d = 4 the prices will be the same ($30). This is where the graphs intersect.



The graph below shows the cost of renting a moving truck from **Strong Movers**. The initial cost of their competitors, **Pack-n-Haul**, is $10 ***more***, but they ***charge half as much per kilometre***.

d) If your move is $47\ km$ away, which company should you call?

We can see that once you are moving more than 4km away that Pack-n-Haul will be cheaper than Strong Movers.