Linear Algebra Quiz #1

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1. Find the intersection point (x, y) of the following two lines

$$l_1: 2x + 7y - 3 = 0$$

$$l_2: x + 2y - 3 = 0$$

$l_1: y = -\frac{2}{7}x + \frac{3}{7}$.

$l_2: y = -\frac{1}{2}x + \frac{3}{2}$.

$-\frac{2}{7}x + \frac{3}{7} = -\frac{1}{2}x + \frac{3}{2}$.

$\Leftrightarrow \frac{3}{14}x = \frac{15}{14}$

$x = 5, y = -1$. $\therefore (5, -1)$ ■

2. For a non-zero real number a, find out the minimum value of $\left(4a + \frac{1}{a}\right)\left(a + \frac{4}{a}\right)$.

Let $f(a) = \left(4a + \frac{1}{a}\right)\left(a + \frac{4}{a}\right)$.

$= 4a^2 + 1 + 16 + \frac{4}{a^2}$

$= 4a^2 + \frac{4}{a^2} + 17$.

$f'(a) = 8a - \frac{8}{a^3}$.

$f'(a) = 0 \Leftrightarrow 8a = \frac{8}{a^3}$.

$\Leftrightarrow a^4 = 1$

$\therefore a = -1, 1$ 일 때 $f(a) = 25$로 최소. ■