大問1

(1) ①

$OB = 8$

$\therefore$

$B(0, 8)$

$\therefore$

$A(t, 4)$

$t = 4$

$\therefore$

$y = \frac{1}{4}x^2$

$a = \frac{1}{4}$

大問1

(1) ②

B(0, 8)

C(-4, 4)

BC : $y = x + 8$

$\frac{1}{4}x^2 = x + 8$

$x^2 = 4x + 32$

$(x+4)(x-8) = 0$

$x = -4, 8$

∴

(8, 16)

大問1

(2)

$x^2 = 2x + 3$

$x = 3, -1$

$\therefore$

$B(3, 9)$

$A(-\frac{3}{2}, 0)$

$\frac{3}{2} \times 3 \times \frac{1}{2} = \frac{9}{4}$ ⋯ △AOCの面積　ABの交点を点Cとしたとき.

$(0, 9)$ を点B'としたとき.

$\frac{x^2}{3} \times 3^3 \times \frac{1}{x} = 18$ ⋯ BB'Oの面積

$6 \times 3 \times \frac{1}{2} = 9$ ⋯ BB'Cの面積

$\therefore$

$(18 - 9) + \frac{9}{4} = \frac{45}{4}$

$\frac{45}{4}$

大問2

(1)

$A(-t, at^2)$

$B(3t, 9at^2)$

$t : 3t = OC : OD$

$OC : OD = 1 : 3$

大問2

(2)

$A(-t, at^2)$

$B(3t, 9at^2)$

$$\begin{cases} at^2 = -at + b & \cdots ① \\ 9at^2 = 3at + b \end{cases}$$

$$\begin{array}{rl} & at^2 = -at + b \\ -) & 9at^2 = 3at + b \\ \hline & -8at^2 = -4at \end{array}$$

$$t = \frac{1}{2}$$

①に代入

$$\frac{1}{4}a = -\frac{1}{2}a + b$$

$$b = \frac{3}{4}a$$

∴

$$\frac{3}{4}a \times \frac{1}{a} = \frac{3}{4}$$

$$\frac{3}{4}$$

大問2

(3)

(2)より

$t = \frac{1}{2}$

$l = \frac{3}{4}a$

∴

$AB : y = ax + \frac{3}{4}a$

∴

$E\left(-\frac{3}{4}, 0\right)$

また、

$F\left(0, \frac{3}{4}a\right)$

∴

$\triangle OEF = \frac{3}{4}a \times \frac{3}{4} \times \frac{1}{2}$

$= \frac{3}{4} \times \frac{3}{8}a$

$A\left(-\frac{1}{2}, \frac{1}{4}a\right)$

$B\left(\frac{3}{2}, \frac{9}{4}a\right)$

∴

$\triangle OAB = \left(\frac{1}{2} + \frac{3}{2}\right) \times \frac{3}{4}a \times \frac{1}{2}$

$= 2 \times \frac{3}{8}a$

∴

$\triangle OAB : \triangle OEF = 2 : \frac{3}{4}$

$= 8 : 3$

大問3

(1) ①

$AB : y = x + 1$

$2x^2 = x + 1$

$x = -\frac{1}{2}, 1$

$\therefore$

$\begin{cases} A\left(-\frac{1}{2}, \frac{1}{2}\right) \\ B(1, 2) \end{cases}$

大問3

(1) ②

C(−1, 0)

B(1, 2)

∴

E(3, 0)

F, T

$4 \times 2 \times \frac{1}{2} = 4$

4

大問3

(1) ③

D(d, 0)

∴

$2^2 + (1-d)^2 = 4 + 1 - 2d + d^2$

$= 5 - 2d + d^2$ (BD^2)

CD = BDより

$1 + d = BD$

∴

$(1+d)^2 = 5 - 2d + d^2$

$1 + 2d + d^2 = 5 - 2d + d^2$

$4d = 4$

$d = 1$

D(1, 0)

点Dから ABに平行な直線を引き、

y軸との交点をD'とする

DD' : $y = x - 1$

∴

$(1+1) \times \left(\frac{1}{2} + 1\right) \times \frac{1}{2} = \frac{3}{2}$ … $\triangle D'AB$

$\triangle D'AB = \triangle BAD$ (等積変形)

$\frac{3}{2}$