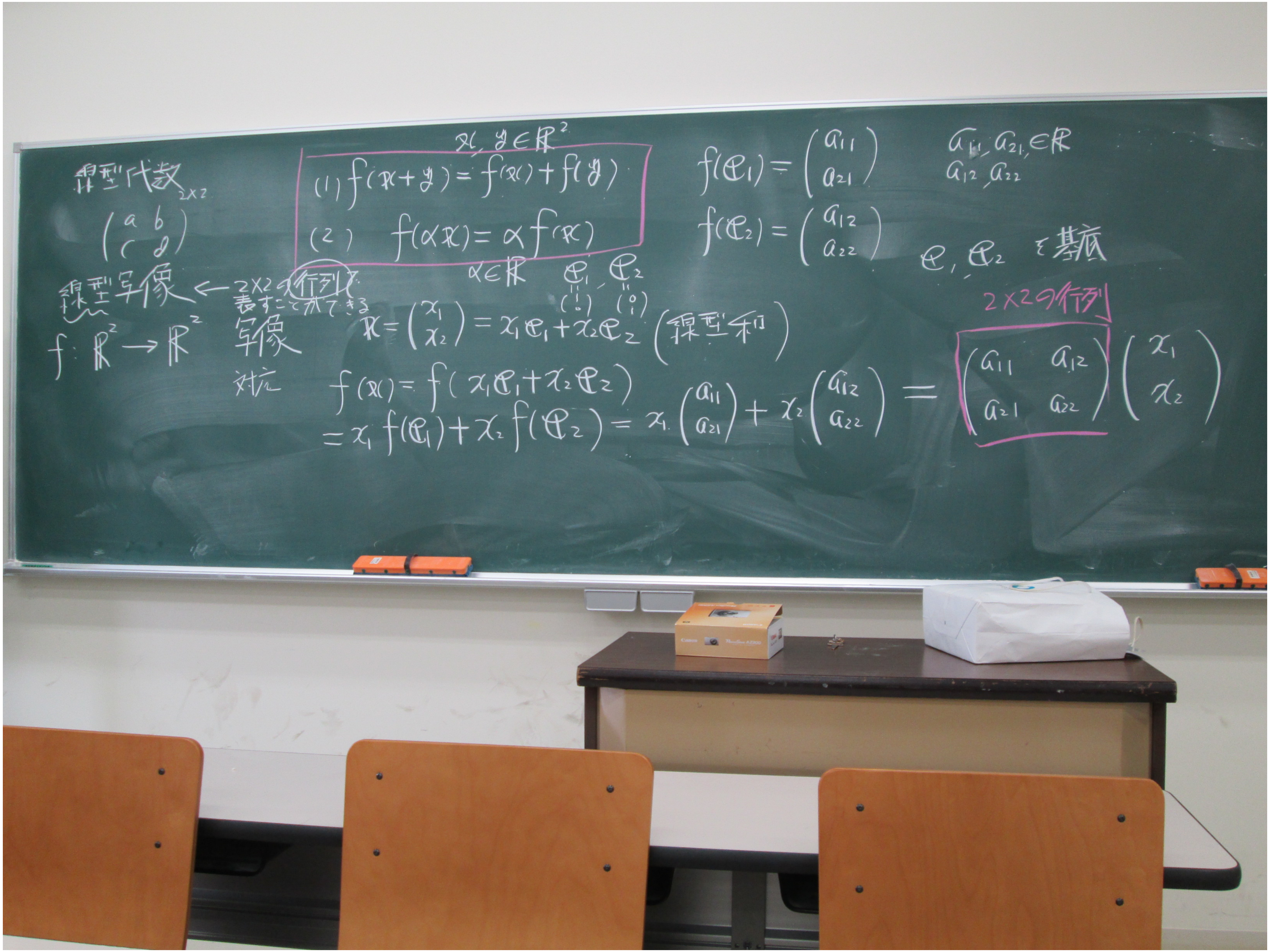
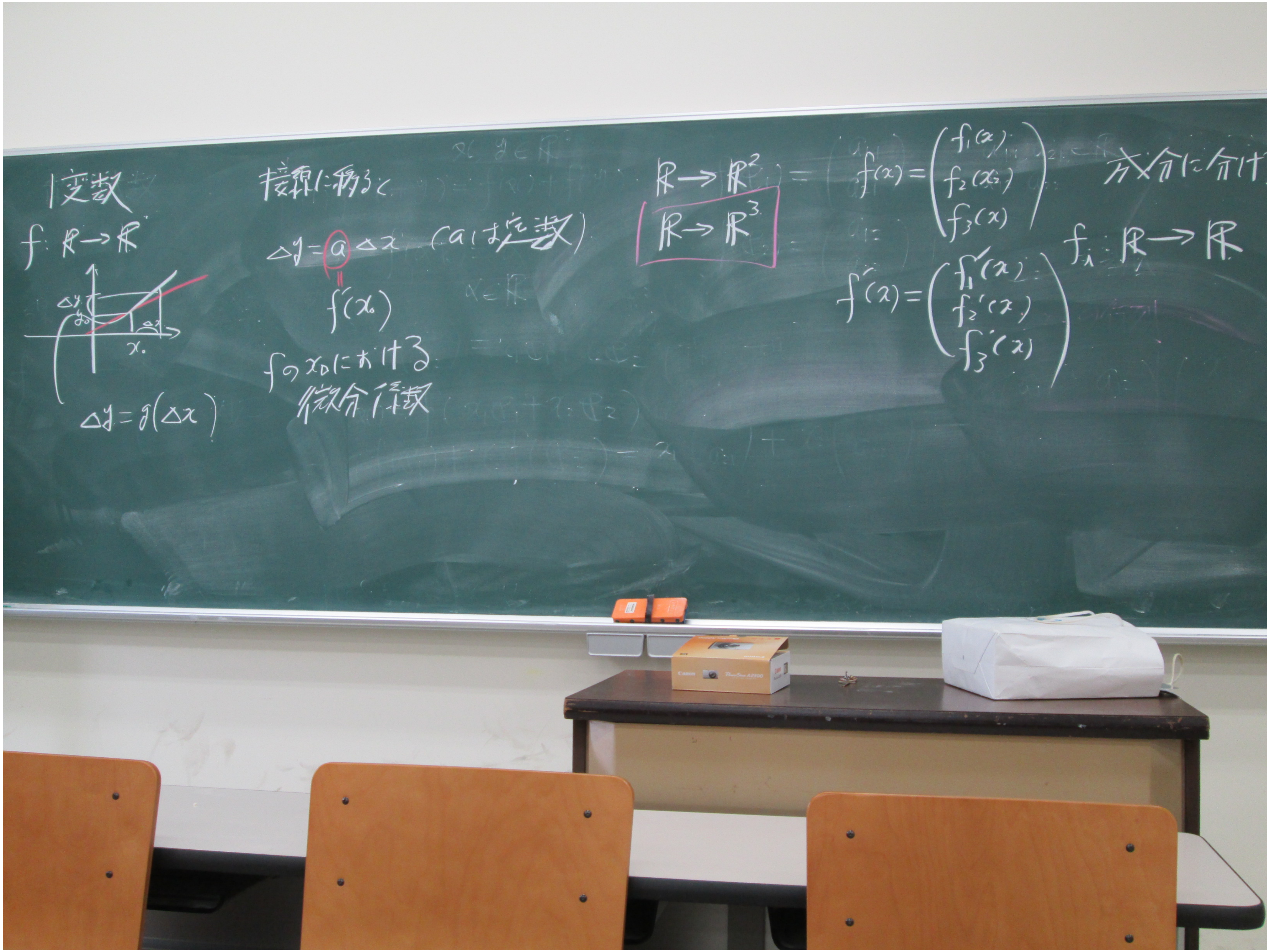
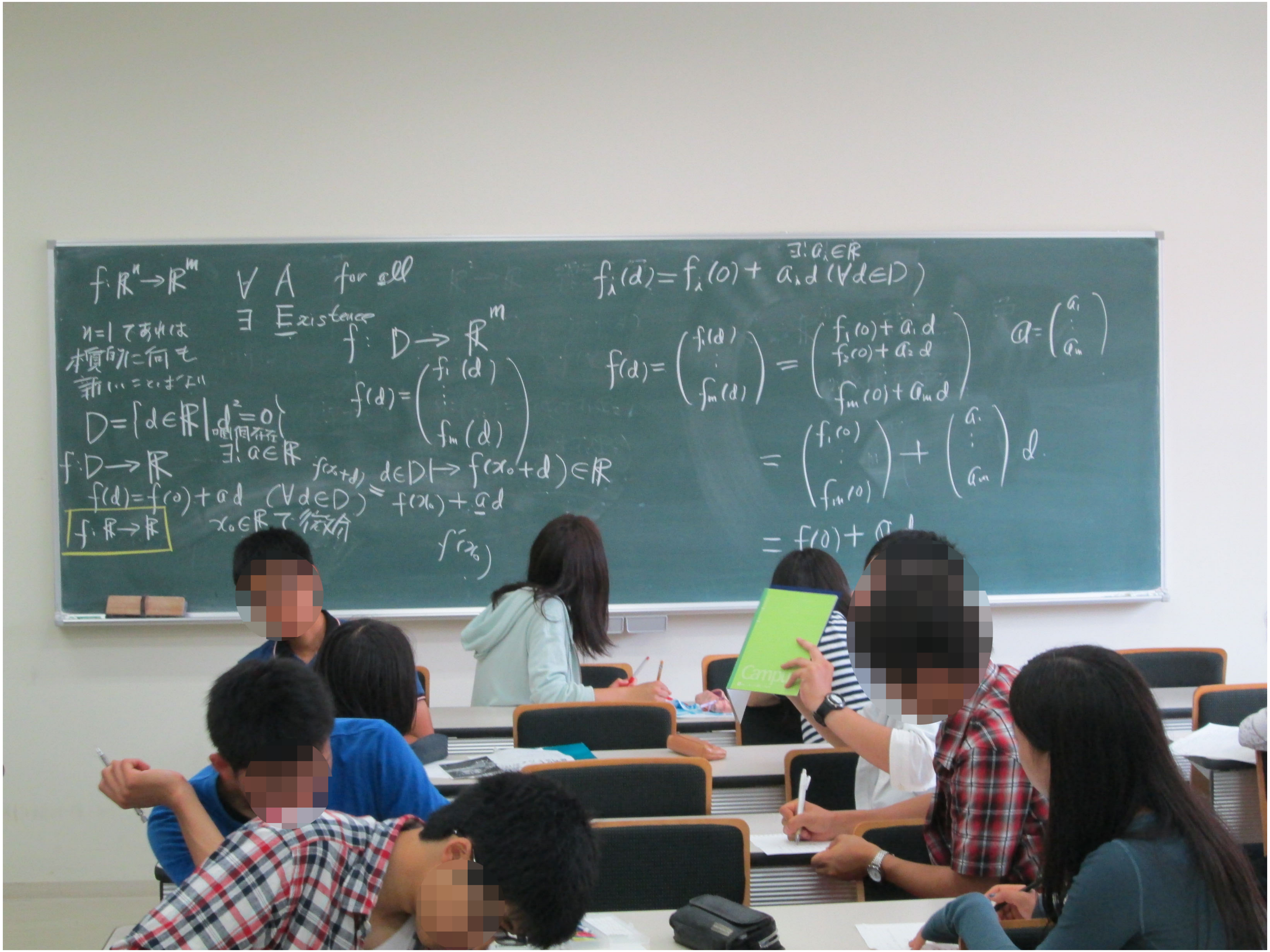
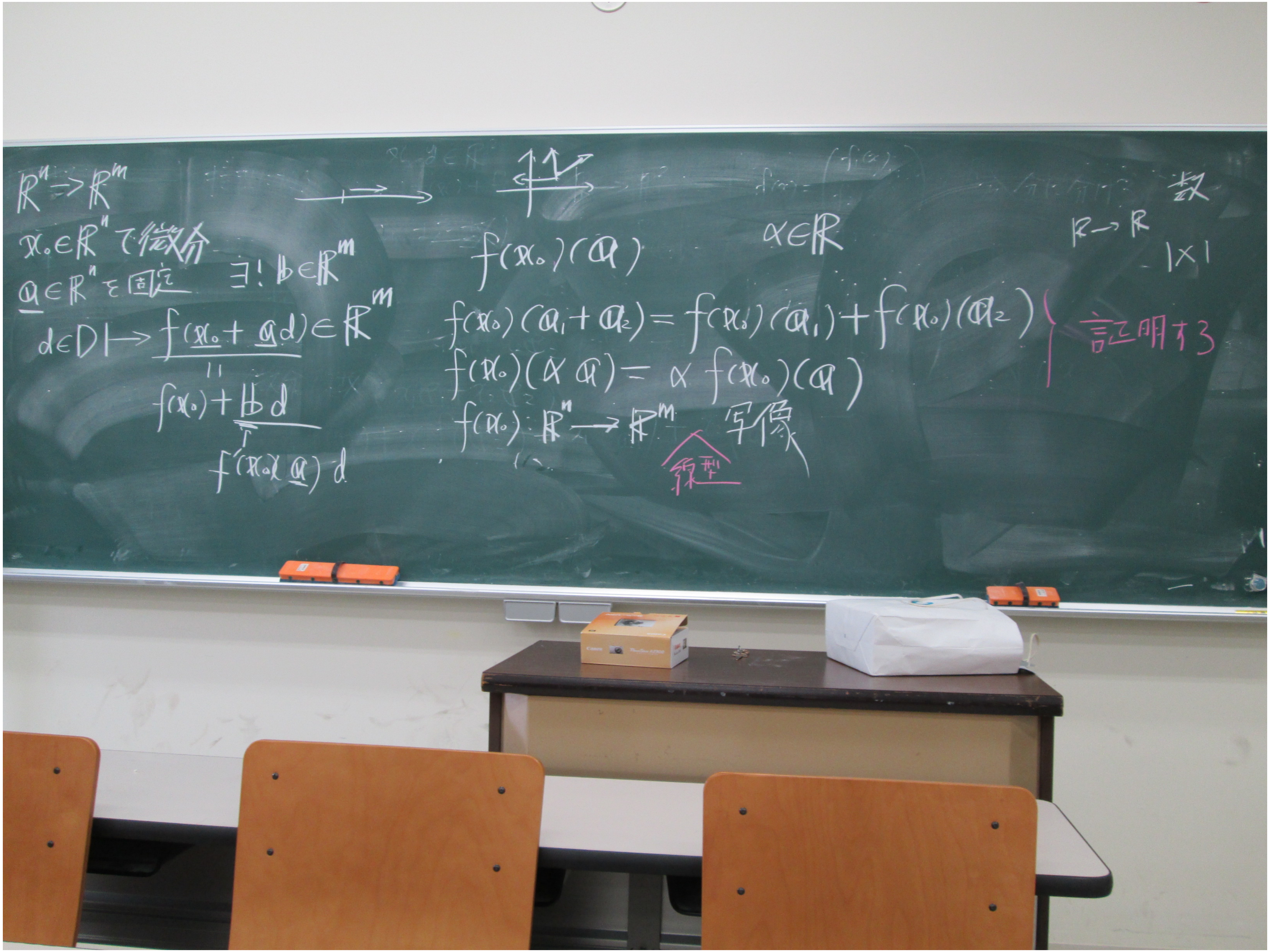

線型代数
2×2
(a b / c d)
線型写像 ← 2×2の行列で表すことができる
f: R² → R² 写像
対応
x, y ∈ R²
(1) f(x+y) = f(x) + f(y)
(2) f(αx) = αf(x)
α ∈ R
e₁ e₂
(1 0) (0 1)
x = (x₁ x₂) = x₁e₁ + x₂e₂ (線型和)
f(x) = f(x₁e₁ + x₂e₂)
= x₁f(e₁) + x₂f(e₂) = x₁(a₁₁ a₂₁) + x₂(a₁₂ a₂₂) = (a₁₁ a₁₂ / a₂₁ a₂₂)(x₁ x₂)
f(e₁) = (a₁₁ a₂₁)
f(e₂) = (a₁₂ a₂₂)
a₁₁, a₂₁ ∈ R
a₁₂, a₂₂
e₁, e₂ を基底
2×2の行列

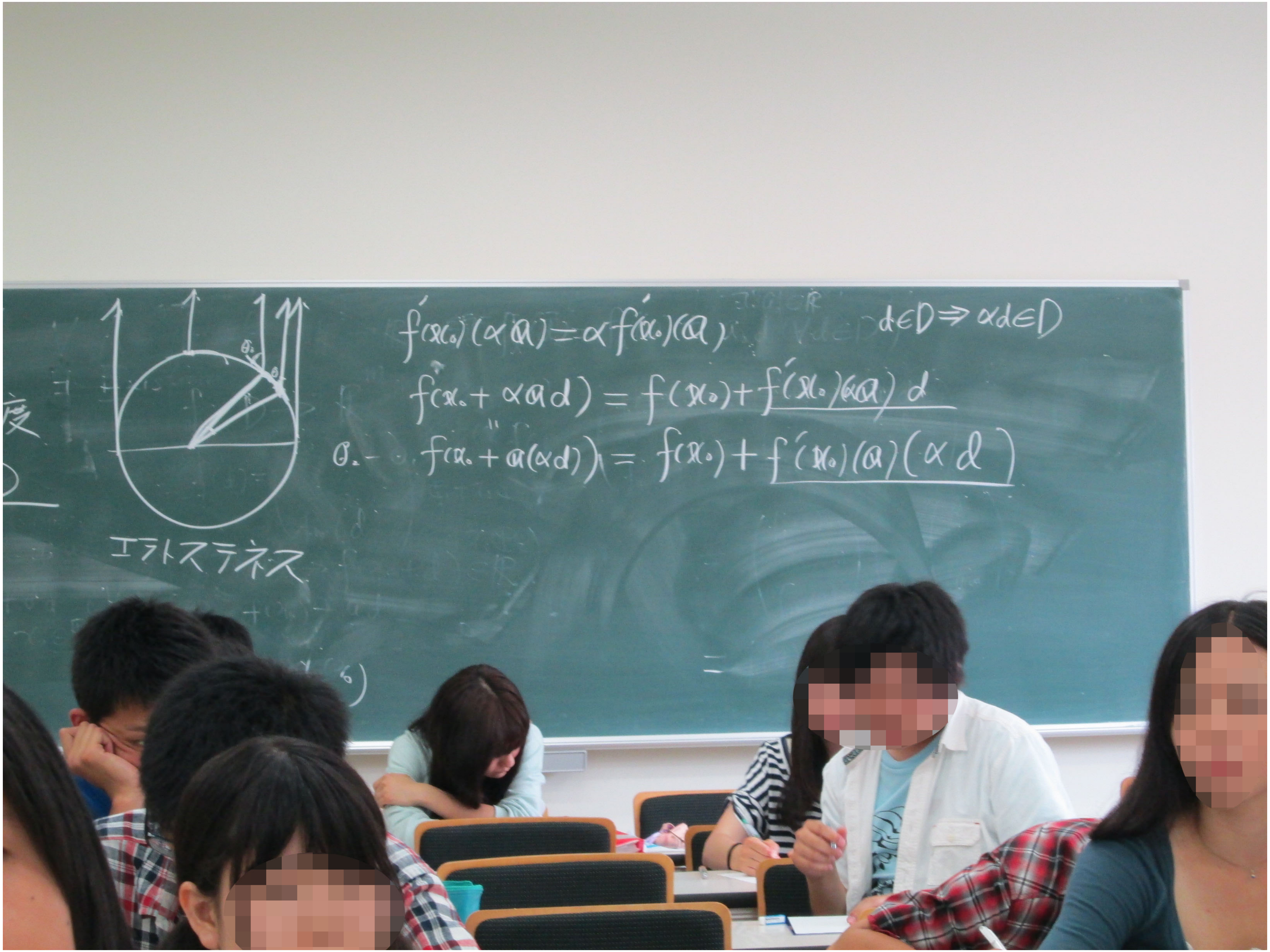

1変数
f: R→R
Δy = g(Δx)
接線に移ると
Δy = a Δx (aは定数)
f'(x0)
fのx0における
微分係数
R→R2
R→R3
f(x) = (f1(x), f2(x), f3(x))
f'(x) = (f1'(x), f2'(x), f3'(x))
f1: R→R



f: ℝⁿ → ℝᵐ
∀ A for all
∃ Existence
f : D → ℝᵐ
D = {d ∈ ℝ | d² = 0}
f : D → ℝ
f(d) = f(0) + a d (∀d ∈ D)
f : ℝ → ℝ
Campus



$\mathbb{R}^n \Rightarrow \mathbb{R}^m$
$x_0 \in \mathbb{R}^n$ で微分
$a \in \mathbb{R}^n$ を固定
$\exists!\, b \in \mathbb{R}^m$
$d \in D \mapsto f(x_0 + a d) \in \mathbb{R}^m$
$f(x_0) + b d$
$f'(x_0)(a)\, d$
$f(x_0)(a)$
$\alpha \in \mathbb{R}$
$f(x_0)(a_1 + a_2) = f(x_0)(a_1) + f(x_0)(a_2)$
$f(x_0)(\alpha a) = \alpha f(x_0)(a)$
証明する
$f(x_0) : \mathbb{R}^n \to \mathbb{R}^m$ 写像
線型
数
$\mathbb{R} \to \mathbb{R}$
1×1


f′(x₀)(αa) = αf′(x₀)(a)
d∈D ⇒ αd∈D
f(x₀ + αa d) = f(x₀) + f′(x₀)(αa) d
f(x₀ + a(αd)) = f(x₀) + f′(x₀)(a)(αd)
エラトステネス