

EXAMINATION #1 ANSWER KEY

Version A

I. Multiple choice

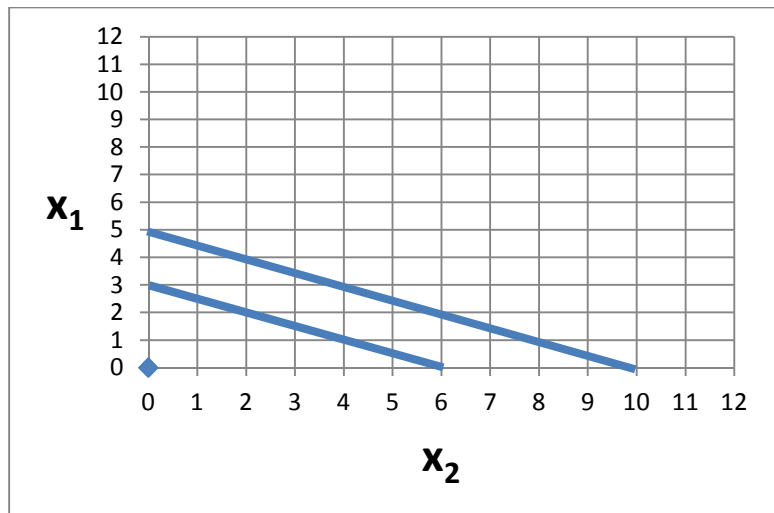
(1)c. (2)e. (3)c. (4)d. (5)c. (6)c. (7)b. (8)d. (9)c. (10)e.

II. Short answer

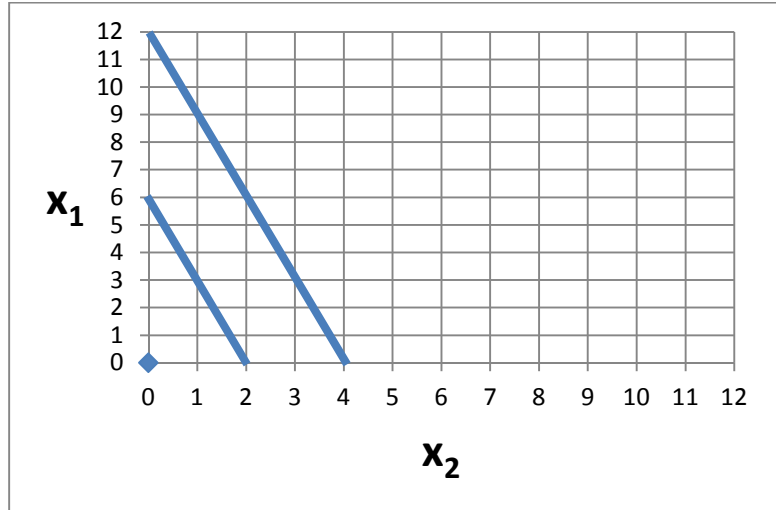
- | | | | |
|-----|-------------|-------------|---------------|
| (1) | a. increase | b. 2.4 %. | |
| (2) | a. increase | b. 7 units. | |
| (3) | a. down | b. decrease | c. 2/5 units. |
| (4) | a. increase | b. 2 %. | |
| (5) | a. increase | b. 2 %. | |

III. Problems

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|-----|--|--|---|
| (1) | a. $dy/dx = -0.5x + 7$. | b. $x^* = 14$. | |
| (2) | a. $\varepsilon_1 = \frac{3x_1}{x_1+2}$. | b. $\varepsilon_2 = 5$. | |
| (3) | a. $\frac{\partial y}{\partial x_1} = 2x_1^{-2}$. | b. $\frac{\partial y}{\partial x_2} = 3x_2^{-2}$. | c. $MRS = \frac{3}{2} \left(\frac{x_1}{x_2}\right)^2$. |
| (4) | a. $MRS = \frac{1}{2}$. | b. | |



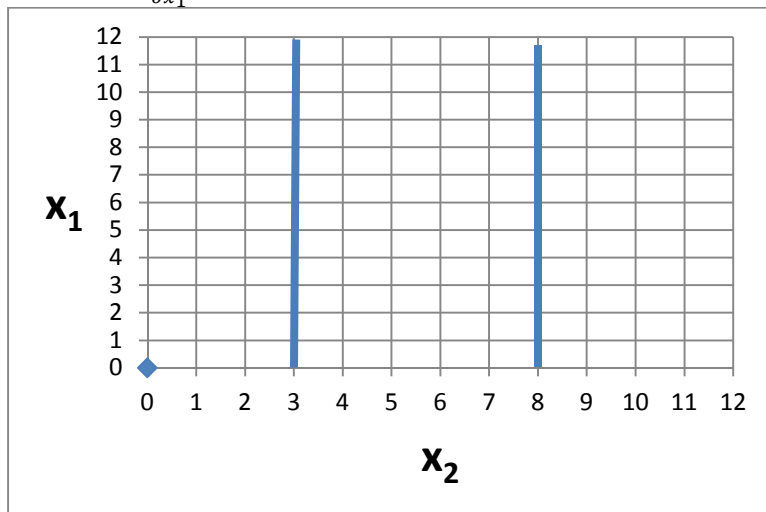
- (5) a. $MRS = \frac{x_1 x_2}{x_2^2 - 5}$. b. many possible answers, such as
 $g(x_1, x_2) = x_1^2 (x_2^2 - 5) + \text{constant}$, or $g(x_1, x_2) = x_1^2 (x_2^2 - 5) \times \text{constant}$,
 or $g(x_1, x_2) = [x_1^2 (x_2^2 - 5)]^{\text{constant}}$, or $g(x_1, x_2) = \ln[x_1^2 (x_2^2 - 5)]$.



- (5) a. $MRS = \frac{3(x_1+4)}{x_2}$. b. many possible answers, such as
 $g(x_1, x_2) = (x_1+4) x_2^3 + \text{constant}$, or $g(x_1, x_2) = (x_1+4) x_2^3 \times \text{constant}$,
 or $g(x_1, x_2) = [(x_1+4) x_2^3]^{\text{constant}}$, or $g(x_1, x_2) = \ln[(x_1+4) x_2^3]$.

IV. Critical thinking

- (1) Slope of level curves = $-\frac{\frac{\partial y}{\partial x_2}}{\frac{\partial y}{\partial x_1}} = \infty$, so level curves must be vertical, such as the following.



[end of answer key]