

[1]

(1)	(あ)	16	(い)	$8 + 4\sqrt{3}$
(2)	(う)	$\log_{10} 10m$	(え)	$\log_{10} 3$
(3)	(お)	$\begin{pmatrix} 2 & 1 \\ 1 & 2 \end{pmatrix}, \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}, \begin{pmatrix} -2 & -1 \\ -1 & -2 \end{pmatrix}, \begin{pmatrix} -1 & -2 \\ -2 & -1 \end{pmatrix}$		

(注) (う) は $\log_{10} m + 1$ でもよい.

[II]

(あ)	$a^2m^2 + b^2$
(い)	$(1 + m^2)(a^2m^2 + b^2 - k^2)$
(う)	$\frac{\sqrt{a^2m^2 + b^2} - k}{\sqrt{1 + m^2}}$
(え)	$-\frac{\sqrt{a^2m^2 + b^2}}{2}$
(お)	$\frac{3\sqrt{3}}{4}ab$

[Ⅲ]

(1)	(あ)	$\frac{1}{6}$	(い)	$\frac{2}{3}$	(う)	0	(え)	$\frac{1}{6}$
(2)	(お)	$\frac{2}{3}$	(か)	$\frac{1}{6}$	(き)	$\frac{1}{6}$	(く)	$\frac{2}{3}$
	(け)	0	(こ)	0	(さ)	$\frac{1}{6}$	(し)	$\frac{2}{3}$
	(す)	0						
(3)	$p_n = \frac{2}{3}p_{n-1} + \frac{1}{6}q_{n-1}$ $s_n = \frac{2}{3}s_{n-1} + \frac{1}{6}q_{n-1} \quad (n \geq 2)$ 辺々を引いて、$p_n - s_n = \frac{2}{3}(p_{n-1} - s_{n-1})$ $p_n - s_n = \left(\frac{2}{3}\right)^{n-1} (p_1 - s_1) = 0 \quad (n=1 \text{ のときも成立})$ よって、任意の n で $p_n = s_n$							
(4)	(せ)	$\left(\frac{4+\sqrt{2}}{6}\right)^n$	(そ)	$\left(\frac{4-\sqrt{2}}{6}\right)^n$				

[IV]

(1)	(あ)	$-4t \sin 2t$	(い)	$4t \cos 2t$
(2)	(う)	$\cos 2t$	(え)	$\sin 2t$
(3)	$f(t) = \cos 2t + t \sin 2t$ $f'(t) = -\sin 2t + 2t \cos 2t$ $f''(t) = -4t \sin 2t$ $0 < t < \frac{\pi}{2} \text{ で } f''(t) < 0$ よって、$0 < t < \frac{\pi}{2}$ で $f'(t)$ は単調に減少する関数. $\therefore f'(0) = 0 > f'(t) \quad \left(0 < t < \frac{\pi}{2} \right)$ したがって、$0 \leq t \leq \frac{\pi}{2}$ で $f(t)$ は単調に減少する関数.			
(4)	(お)	$\frac{7\pi^3}{192}$		