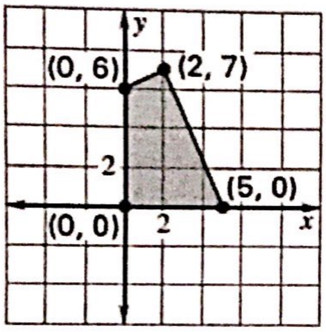
Honors Pre-Calculus
CW: 7.5

Name____________________
Date____________ **Period**_____

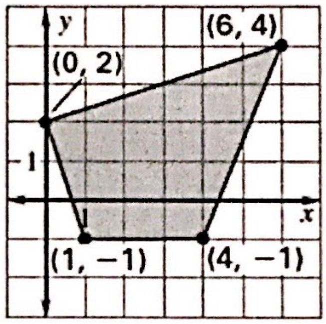
The feasible region determined by a system of constraints is given. Find the minimum and maximum values of the objective function for the given feasible region.

1.) $C = x - y$



$(0,6) = -6$
$(2,7) = -5$
$(5,0) = 5$
$(0,0) = 0$
Max = 5 at $(5,0)$
Min = -6 at $(0,6)$

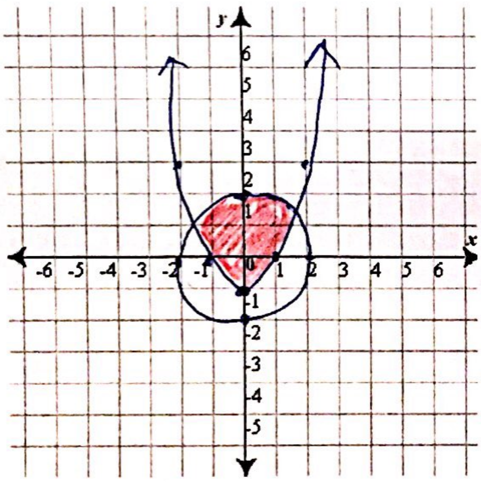
2.) $C = x + 5y$



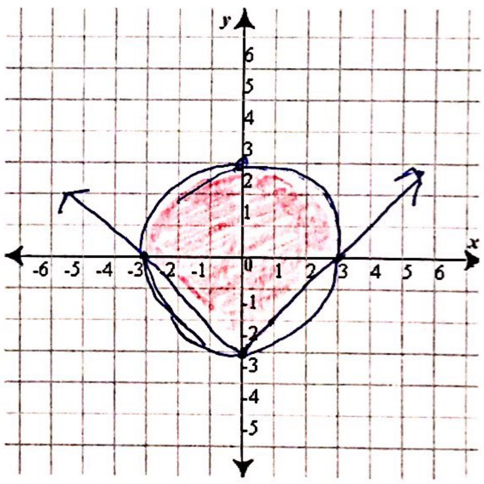
$(0,2) = 10$
$(6,4) = 26$
$(1,-1) = -4$
$(4,-1) = -1$
Max 26 @ $(6,4)$
Min -4 @ $(1,-1)$

Solve the system.

3.) $y \geq x^2 - 1$
$x^2 + y^2 \leq 4$



4.) $y \geq |x| - 3$
$x^2 + y^2 \leq 9$



5.) Given the following constraints and cost function, use your calculator to find the max and min values.

$C = 10x + 5y$

$4x + y \geq 180$
$x + y \geq 90$
$10x + 5y \leq 800$
$x \geq 0; y \geq 0$

$y \geq -4x + 180$
$y \geq -x + 90$
$y \leq -2x + 160$

$(30,60) = 600$
$(70,20) = 800$
$(10,140) = 800$

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.) A toy manufacturer wants to minimize her cost for producing two lines of toy airplanes. Because of the supply of materials, no more than 40 Flying Bats can be built each day, and no more than 60 Flying Falcons can be built each day. There are enough workers to build at least 70 toy airplanes each day. It costs $12 to manufacture a Flying Bat and $8 to build a Flying Falcon. What is the minimum possible cost each day?

FB = x

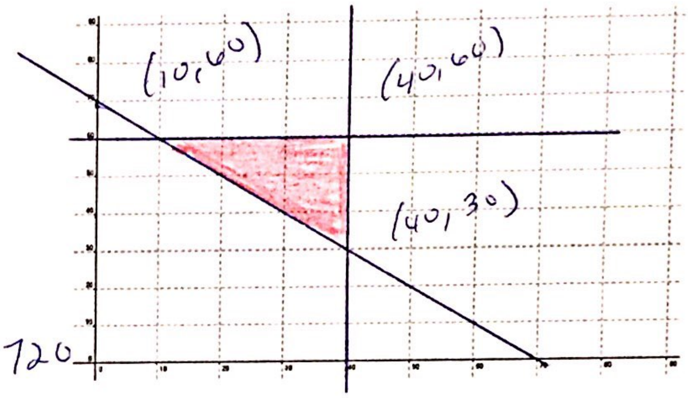
FF = y

$x \leq 40$

$y \leq 60$

$x + y \geq 70$

$12x + 8y = C$



(10,60) = 600   (40,60) = 960   (40,30) = 720

7.) Paul's diet is to contain at least 24 units of carbohydrates and 16 grams of protein. Food substance A costs $1.40 per unit and each unit contains 3 units of carbohydrates and 4 units of protein. Food substance B costs $0.90 per unit and each unit contains 2 units of carbohydrates and 1 unit of protein. How many units of each food substance should be purchased in order to minimize cost? What is the minimum cost?

x - ~~food~~ substance A

y - Food substance B

A	3	4
B	2	1

$C = 1.4x + .9y$

$3x + 2y \geq 24$

$4x + y \geq 16$

$x \geq 0 \quad y \geq 0$

(0,16) = 14.4

(8,0) = 11.2

(1.6, 9.6) = 10.88 Min ✓

8.) A manufacturer wants to maximize the profit for two products. Product A yields a profit of $2.25 per unit, and product B yields a profit of $2.00 per unit. Demand information requires that the total number of units produced be no more than 3000 units, and that the number of units of product B produced be greater than or equal to half the number of units of product A produced. How many of each unit should be produced to maximize profit?

x : A

y : B

$x + y \leq 3000$ $x \geq 0 \quad y \geq 0$

$y \geq \frac{1}{2}x$

$P = 2.25x + 2y$

(0,0) = 0

(0, 3000) = 6000

(2000, 1000) = 6500 ✓ MAX

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