

World 5-1 Three Ways to Solve a System of Equations

1) Fred & Barney are running to Bedrock. Fred moves 2 km/h and starts 18 km away from his destination. Barney moves 6 km/h and starts 30 km from his destination.

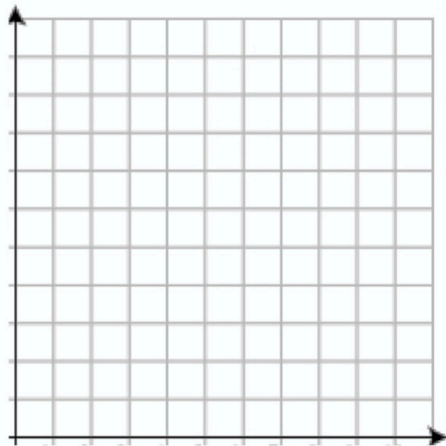
- a) Define the variables and set up the equations for this system
- b) Complete a table of values
- c) Complete a graph of the situation
- d) Determine the solution Algebraically, by comparison.



- a) Define variables and set-up equations
- b) Table of Values

d) Algebraic Comparison

c) Graph



e) When are Fred and Barney at exactly the same distance from Bedrock? How far away are they?

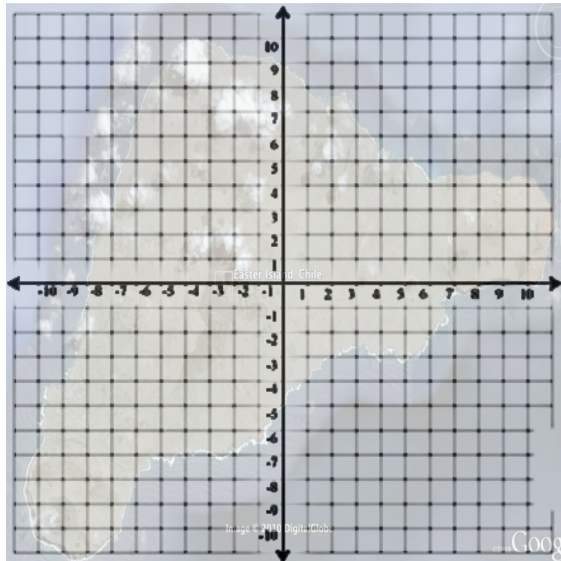
2) Ancients buried treasure on **Easter Island** where the paths of two Maoi statues crossed. Statue 1's path starts at coordinate (0, 8) and has a slope of -1. Statue 2's path starts at coordinate (-2, -10) and has a slope of 4

- Define the variables and set-up equations
- Graph the situation
- Complete the table of values
- Determine the solution Algebraically, by comparison. ie Where is the ancient buried treasure?



a)

b) Graph



c) Table of Values

| x | y Statue 1 | y Statue 2 |
|----|------------|------------|
| -2 | | |
| -1 | | |
| 0 | | |
| 1 | | |
| 2 | | |
| 3 | | |

d) Algebraic Comparison

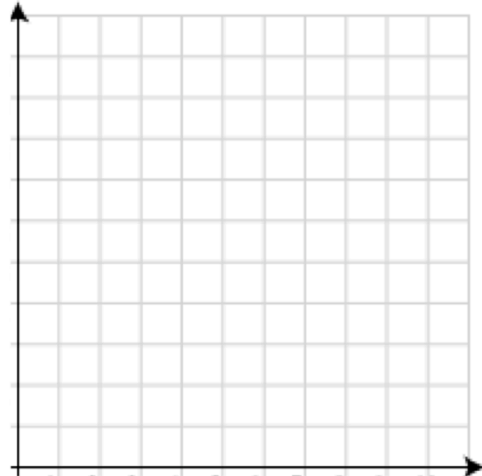
3) *Pepé le Pew* is chasing "*kitty*" around town. *Pepé* runs at 8 km/hr and starts 36 km from his home. "*Kitty*" starts 20 km from home and runs at 4 km/hr.

At what time are they both the same distance from home?

- a) Using a table of values
- b) graphing
- c) Using algebraic comparison

Table of Values

| Time (hr) | Distance from Home (km) | |
|-----------|-------------------------|--------------|
| | <i>Pepé</i> | <i>Kitty</i> |
| 0 | | |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |



World 5-2 Solving System of Equations Word Problems

For each of the following problems

- (a) Define your variables
- (b) Setup the two equations.
- (c) Solve the system by letting $y_1=y_2$

(1) Two companies offer jobs as Santa in a local mall. *We Love Christmas Co* pays \$25 a day plus \$3 per photo taken. *Milk and Cookies Co* pays \$20 plus \$4 per photo taken. After how many photos do the two companies pay the same amount?

(2) A giant tank of eggnog is leaking! The tank contains 6500 L of eggnog and empties at a rate of 95 L/min. Workers find a giant wheelbarrow to hold the leaking liquid. If the wheelbarrow already contains 80 L of eggnog, when will the wheelbarrow contain the same amount of liquid as the tank?

(3) Cellphone Plan A costs \$25 a month and \$0.30/min long distance. Cellphone Plan B costs \$50 a month and \$0.05/min long distance. After how many long distance minutes will it take for the cellphone plans to cost the same amount?

(4) Chuck Norris charges \$1200 to make a personal appearance at the Rideau Centre, plus an additional \$10 per autograph. Jean Claude Van Damme only charges \$900, but he demands \$15 per autograph. After how many autographs do they cost the same amount?

(5) Andy and Michelle each recorded a CD. Andy recorded at *Studio One*. It cost him \$500 for the recording session and \$2.75 for each CD produced. Michelle chose *Studio Plus*, where the cost was only \$300 for the recording session, but \$5.25 for each CD produced. They each recorded the same number of CDs and their final production costs were the same. How much money did each of them spend?

(6) Carmen and Paulo are engaged to be married. They contacted two companies to cater their engagement party. The *Banquet Plus Company* told them it charged \$300 for the rental of the dishes, tables and chairs and \$10 a person for food. The *Master Food Catering Company* told them it charged \$15 a person which included food and all rental charges.

(7) Peter and Allan decided to meet in Quebec City. Peter drives the 385-km distance to Quebec City at a constant speed of 110 km/h. Allan, 420 km away from Quebec, drives at a constant speed of 105 km/h. Both start at the same time. When the first of the two arrives in Quebec, how many kilometres does the other driver still have to cover to reach Quebec?

(8) Bill received an offer to work as a salesman at two competing department stores. Company A offered to pay him a salary of \$250 per week plus a commission of 6% on his total weekly sales. Company B offered to pay him a salary of \$350 per week plus a commission of 2% of his total weekly sales. Under what conditions would he earn more money working for Company A than working for Company B?

World 5-3 Exam Type Systems Questions

1) Leah is planning a trip to Winnipeg, Manitoba. In order to find the best price for her trip, she researches different options offered online. The following is the information that she found:

Option 1: Travel Time
Transportation (round trip): \$250

Hotel:

| Number of nights | Total cost of hotel |
|------------------|---------------------|
| 2 | 250 |
| 4 | 500 |
| 6 | 750 |

Option 2: Dream Tours
Transportation (round trip): \$150

Hotel: membership fee of \$25 and \$150 per night

Leah is not sure how many days he will be staying in Winnipeg
When do both companies cost the same amount?

2) "Chuck Norris has counted to infinity. Twice."

The crime rate always drops whenever Chuck Norris visits the province. The police recorded the number of calls to 911 in Gatineau and Montreal when Chuck was in the province of Quebec. The 911-calls in each town are represented by the following equations:

Gatineau: $y = 450 - 10x$

Montreal: $y = 600 - 15x$

Where x is the number of days since Chuck arrived and y is the number of 911 calls that day

- How many calls were made on the fifth day in Gatineau?
- On what day did Montreal and Gatineau receive the same number of 911 calls?
- How many calls did Gatineau receive on the day that Montreal hit zero calls?

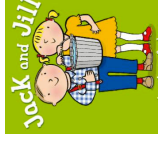


3) Jennifer and Chris were talking about jet skiing this summer.

Jennifer likes to go to Club Plain Air. The Club charges a certain amount per hour to jet ski and a fixed amount for equipment rental. Three hours costs \$61. Five hours of wakeboarding costs \$85.

Chris will use Hawksburg Jet Ski as his rental company. The cost of jet skiing at Hawksburg Jet Ski is \$67 per hour plus \$6 to rent the equipment per hour

After how many hours of wakeboarding would it cost the same at both wakeboarding facilities and what would that cost be?

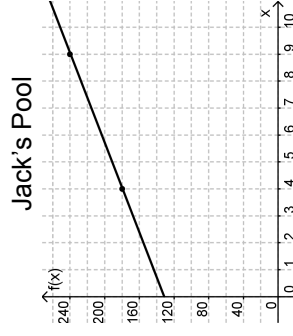


4) "Jack and Jill filled up their pools with many pails of water..."

Jack and Jill decide to fill their pools at the same time. Jack's pool already contains some water but Jill's pool is empty initially.

The volume of water in either pool can be represented by function f where x represents the time elapsed (in minutes) and $f(x)$ represents the volume of water in the pool (litres).

At the moment when both pools contain the same amount of water, **how much water has Jack added to his pool?**



Jill's Pool

| x | f(x) |
|----|------|
| 2 | 32 |
| 5 | 80 |
| 9 | 144 |
| 11 | 176 |

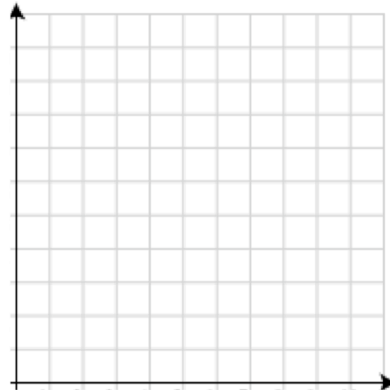
World 5-4 Rational Function

1) Our class decides to go on a field trip to _____. The bus we rent happens to be a city bus, which costs at total of \$240 for the weekend.

Complete the **table of values** and **graph** the relationship between x: the # of people going and y: the cost per person (\$).

Cost of the bus trip per person

| | |
|----|--|
| | |
| 1 | |
| 2 | |
| 4 | |
| 8 | |
| 12 | |
| 16 | |
| 20 | |
| 24 | |

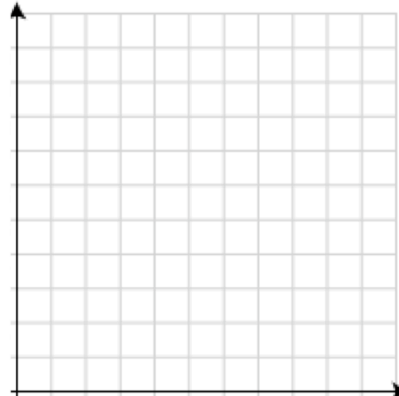


2) An interior designer at IKEA wants to build a dinner table for a large family. From experience she knows that a desk with 40 ft² of surface area is the most popular.

Complete the **table of values** and **graph** the relationship between x: the length (ft) and y: the width (ft).

Length and Width of IKEA Table

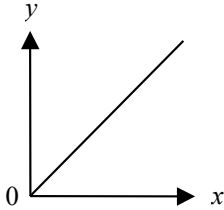
| | |
|----|--|
| | |
| 1 | |
| 2 | |
| 4 | |
| 8 | |
| 10 | |
| 20 | |
| 40 | |



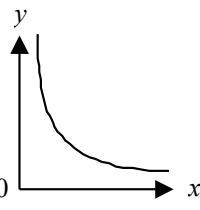
Summary: Rational Function

3) Circle the graph or table that describes a rational function

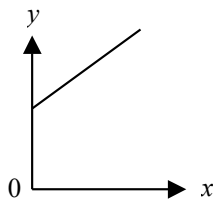
a)



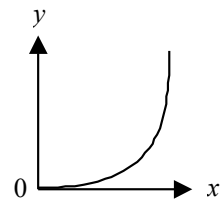
b)



c)



d)



e)

| x | y |
|----|----|
| 3 | 20 |
| 6 | 10 |
| 12 | 5 |

f)

| x | y |
|---|----|
| 0 | 5 |
| 4 | 10 |
| 8 | 15 |

g)

| x | y |
|------|------|
| 0.01 | 100 |
| 1 | 1 |
| 100 | 0.01 |

h)

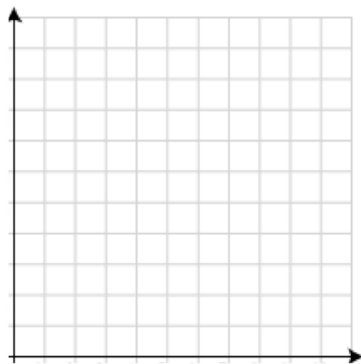
| x | y |
|---|----|
| 2 | 4 |
| 3 | 8 |
| 4 | 12 |

4) Identify which of the follow situations can be modelled by a rational function by writing Y or N beside the statement

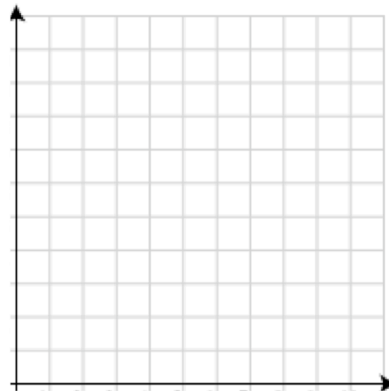
- a) The cost of pizza is \$20. How much each person pays will depend on the number of people who are at the party
- b) Tammy's phone bill each month is based on an initial fee plus 5 cents per minute she talks on the phone
- c) All the pieces of a birthday cake need to be cut. The size of a piece depends on the number of people present

5) For both situations complete the graph and table

a) Students are raising money to travel to Europe by selling popcorn at lunch. \$720 was raised. This money will be divided up evenly amongst people going on the trip. Consider the situation if up to 10 students travel.



b) A car destroyed a popsicle stand. To fix it, a certain number of workers will be needed. It takes 12 hours for 1 person, 6 hours for 2 people.



| | | | | | | | | | | | |
|------------------|---|---|---|---|----|--------------|----|---|---|---|---|
| # of Students | 1 | 2 | 3 | 5 | 10 | # of People | 1 | 2 | 3 | 4 | 6 |
| \$ each Receives | | | | | | Time (hours) | 12 | 6 | | | |