T-PT Pre-Calculus : Trigonometry

Exponents → Advanced Multiplication

2^3 ← exponent / power

2 ↑ base

$$2^3 = 2 \cdot 2 \cdot 2 = 8$$

$$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

$$\frac{4^5}{4^2} = \frac{\cancel{4}\cdot\cancel{4}\cdot 4\cdot 4\cdot 4}{\cancel{4}\cdot\cancel{4}} = 4\cdot 4\cdot 4 = 4^3 \qquad \frac{4}{4} = 1$$

$$\frac{4^{5}}{4^{2}} = 4^{5-2} = 4^3$$

$$\frac{7^3}{7^8} = 7^{3-8} = 7^{-5} = \frac{1}{7^5} \qquad \frac{7^3}{7^8} = \frac{\cancel{7\cdot 7\cdot 7}}{\cancel{7\cdot 7\cdot 7}\cdot 7\cdot 7\cdot 7\cdot 7\cdot 7}$$

$$x^3 * x^5 = x^{3+5} = x^8$$

$8^{\frac{2}{3}}$ ← power, ↑ root $= \sqrt[3]{8^2}$ or $\left(\sqrt[3]{8}\right)^2 = (2)^2 = \boxed{4}$

$4^3 = (2^2)^3 = 2^{2*3} = 2^6$ Change the Base

$(2^2)^3 = 2^2 \cdot 2^2 \cdot 2^2 = 2^6$

1.) $125^{2/3}$ (square ↓, cube root ↑)

$\sqrt[3]{125^2}$ or $\left(\sqrt[3]{125}\right)^2$

$(5)^2 = \boxed{25}$

2.) $6^{-3} = \frac{1}{6^3} = \boxed{\frac{1}{216}}$

3.) $27^4 * 9^5$

$(3^3)^4 * (3^2)^5$

$3^{12} * 3^{10} = 3^{12+10}$

$\boxed{3^{22}}$

4.) $\frac{64^2}{2^5} = \frac{(2^6)^2}{2^5} = \frac{2^{12}}{2^5}$

$\boxed{2^7}$

$4^{a} = 2^{6}$

$(2^{2})^{a} = 2^{6}$

$2^{2a} = 2^{6}$

$\frac{2a}{2} = \frac{6}{2}$

$a = 3$

$25^{4m+1} = 125^{2m+2}$

$(5^{2})^{4m+1} = (5^{3})^{2m+2}$

$5^{8m+2} = 5^{6m+6}$

$8m + 2 = 6m + 6$

$-6m \quad -6m$

$2m + 2 = 6$

$-2 \quad -2$

$\frac{2m}{2} = \frac{4}{2}$

$m = 2$

$64^{2-3n} = \frac{1}{16}$

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

$4^{6-9n} = 4^{-2}$

$6 - 9n = -2$

$+2 \qquad +2$

$8 - 9n = 0$

$+9n \quad +9n$

$8 = 9n$

$\frac{8}{9} = \frac{9n}{9}$

$n = \frac{8}{9}$

Graphing Exponents

$y = 5^x$

set equal to 0 and 1

$x = 0$

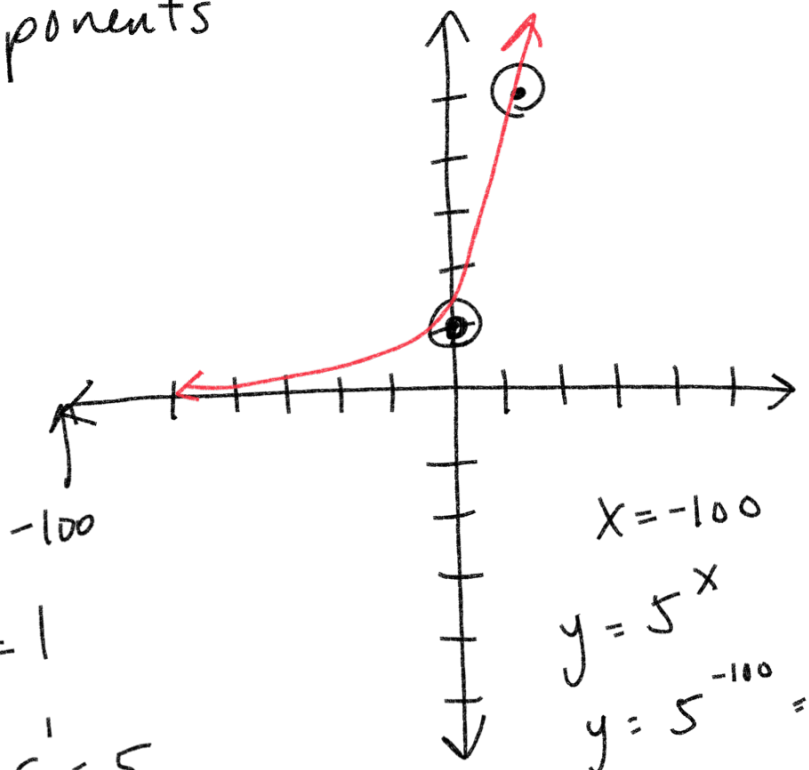
$y = 5^0 = 1$

$(0, 1)$

$x = 1$

$y = 5^1 = 5$

$(1, 5)$



$x = -100$

$y = 5^x$

$y = 5^{-100} = \frac{1}{5^{100}}$

≈ 0

$\frac{5^2}{5^2} = 5^{2-2} = 5^0 = 1$

red → blue

$y = 5^{x-1}$

moved 1 right

move in opposite direction

$x - 1 = 0$

$+1 \quad +1$

$x = 1$

$y = 5^{1-1} = 5^0 = 1$

$(1, 1)$

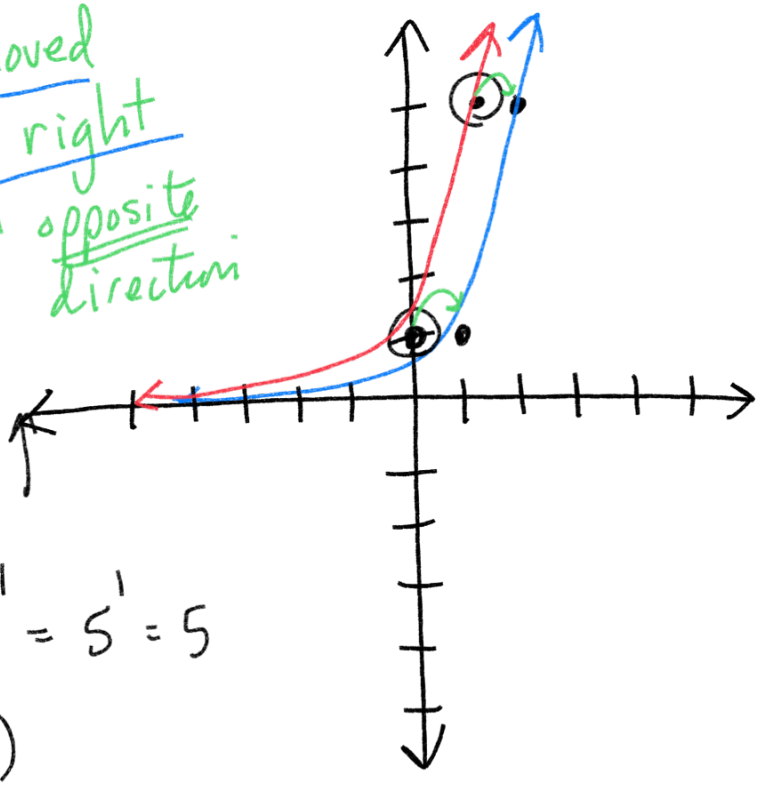
$x - 1 = 1$

$+1 \quad +1$

$x = 2$

$y = 5^{2-1} = 5^1 = 5$

$(2, 5)$

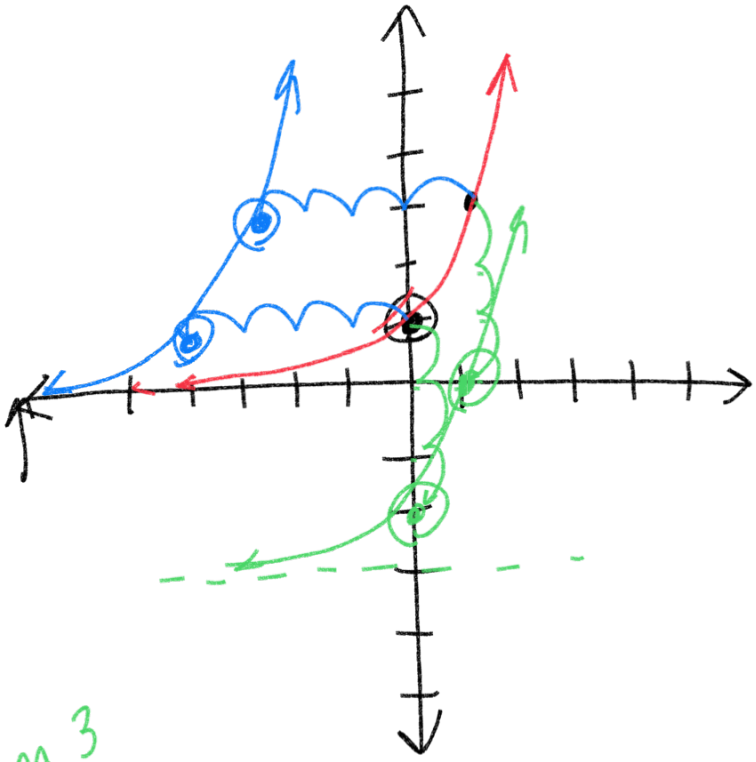


$y = 2^{x}$

0 and 1

$y = 2^{0} = 1$ $y = 2^{1} = 2$

$(0,1)$ $(1,2)$

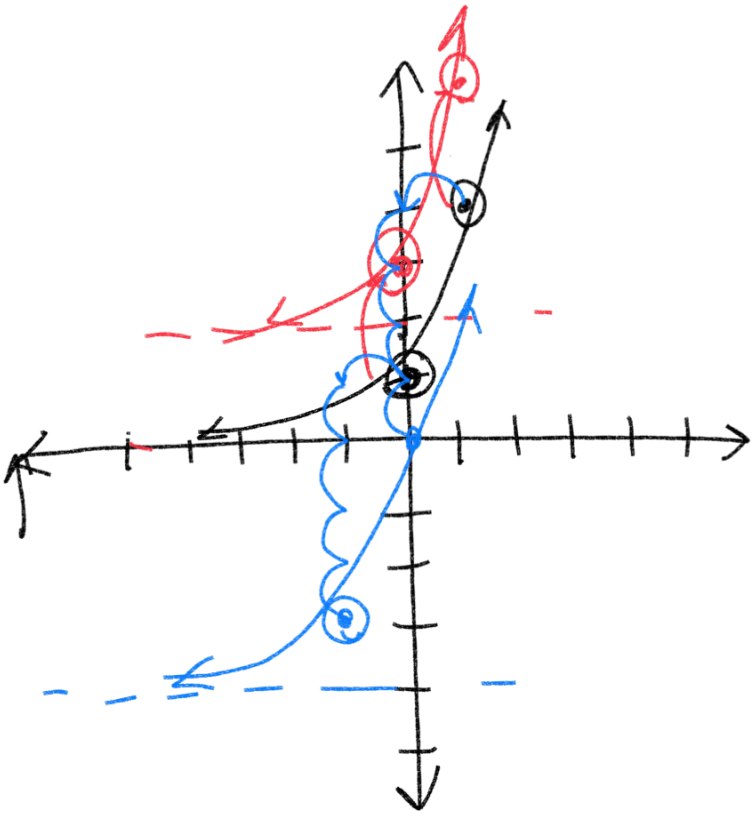


$y = 2^{x+4}$ Left 4

$y = 2^{x} - 3$ down 3

$y = 3^{x}$ $x=0$ $x=1$

$3^{1} = 3$ $y=1$ $y=3$



$y = 3^{x} + 2$

$y = 3^{x+1} - 4$ ← opposite