Boat across the River

Grade 11 Mathematics Project

Term 2   (2011/12)

Date due:

| GRADE :	11
SECTION:	ES
Students' Name:	

Boat across the River

Task 1:

Students will search the web to find real life examples on working with vectors, e.g. adding forces, projectile, components, vectors in 3D, etc...

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Task 2:

If the boat is heading due north as it crosses a river with velocity of 10 km/h relative to water, the river has a uniform velocity of 5 km/h due to east. Graph the vectors in the chart below. Then determine the magnitude and direction of the boat's velocity.
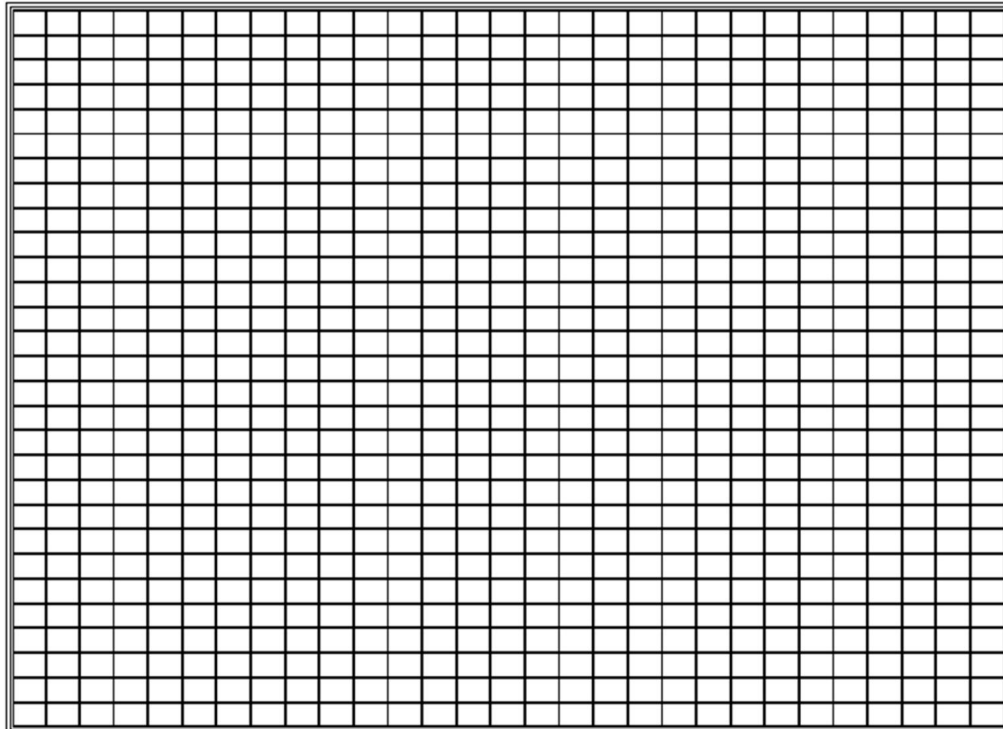
Task 2: Two horses are pulling the boat along a canal, one horse exerts a force of 300 N at an angle20°, and the other exerts 500 N at angle 30°.
Find the magnitude of the resultant force.

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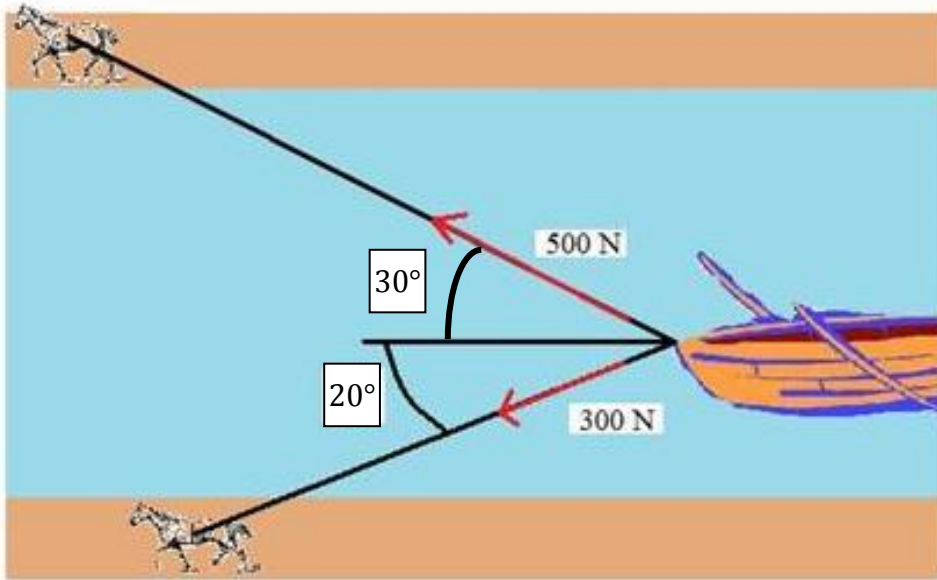
Task 3:.

The boat is part of delivering company, it can hold 1200 kg and its capacity is 7.20 cubic meter. The service handles two types of boxes: small, which weight is up to 20 kg and no more than $1200cm^3$, and large which 25 kg each and 1600 cm^3 each.
The delivery service charges 10Dhs for each small package, and 15 for each large package.

    a.   Write an inequality to represent the weight of the packages in kg the boat can hold.

    b.   Write an inequality to represent the volume in cubic meter of packages the boat can hold.

    c.   Graph the system of inequality
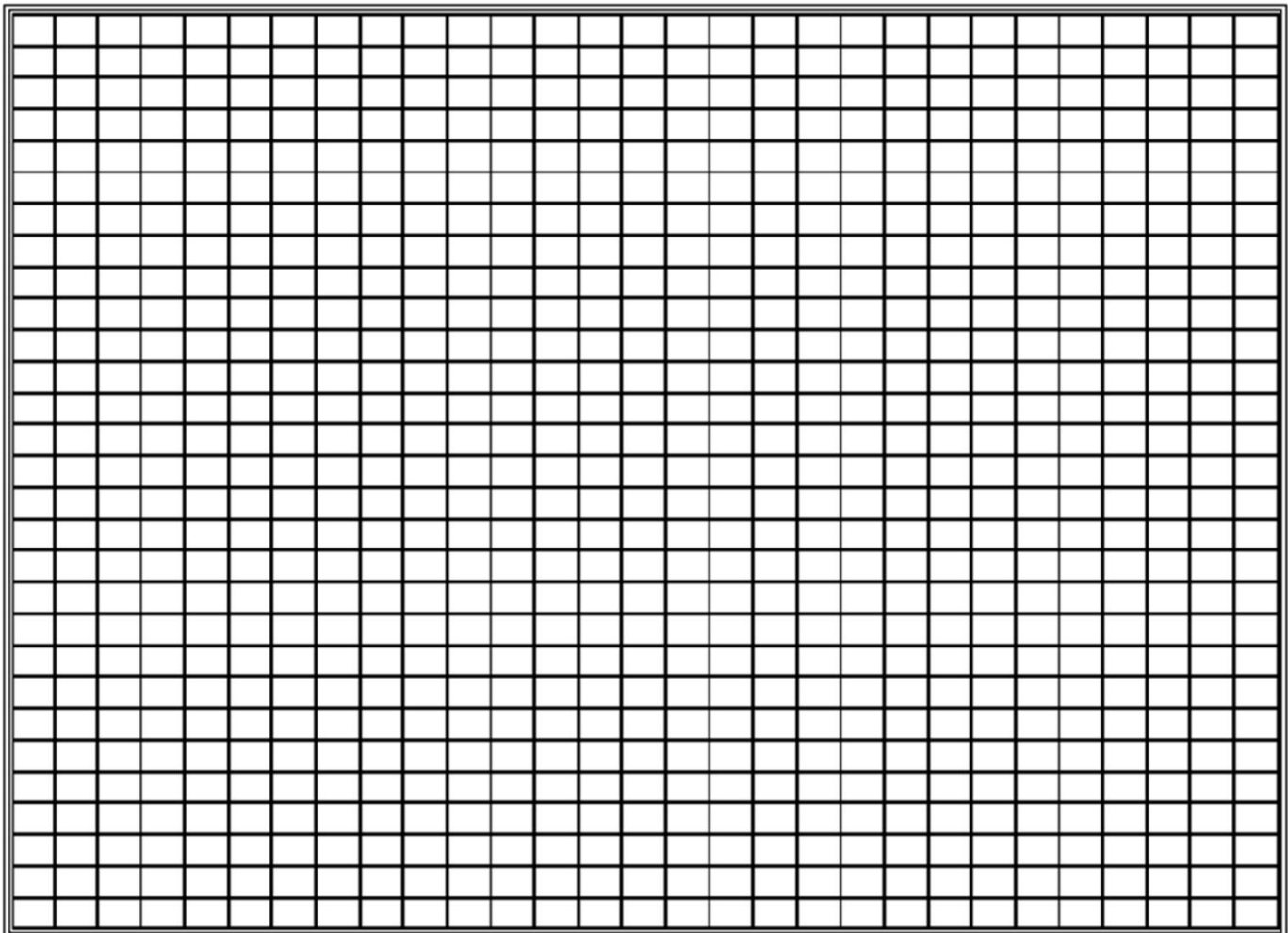
d.   Write a function that represents the amount of money the delivery service will make on each boat hold.

e.   Find the number of each type of the boxes that should be placed on a boat to maximize revenue.

f.   What is the maximum revenue per boat?

Task 4

Suppose that the force acting on the boat can be expressed by vector ⟨45,24,110⟩ where each measure in the ordered triple represents the force in Newton. What is the magnitude of the force?

Task 5

Workers are using a force of 200 Newton to push a cart up a ramp. The ramp is 6 feet long and is at 30° angle with the horizontal. How much work are the workers doing in the vertical direction?

You may use sine ratio and formula $W = \vec{F}.\vec{d}$

Task 6: Prepare a power point that represent your findings, and post it on your wiki.

Share it with the class.

	4	**3**	**2**	**1**	
Completeness of Tasks **20%**	Tasks are totally completed and correct. (100%)	Tasks are partially completed, **OR** Partially wrong.(75%)	Tasks are partially completed, **AND** Partially wrong (50%).	Tasks are Attempted (25% or less)	____
Presentation and Integration of Technology **70%**	Students used one mean of technology. The tool used helped the student and was useful to support his project. Moreover, the student was able to explain the work he/she submitted confidently and fluently; he/she was **able to answer all** of colleagues and instructor's questions	Student used a mean of technology but it was not that supportive to the topic. In addition, student was able to explain the work he/she submitted confidently and fluently and he/she reflected an understanding of his/her works. The student was **able to answer most** of colleagues and instructor's questions.	Student was able to explain the work he/she submitted. Student reflected a shallow understanding of his/her work; she was **able to answer some** of colleagues and instructor's questions,	Student use of technology was primitive and way below the level of other IAT students. Student was unable to explain the work he/she submitted. Student reflected no understanding of his/her work; he/she was **unable to answer any** of colleagues and instructor's questions.	____
Creativity& enrichment **10%**	Student had an outstanding addition in **all aspects** of his/her project.	Student had an outstanding addition in **some aspects** of his/her project.	Student had an outstanding addition in **very few aspects** of his/her project.	Student had an outstanding addition in **no aspects** of his/her project.	____
This rubric is out of 100, percentage orientation. **To make the mark out of 30 (Student's Mark/10*3)**				**Total ---->**	____