

1.3E Worksheet

- 3) A company makes two types of candles: fancy and classic. Fancy candles use up 8 ounces of wax and ¹⁶~~10~~ ounces of glass and bring in a profit of \$12 per candle. Classic candles use ¹⁶~~10~~ ounces of wax and 4 ounces of glass and bring in a profit of \$5 per candle. The company only has 320 ounces of wax and 480 ounces of glass to work with. How many of fancy and classic candles should be made to maximize profits?

	$x = \# \text{ of}$ Fancy	$y = \# \text{ of}$ Classic	Total
Wax	8	4	320
Glass	16	4	480
Max Profit	12	5	

- a) Define the variables.

$x = \# \text{ of fancy candles}$

$y = \# \text{ of classic candles}$

- b) Write the constraints.

- 1) $x \geq 0$
- 2) $y \geq 0$
- 3) $8x + 4y \leq 320$
- 4) $16x + 4y \leq 480$

$$\begin{array}{r|l} x & y \\ \hline 0 & 80 \\ 40 & 0 \end{array} \quad \begin{array}{r|l} x & y \\ \hline 30 & 0 \\ 0 & 120 \end{array}$$

- c) Write the Objective Function.

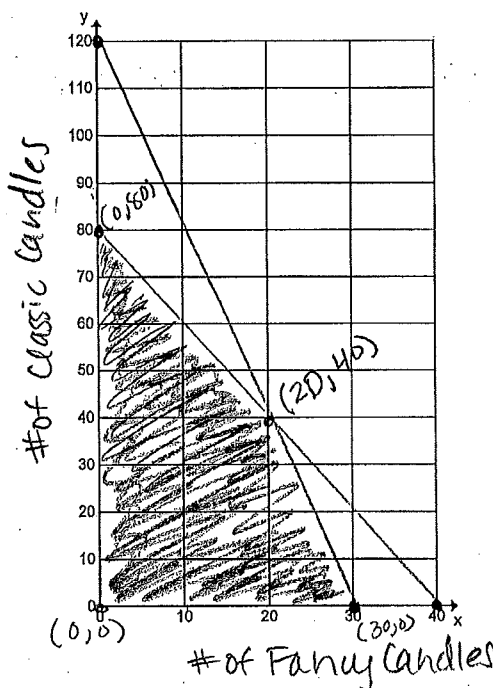
$P = 12x + 5y$

- d) Graph the constraints.

- e) List two possible solutions and explain in words what these solutions represent.

$(10, 20) \rightarrow 10 \text{ Fancy } \& 20 \text{ Classic}$

$(7, 51) \rightarrow 7 \text{ Fancy } \& 51 \text{ Classic}$



- f) List the vertices.

$(0,0)$ $(20,40)$
 $(30,0)$ $(0,80)$

- g) Make a table to find the number of fancy and classic candles that will maximize profit.

$(0,0)$	$P = 12(0) + 5(0)$ $P = 0$
$(30,0)$	$P = 12(30) + 5(0)$ $P = 360$
$(20,40)$	$P = 12(20) + 5(40)$ $P = 440$
$(0,80)$	$P = 12(0) + 5(80)$ $P = 400$

What is the maximum profit?

\$440

How many of each should they make?

20 fancy
40 classic

1.3 E Worksheet

- 4) A small company makes two types of car radios: the standard & the deluxe. Each standard requires 2 units of plastic to make and \$2 worth of electrical parts and brings in a profit of \$14 each. Each deluxe requires 1 unit of plastic and \$3 worth of electrical equipment and brings in a profit of \$24 each. The company has 200 units of plastic and has budgeted \$360 for electrical parts. How many of the standard and deluxe should be made to maximize profit?

	Standard	Deluxe	Total
Plastic	2	1	200
Cost	2	3	360
MAX Profit	14	24	

- a) Define the variables.

$x = \# \text{ of standard}$

$y = \# \text{ of deluxe}$

- b) Write the constraints.

- $x \geq 0$
- $y \geq 0$
- $2x + y \leq 200$
- $2x + 3y \leq 360$

$$\begin{array}{c|c} x & y \\ \hline 0 & 200 \\ 100 & 0 \end{array}$$

$$\begin{array}{c|c} x & y \\ \hline 180 & 0 \\ 0 & 120 \end{array}$$

- c) Write the Objective Function.

$P = 14x + 24y$

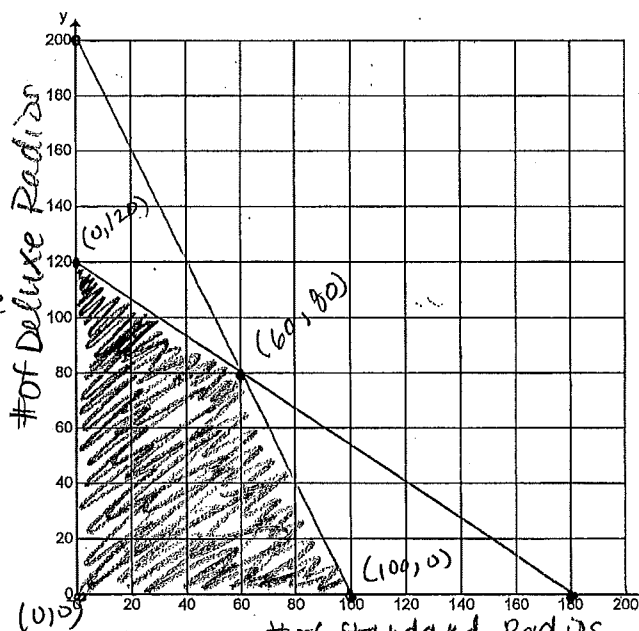
- d) Graph the constraints.

- e) List two possible solutions and explain in words what these solutions represent.

$(1, 1) \rightarrow 1 \text{ standard} \& 1 \text{ Deluxe}$
 $(81, 22) \rightarrow 81 \text{ standard} \& 22 \text{ Deluxe}$

- f) List the vertices.

$(0, 0)$ $(60, 80)$
 $(100, 0)$ $(0, 120)$



- g) Make a table to find the number of standard and deluxe radios that will maximize profit.

$(0, 0)$	$P = 14(0) + 24(0)$ $P = 0$
$(100, 0)$	$P = 14(100) + 24(0)$ $P = 1400$
$(60, 80)$	$P = 14(60) + 24(80)$ $P = 2760$
$(0, 120)$	$P = 14(0) + 24(120)$ $P = 2880$

What is the maximum profit?

\$2880

How many of each should they make?

0 Standard
120 Deluxe