

[52] F: $y = x^2(x-a)$

G: $y = 2x(x-a)$

FとGを連立

$x^2(x-a) = 2x(x-a) = 0$

$x^2(x-a) - 2x(x-a) = 0$

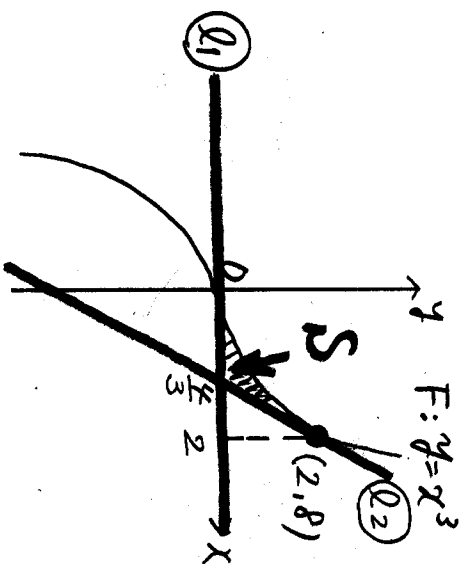
$x(x-a)(x-2) = 0 \dots \textcircled{1}$

共有点がちょうど2個 $\Leftrightarrow a=0, 2$ (77)

(1) $\ast a=0$ と $a=2$

$\textcircled{1}$ $F: x^2(x-2) = 0$

$x=0, 2$ $\therefore (0,0), (2,8)$ (77)



\square $y' = 3x^2$

$\textcircled{Q1}$ 接点 $(0,0)$
傾き 0

$\therefore y=0$

$\textcircled{Q2}$ 接点 $(2,8)$
傾き 12

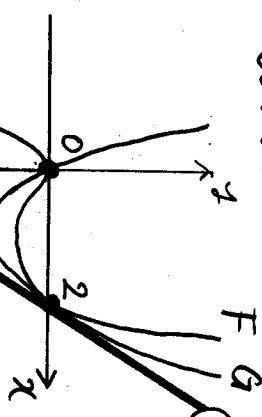
$\therefore y-8 = 12(x-2)$
 $y = 12x - 16$

求める面積 $S = \int_0^2 x^3 dx - \frac{2}{3} \cdot 8 \cdot \frac{1}{2}$

$= \frac{1}{4} [x^4]_0^2 - \frac{8}{3}$

$= 4 - \frac{8}{3} = \frac{4}{3}$ (77)

(2) $\ast a=2$ と $a=3$



\square $y = x^3 - 2x^2$
 $y' = 3x^2 - 4x$

\square $y = 2x^2 - 4x$
 $y' = 4x - 4$

$x=2$ と $x=4$ と $x=0$ と $x=-2$
傾き $y' = 4x - 4 \leftarrow \textcircled{Q3}$ の傾き

$\textcircled{Q3}$ $y=0 = 4(x-2)$
 $y = 4x - 8$ (77)

FとQ3を連立

$x^2(x-2) = 4(x-2)$

$x^2(x-2) - 4(x-2) = 0$

$(x-2)(x^2-4) = 0$

$(x-2)^2(x+2) = 0 \therefore x=2, -2$

$T = \int_{-2}^2 \{ x^3 - 2x^2 - (4x - 8) \} dx$

$= \int_{-2}^2 (x^3 - 2x^2 - 4x + 8) dx$

$= 2 \int_0^2 (-2x^2 + 8) dx$

$= -\frac{4}{3} [x^3]_0^2 + 16 [x]_0^2 = \frac{64}{3}$ (77)