HW Questions...

gas depends on oil

8. A refinery produces oil and gas.

- At least 2 L of gasoline is produced for each litre of heating oil.
- The refinery can produce up to 9 million litres of heating oil and 6 million litres of gasoline each day.
- Gasoline is projected to sell for $1.10 per litre. Heating oil is projected to sell for $1.75 per litre.

The company needs to determine the daily combination of gas and heating oil that must be produced to maximize revenue. Create a model to determine this combination. What would the revenue be?

Optimization Model

Let g represent the number of litres of gasoline. (y)
Let h represent the number of litres of heating oil. (x)
Let R represent the total revenue from sales.

Restrictions:
$g \in \mathrm{R}, h \in \mathrm{R}$

Constraints:
$g \geq 0$
$h \geq 0$] Q1
$g \geq 2h$ *
$g \leq 6\,000\,000$
$h \leq 9\,000\,000$

Objective function to maximize:
$R = 1.10g + 1.75h$

$g \geq 2h$] Graph Variables

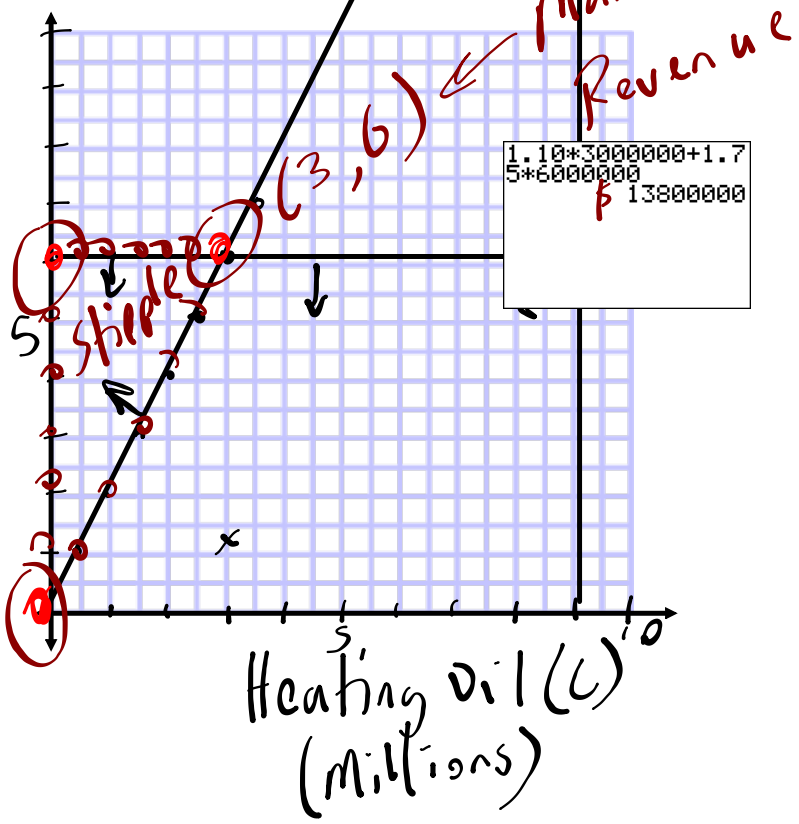
sub

$y = 2x$ h g

Test (3, 1)

$g \geq 2h$

LS	RS (L) (millions)
1	2(3)
	6
	No



7. The following model represents an optimization problem. Determine the maximum solution.

Optimization Model

Restrictions:

$m \in R, s \in R$

Constraints:

$m \geq 0$

$s \geq 0$

$3m + 4s \leq 24$

$m + s \geq 4$

Objective function:

$T = 1.5m + 4.2s$

$3x + 4y = 24$

$\frac{4y}{4} = \frac{-3x}{4} + \frac{24}{4}$

$y = -\frac{3}{4}x + 6$

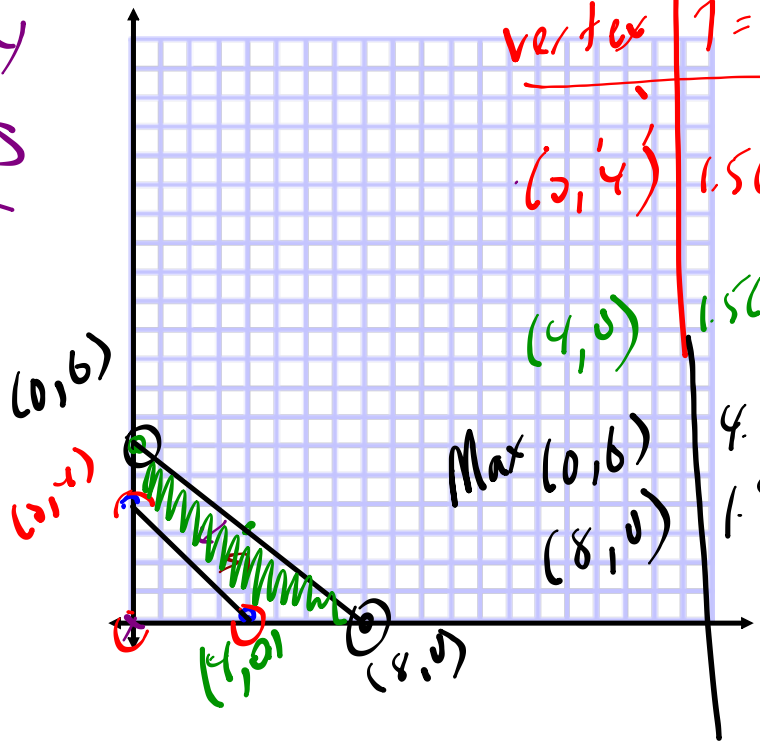
$x + y = 4$

$y = -x + 4$

$3x + 4y \leq 24$

LS	RS
0	24

Yes



vertex	$T = 1.5x + 4.2y$
(0, 4)	$1.5(0) + 4.2(4) = 16.8$
(4, 0)	$1.5(4) + 4.2(0) = 6$
	$4.2(6) = 25.2$
Max (0,6)	$1.5(8) = 12$
(8, 0)	