

平均 50
最高 80

数学 I 1学期

中間考査

1987. 5. 28

70

1年 10組 9番 坂本政希 得点
 $x < 0$ のとき $x + \frac{1}{x}$ と

① ② ③ の計算をせよ。

- (1) $(a-b-2)(a^2b+2ab+4)$ (2) $2x^3-3x^2+2x-8) \div (2x-1)$
- (3) $x^2+7x+12 \div x^2+2x-3$ (4) $a^2+a-6 \div \frac{a^2+5a+6}{a^2+2a}$
の G.C.M と L.C.M を求めよ。
- (5) $\frac{a}{x(x-2)} + \frac{x}{a(x-a)}$ (6) $\frac{\sqrt{5}}{\sqrt{7+\sqrt{5}}} - \frac{\sqrt{7}}{\sqrt{7-\sqrt{5}}}$

② ④ の因数分解をせよ。

- (1) $4x^2 - 8xy + 3y^2$
- (2) $8 - a^3$

①	(1) $a^2b^2 - 8^3$ $(ab-2)^3$	(2) $x^2 - x + \frac{1}{2}$ $\therefore \dots - \frac{15}{2}$
②	(1) G.C.M $(x+3)$ L.C.M $(x+3)(x+4)(x-1)$	(2) $\frac{a-2}{a-1}$
③	(1) $\frac{a+x}{ax}$	(2) -6
④	(1) $(2x-8)(2x-3y)$	(2) $(2-a)(4+2a+a^2)$

③ ④ の因数分解をせよ。

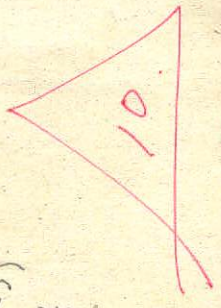
$2x^2 + 2xy - y^2 + 3y^2 - 2$
 $= x^2 + (3+x)y^2 + 7y^2 - 1$

⑤ $x^2 + \frac{1}{x^2} = 5$ $x^3 + \frac{1}{x^3}$ の値を求めよ。

$x^2 + \frac{1}{x^2} = 5$
 $(x + \frac{1}{x})^2 - 2 = 5$
 $(x + \frac{1}{x})^2 = 7$
 $x + \frac{1}{x} = \pm\sqrt{7}$

$x < 0$ のとき
 $x + \frac{1}{x} = -\sqrt{7}$

$x^3 + \frac{1}{x^3} = (x + \frac{1}{x})(x^2 - 1 + \frac{1}{x^2})$
 $= (x + \frac{1}{x})\{(x + \frac{1}{x})^2 - 3\}$
 $= \sqrt{7} \times \{(\sqrt{7})^2 - 3\}$
 $= \sqrt{7} \times (7-3)$
 $= 4\sqrt{7}$



$x^3 + \frac{1}{x^3} = 4\sqrt{7}$
 $-4\sqrt{7}$

⑥ $\sqrt{11-6\sqrt{2}}$ の整数部分を x , 小数部分を y と

するとき $\frac{1}{x-y} - y$ の値を求めよ。

$$= -y^2 + (3+x)y + 2(x+1)(x-1)$$

$$= (-y^2 + 2x + 2)(y + x - 1)$$

④ x, y は有理数とする。次の等式を満たす

x, y の値を求めよ。

$$(1+\sqrt{3})x + (2-\sqrt{3})y = 1+4\sqrt{3}$$

$$x + \sqrt{3}x + 2y - \sqrt{3}y = 1 + 4\sqrt{3}$$

$$x + 2y + (x-y)\sqrt{3} = 1 + 4\sqrt{3}$$

$$\begin{cases} x + 2y = 1 \\ x - y = 4 \end{cases}$$

$$\underline{x = 3, y = -1}$$

$$\sqrt{11-6\sqrt{2}} = \sqrt{11-2\sqrt{18}} = \sqrt{9-\sqrt{2}} = 3-\sqrt{2}$$

$$x = 1 \quad y = \frac{1-\sqrt{2}}{2}$$

$$\frac{x-y}{x+y} = \frac{1 - \frac{1-\sqrt{2}}{2}}{1 - (1-\sqrt{2})} = \frac{1 - \frac{1-\sqrt{2}}{2}}{1 - (1-\sqrt{2})} = \frac{1 - (1-\sqrt{2})}{1 - (2-\sqrt{2})} = \frac{1 - (2-\sqrt{2})}{1 - 2 + \sqrt{2}} = \frac{-1 + \sqrt{2}}{-1 + \sqrt{2}} = \frac{-1 + \sqrt{2}}{-1 + \sqrt{2}} = \frac{1 \cdot (\sqrt{2}+1)}{(\sqrt{2}-1)(\sqrt{2}+1)} = \frac{1 \cdot (\sqrt{2}+1)}{\sqrt{2}-1-2+\sqrt{2}} = \frac{\sqrt{2}+1}{\sqrt{2}-2+\sqrt{2}} = \frac{\sqrt{2}+1}{2\sqrt{2}-2} = \frac{\sqrt{2}+1}{2(\sqrt{2}-1)} = \frac{(\sqrt{2}+1)(\sqrt{2}+1)}{2(\sqrt{2}-1)(\sqrt{2}+1)} = \frac{2+2\sqrt{2}+1}{2(2-1)} = \frac{3+2\sqrt{2}}{2}$$

$$= \frac{1}{1-1+\sqrt{2}} - \frac{1}{1+\sqrt{2}}$$

$$= \frac{1}{\sqrt{2}} - 1 + \sqrt{2}$$

$$= \frac{\sqrt{2}}{2} - \frac{2}{2} + \frac{2\sqrt{2}}{2}$$

$$= \frac{3\sqrt{2}-2}{2}$$

$$\frac{3\sqrt{2}-2}{2}$$