Lesson 3: M.A.R.S.Math Tasks
Lesson Plan Answer Key

Task 1: Measuring the Fuel Cost

Example 1 - Part 1: Amount of Fuel Used

Fuel Cost = Distance × Fuel Cost Rate **OR** **F = D × C**

- For the first leg of your flight, the distance (D) between site *p* and site *a* is 362 kilometers.
- The fuel cost rate (C) is .02 kilograms per kilometer (kg/km).
- Calculate the fuel cost (F) of flying from site p to site a using the formula:

  F = D × C Be sure to show your work!

  F = 362 km × .02 kg/km

  F = **7.24 kg/km**

Example 1 - Part 2: Percentage of Initial Fuel

- Now that you know the fuel cost (F) of flying from site p to site *a*, you need to calculate what percentage of your total fuel was used.
- To calculate what percentage of the fuel tank has been used with this leg of the flight, you will use the following equation:

  Percentage of Fuel Tank = $\frac{F\ kg}{20\ Kg} * 100\%$

  $\frac{\_\_\_\_\ kg}{20\ Kg} * 100\% \quad = \quad \_\_\_\_\_\ \%$

- What percentage of your fuel tank did you use?

  $\frac{7.24\ kg}{20\ Kg} * 100\% \quad = \mathbf{36.2\ \%}$

Example 2

- For the next leg of your flight, the distance (D) will be 347 km. The fuel cost rate (C) will be .02 kg.
- Calculate the fuel cost for the next leg of your flight using the equation:
  F = D × C

Now calculate what percentage of your total fuel would be used with this equation:

Percentage of Fuel Tank = $\frac{F\ kg}{20\ Kg} * 100\%$

- What percentage of your fuel tank did you use?
  34.7 %

Task 2: Deciding Which Site to Visit

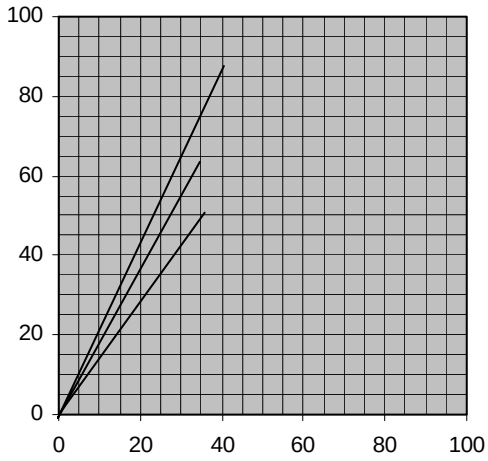
Example 1

Data set : Coordinates of site *a* : (36%, 51%)

Coordinates of site *b* : (35%, 62%)

Coordinates of site *c* : (41%, 82%)

Decision-making Graph



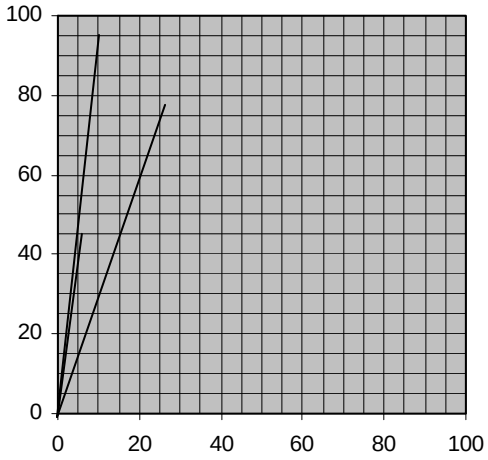
Example 2

Data set : Coordinates of site *a* : (6%, 45%)

Coordinates of site *b* : (26%, 77%)

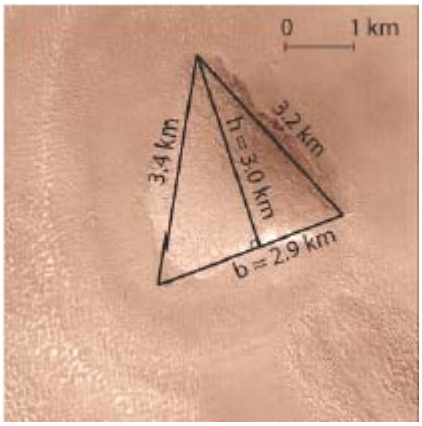
Coordinates of site *c* : (8%, 95%)

Decision-making Graph



Task 3: Calculating the Area of the Site

Example 1



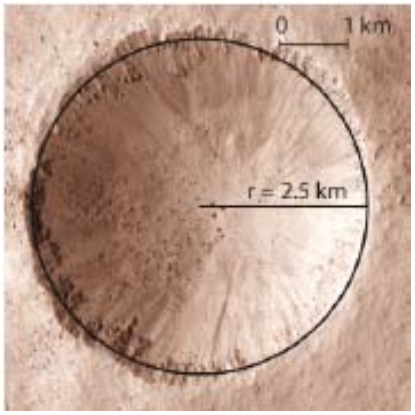
The formula needed is that of the triangle.

$$\text{Area of a triangle} = \frac{B \times H}{2}$$

The base is 2.9 km and the height is 3.0 km. The area is:

$$\frac{2.9\ km * 3.0\ km}{2} = \mathbf{4.35\ km^2}$$

Example 2



The formula needed is that of the circle:

Area of a circle = $\pi \times r^2$ ($\pi = 3.14$)

The radius is 2.5 km. The area is:

$3.14 \times 2.5\ km \times 2.5\ km = \mathbf{19.6\ km^2}$

You are almost done!

Task 4: Calculating the Amount of Mineral

Example 1

Site area = 4.35 km^2

Site mineral density = 50 kg/km^2

Mineral quantity = density (kg/km^2) * site area (km^2)

- The mineral density of hematite contained at the site is 50 kg/km^2.
- Use the formula to calculate the mineral quantity for this site.

Mineral quantity = 50 kg/km^2 * 4.35 (km^2)

Mineral quantity = **217.5 kg**

Example 2

Site area = 19.625 km2

Site mineral density = 75 kg/km^2

- Find the mineral quantity for this site using the mineral quantity formula.

Mineral quantity = density (kg/km^2) * site area (km^2)

Mineral quantity = 75 kg/km^2 * 19.625 km^2

Mineral quantity = **1471.8 kg**

Congratulations! You did it!