415 Midterm, Fall 2018 Solutions.

1-8. B C D A D C C A

9 (a). Unique optimal solution $(0, 2, 0, 0)$

9 (b) Unbounded. Starting point $(2, 4, 0, 0, 0)$

direction $(0, 2, 0, 0, 1)$.

10 (a). Let x_i denote the amount of product i (in units) to produce

$$\max \quad 6x_1 + 4x_2 + 3x_3$$

$$\text{s.t.} \quad 4x_1 + 3x_2 + 2x_3 \leq 3{,}000{,}000$$

$$0.000003x_1 + 0.000002x_2 + 0.000001x_3 \leq 2$$

$$x \geq 0$$

10 (b)

$$\max \quad 6x_1 + 4x_2 + 3x_3$$

$$\text{s.t} \quad 4x_1 + 3x_2 + 2x_3 + s_1 = 3{,}000{,}000$$

$$0.000003x_1 + 0.000002x_2 + 0.000001x_3 + s_2 = 2$$

$$x, s \geq 0$$

10 (c)

z	x_1	x_2	x_3	s_1	s_2	RHS
1	-6	-4	-3	0	0	0
0	4	3	2	1	0	3,000,000
0	0.000003	0.000002	0.000001	0	1	2

10 (d) BFS: $(x, s) = (0, 0, 0, 3{,}000{,}000, 2)$.