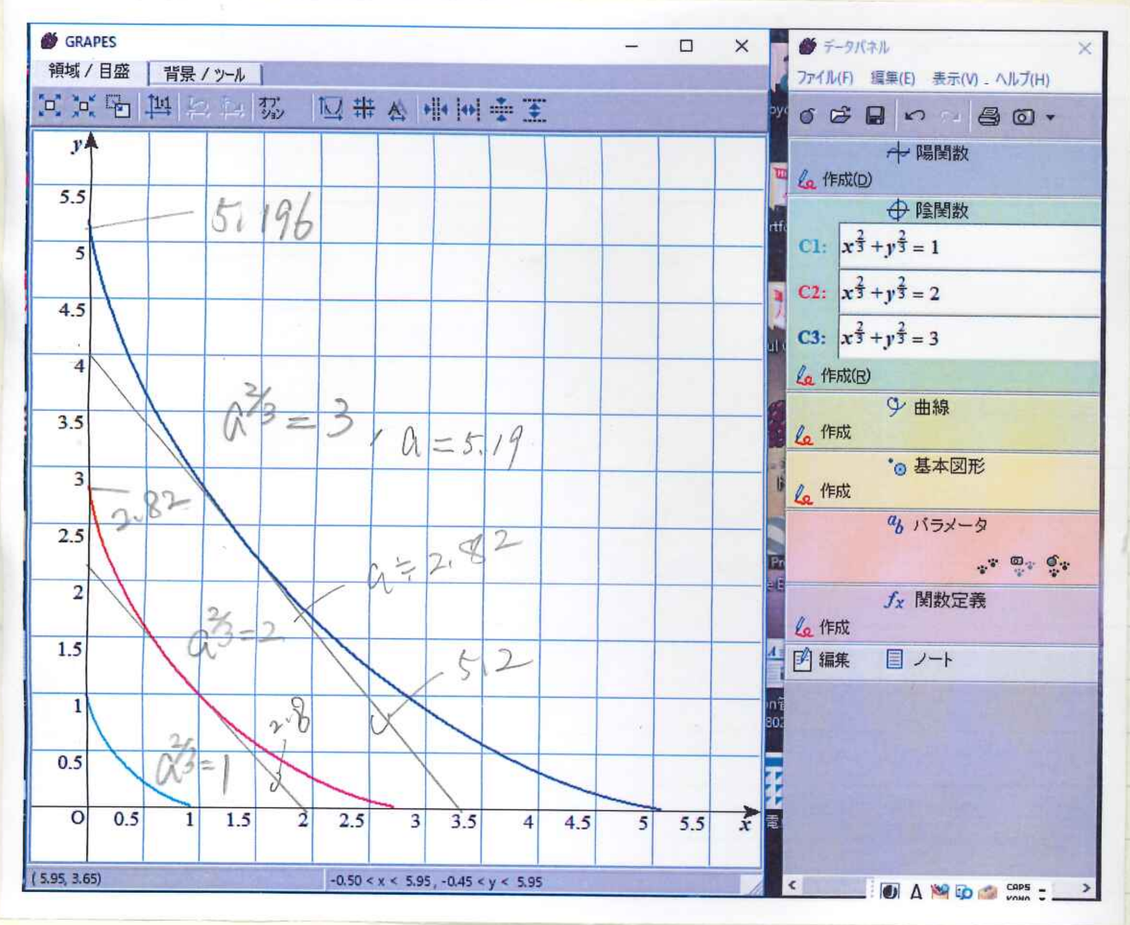
No.

DATE H30. 3. 7



問8.

$$x^{2/3}+y^{2/3}=a^{2/3}$$

$$\frac{2}{3}x^{-\frac{1}{3}}+\frac{2}{3}y^{-\frac{1}{3}}\frac{dy}{dx}=0$$

$$\frac{dy}{dx}=-\frac{2}{3}\frac{1}{\sqrt[3]{x}}\Big/\frac{2}{3}\frac{1}{\sqrt[3]{y}}$$

$$=-\frac{\sqrt[3]{y}}{\sqrt[3]{x}}$$

接線の方程式

$$Y-y=-\frac{\sqrt[3]{y}}{\sqrt[3]{x}}(X-x)$$

$Y=0$ のとき $-y=-\frac{\sqrt[3]{y}}{\sqrt[3]{x}}(X-x)$　$-\sqrt[3]{x}\cdot y=-\sqrt[3]{y}X+\sqrt[3]{y}\cdot x$

$X_1=\frac{+1}{\sqrt[3]{y}}(x\sqrt[3]{y}+\sqrt[3]{x}\cdot y)=x+\sqrt[3]{\frac{x}{y}}\cdot y$

$X=0$ のとき $Y-y=+\frac{\sqrt[3]{y}}{\sqrt[3]{x}}x$　$Y_1=y+\sqrt[3]{\frac{y}{x}}x$

ピタゴラスの定理

$$X_1^2+Y_1^2=x^2+\left(\sqrt[3]{\tfrac{x}{y}}\right)^2y^2+2xy\sqrt[3]{\tfrac{x}{y}}+y^2+\left(\sqrt[3]{\tfrac{y}{x}}\right)^2x^2+2xy\sqrt[3]{\tfrac{y}{x}}$$

$$=\left\{1+\left(\sqrt[3]{\tfrac{y}{x}}\right)^2\right\}x^2+\left\{1+\left(\sqrt[3]{\tfrac{x}{y}}\right)^2\right\}y^2+2xy\left(\sqrt[3]{\tfrac{x}{y}}+\sqrt[3]{\tfrac{y}{x}}\right)$$

$$=\left\{1+\frac{y^{2/3}}{x^{\frac{2}{3}}}\right\}x^2+\left\{1+\frac{x^{\frac{2}{3}}}{y^{\frac{2}{3}}}\right\}y^2+2xy\left(\frac{x^{\frac{2}{3}}}{y^{\frac{2}{3}}}+\frac{y^{\frac{2}{3}}}{x^{\frac{2}{3}}}\right)$$

$$=\frac{1}{x^{\frac{2}{3}}}\cdot a^{\frac{2}{3}}\cdot x^2+\frac{1}{y^{\frac{2}{3}}}\cdot a^{\frac{2}{3}}\cdot y^2+2xy\left(\frac{1}{x^{\frac{1}{3}}y^{\frac{1}{3}}}\right)\underbrace{\left(x^{\frac{2}{3}}+y^{\frac{2}{3}}\right)}_{=a^{2/3}}$$

$$=a^{\frac{2}{3}}x^{\frac{4}{3}}+a^{\frac{2}{3}}y^{\frac{4}{3}}+a^{\frac{2}{3}}\cdot 2x^{\frac{2}{3}}y^{\frac{2}{3}}$$

$$=a^{\frac{2}{3}}\left(x^{\frac{4}{3}}+2x^{\frac{2}{3}}y^{\frac{2}{3}}+y^{\frac{4}{3}}\right)=a^{\frac{2}{3}}\underbrace{\left(x^{\frac{2}{3}}+y^{\frac{2}{3}}\right)^2}_{a^{\frac{2}{3}}}=a^2$$

x軸とy軸に挟まれる長さ a