Decision Homework 5 Answers

1. a)

x	y	2x + 3y
100	0	200
50	100	400 ✓✓
0	120	360

x	y	4x + y
50	0	200 ✓
0	50	50

(3)

Maximum value of 2x + 3y is 400 (at (50, 100)) ✓

Minimum value of 4x + y is 50 (at (0, 50)) ✓

(2)

b) $x \geq 0$ ✓, $y \geq 0$ ✓, $x + y \geq 50$ ✓, $2x + y \leq 200$ ✓
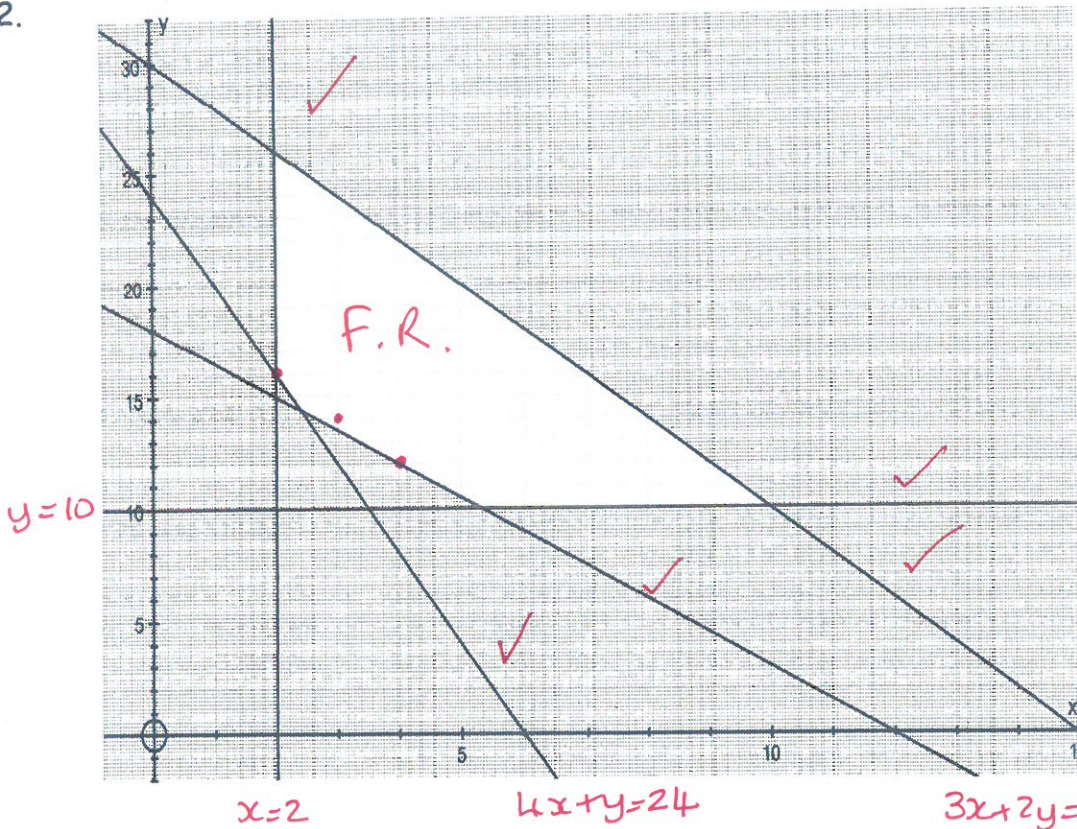
For other line, need equation of line through (0, 120) and (50, 100)

Gradient = -20/50 = -2/5

Using $y - y_1 = m(x - x_1)$, equation is $y - 120 = -2/5(x - 0)$ ✓

x5 gives $5y - 600 = -2x$, so $2x + 5y = 600$ last inequality is $2x + 5y \leq 600$ ✓ (6)

2.

Points are

(4, 12) ✓
(3, 14) ✓
(2, 16) ✓

✓ for evidence of search on diagram

F.R.

y=10
x=2   4x+y=24   3x+2y=36   2x+y = 30 (9)

3   a) x + y maximum where $3x + 4y = 12$ and $2x + y = 4$

Solve simultaneously to get x = 0.8, y = 2.4

Maximum value of x + y is 3.2 at the point (0.8, 2.4) ✓

b)

x	y	x + y
0	3	3
1	2	3

Maximum = 3 at (0, 3) and (1, 2) ✓

(4)

4.

$y = 0.5x$

$3x + 4y = 12$

$2x + y = 4$

x

y

√ Shading

(4)