Consider the problem of finding a solution to the following equation:

$$3w_1 + 4w_2 = 12$$

the line crosses the axes $w1$ and $w2$ respectively at:

(A) 3 and 4

(B) **[Ans]** 4 and 3

(C) 6 and 6

(D) 12 and 12

(E) None of the above

Consider the vector $\mathbf{w} = [w_1, w_2]^T$ and the objective function to be minimized as:

$$\min_{\mathbf{w}} (3w_1 + 4w_2 - 12)^2 + \lambda g(\mathbf{w})$$

If $\underline{g(\mathbf{w}) \text{ is L0 norm of } \mathbf{w}, \text{ and } \lambda = 1}$, what is the optimal value of $\mathbf{w}$

(A) **[Ans]** $[0, 3]^T$

(B) **[Ans]** $[4, 0]^T$

(C) $[1, 1]^T$

(D) $[3, 4]^T$

(E) None of the above

Consider the vector $\mathbf{w} = [w_1, w_2]^T$ and the objective function to be minimized as:

$$\min_{\mathbf{w}} (3w_1 + 4w_2 - 12)^2 + \lambda g(\mathbf{w})$$

If $g(\mathbf{w})$ is L1 norm of $\mathbf{w}$ and $\lambda = 1$, what is the optimal value of $\mathbf{w}$ (if the true answer is very close to one given, do round/approximate for simplifying the answer here)

(A) **[Ans]** $[0, 3]^T$

(B) $[4, 0]^T$

(C) $[1, 1]^T$

(D) $[3, 4]^T$

(E) None of the above

Consider the vector $\mathbf{w} = [w_1, w_2]^T$ and the objective function to be minimized as:

$$\min_{\mathbf{w}} (3w_1 + 4w_2 - 12)^2 + \lambda g(\mathbf{w})$$

If $\underline{g(\mathbf{w}) \text{ is L2 norm of } \mathbf{w} \text{ and } \lambda = 1}$, what is the optimal value of $\mathbf{w}$

(A) $[0, 3]^T$

(B) $[4, 0]^T$

(C) $[1, 1]^T$

(D) $[3, 4]^T$

(E) **[Ans]** None of the above

Consider the vector $\mathbf{w} = [w_1, w_2]^T$ and the objective function to be minimized as:

$$\min_{\mathbf{w}} (3w_1 + 4w_2 - 12)^2 + \lambda g(\mathbf{w})$$

If $g(\mathbf{w})$ is L1 norm of $\mathbf{w}$ and $\lambda = 2$, what is the optimal value of $\mathbf{w}$ (if the true answer is very close to one given, do round/approximate for simplifying the answer here)

(A) **[Ans]** $[0, 3]^T$

(B) $[4, 0]^T$

(C) $[1, 1]^T$

(D) $[3, 4]^T$

(E) None of the above