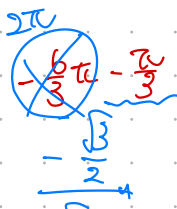


○ 1. テスト

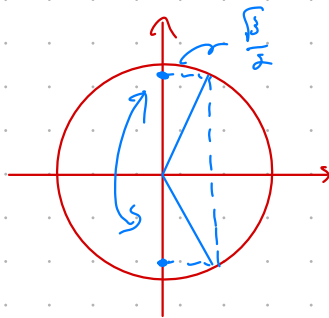
Ⅱ (1) $\sin(-\frac{7}{3}\pi) =$



(2) $\cos(\frac{17}{6}\pi) =$

(3) $\tan(-\frac{11}{3}\pi)$
 $= \tan(\frac{11}{3}\pi + \frac{\pi}{3})$
 $= \sqrt{3}$

(4) $\sin(\frac{29}{4}\pi) =$



Ⅱ $\sqrt[3]{54} = \sqrt[3]{2 \times 3^3} = 3 \cdot \sqrt[3]{2}$

(1) $\sqrt[3]{54} + \sqrt[3]{-150} - \sqrt[3]{-16} = 3 \cdot \sqrt[3]{2} + 5 \cdot \sqrt[3]{-2} - 2 \cdot \sqrt[3]{-2}$
 $= 3 \cdot \sqrt[3]{2} - 5 \cdot \sqrt[3]{2} + 2 \cdot \sqrt[3]{2} = (3 - 5 + 2) \cdot \sqrt[3]{2} = \frac{0}{4}$

(2) $\frac{\sqrt[3]{a^4}}{\sqrt[3]{b}} \times \frac{\sqrt[3]{b}}{\sqrt[3]{a^2}} \times \sqrt[3]{a^2 b} = a^{\frac{4}{3}} \times b^{-\frac{1}{3}} \times a^{-\frac{2}{3}} \times b^{\frac{1}{3}} \times a^{\frac{2}{3}} \times b^{\frac{1}{3}}$
 $(a^{\frac{4}{3}})^{\frac{1}{3}} \times (b^{\frac{1}{3}})^{-1} \times (a^{\frac{2}{3}})^{\frac{1}{3}} = a^1 b^0 = \underline{a}$

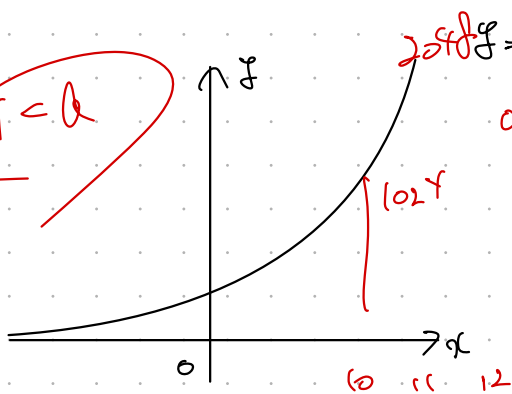
$\sqrt[n]{a} = a^{\frac{1}{n}} \quad \frac{1}{a} = a^{-1}$

○ 指数乗数のグラフ

4 -

☆ 値域は $(0, \infty)$

$a < 1$



$y = a^x$
 $0 < a$

$0 < a < 1$



$(-2)^x$

$x=1 \Rightarrow -2$
$2 \Rightarrow 4$
$3 \Rightarrow -8$
$4 \Rightarrow 16$

2

$2^2 = 2^4 = 16$

$2^{2^2} = 2^{16} = 65,536$

$(\frac{1}{2})^x$

$x=1 \Rightarrow \frac{1}{2}$

$2 \Rightarrow \frac{1}{4}$

$3 \Rightarrow \frac{1}{8}$

$4 \Rightarrow \frac{1}{16}$

“指数的に増加する”

○ 指数方程式

(1) $3^{x+2} = 27$ 指数の底に合わせる.

$3^{x+2} = 3^3$ "底"

$x+2 = 3 \quad \therefore x = 1$

(2) $4^x - 2^{x+2} - 32 = 0$

$2^{2x} - 2^{x+2} - 32 = 0$
 $(2^x)^2 - 2^x \times 2^2 - 32 = 0$

$2^x = X$ とおくと

$(X)^2 - X \times 2^2 - 32 = 0$

$X^2 - 4X - 32 = 0$... 2次方程式

$X = 8, -4$

$2^x = 8, -4$
 $\quad \quad \quad \underline{3} \quad \underline{\text{不適}}$

$x = 3$

(1) $16^{2-x} = 8^x$

$2^{4(2-x)} = 2^{3x}$

$4(2-x) = 3x$

$8 - 4x = 3x$

$\therefore x = \frac{8}{7}$

(2) $27^x - 4 \times 9^x + 3^{x+1} = 0$

$3^{3x} - 4 \times 3^{2x} + 3 \times 3^x = 0$

$3^0 = 1$

$3^x = X$ とおくと $X < 0 \leftarrow X > 0$

$X^3 - 4X^2 + 3X = 0 \leftarrow 3次方程式$

$X(X^2 - 4X + 3) = 0$

$X(X-3)(X-1) = 0$

$X = 0, 1, 3$

$3^x = 0, 1, 3$

不適 $x=0$ $x=1$

$x = 0, 1$

2^{x+1}
 \Downarrow
 $2 \times 2^x - 2^5 = 0$
 $2^x - 2^5 + 2^x = 0$
 $x - 5 + x = 0$
 $2x = 5$
 $x = \frac{5}{2} ?$

~~$3^x = 0$~~

0 指数不等式

ex) $\beta < 2^x$

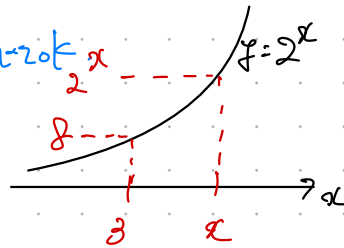
$2^0 < 2^x$

$3 < 2^x$

指数の比較に注意.

"底" $1 < 2$

$1 < a$



ex) $\frac{1}{2} < (\frac{1}{2})^x$

$(\frac{1}{2})^3 < (\frac{1}{2})^x$

~~$3 < x$~~

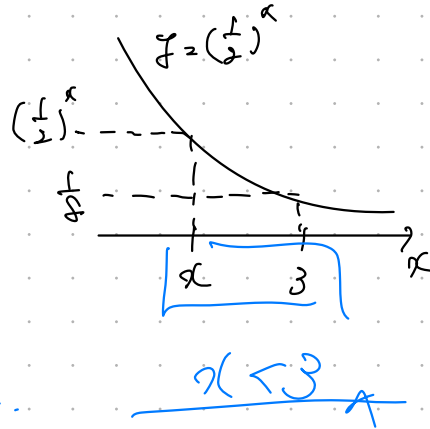
$x < 3$

底 $\frac{1}{2} < 1$

① 底 $0 < b < 1$

②

不等号逆に.



(1) $(\frac{1}{2})^{2x+2} < (\frac{1}{2})^{x-1}$

$(\frac{1}{2})^{2x+2} < (\frac{1}{2})^{4(x-1)}$

$2x+2 > 4x-4$
 $6 > 2x$

等号は逆に.

$x < 3$

ex) $2 \cdot 4^x - 17 \cdot 2^x + 8 < 0$

$2 \cdot 2^{2x} - 17 \cdot 2^x + 8 < 0$

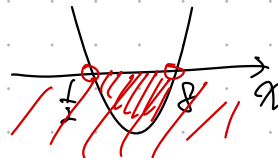
$2^x = x$ とおく. $x > 0$

$$\begin{array}{r} 1 \cdot x \\ 2 \cdot 8 \\ \hline 2 \cdot 8 - 17 \end{array}$$

$2 \cdot x^2 - 17x + 8 < 0$

$(x-8)(2x-1) < 0$

$0 < \frac{1}{2} < x < 8$



$\frac{1}{2} < 2^x < 8$

$2^{-1} < 2^x < 2^3$

$-1 < x < 3$

0より
大きい
確認

[163]

$$(1) 6^{2-x} = 8^x$$

$$(2) 2 \cdot 9^x - 4 \cdot 9^x + 3^{x+1} = 0$$

$$(3) \begin{cases} 3^{x+1} - 2^x = 19 \\ 4^x + 2^{x+1} - 3^x = -1 \end{cases}$$

[164]

$$(1) \frac{1}{\sqrt{3}} < \left(\frac{1}{3}\right)^x < 9$$

$$(2) 2^{9^x} - 4^{x+1} > 0$$

$$(3) \left(\frac{1}{4}\right)^x - 9\left(\frac{1}{2}\right)^{x-1} + 32 \leq 0$$