MTH-PT Trigonometry Session 1 1/25

Exponents

exponent/power

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

base

$$\left[5^{-2} = \frac{1}{5^2} \right]$$

$$9^{-4} = \frac{1}{9^4}$$

$$\frac{5^4}{5^6} = \frac{5 \cdot 5 \cdot 5 \cdot 5}{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5} = \boxed{\frac{1}{5^2}}$$

$$\frac{5^4}{5^6} = 5^{4-6} = \boxed{5^{-2}}$$

exponent

$8^{\frac{2}{3}}$ ← root $= \sqrt[3]{8^2} = \left(\sqrt[3]{8}\right)^2$

$\sqrt[3]{64} = (2)^2 = \boxed{4}$

$(4)^3 = (2^2)^3 = 2^2 \cdot 2^2 \cdot 2^2 = 2^{2+2+2} = 2^6$

"change the base" "multiply exponents — Add the numbers

$(2^2)^3 = \boxed{2^{2*3}} = 2^6$

raise an exponent by an exponent — multiply the numbers

add

$x^3 * x = x^{3+7} = \boxed{x^{10}}$

mult

subtract

$\frac{x^8}{x^3} = x^{8-3} = \boxed{x^5}$

divide

$3^0 = 1$

$\frac{3^4}{3^4} = 3^{4-4} = 3^0$

$\frac{3^4}{3^4} = \frac{3 \cdot 3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 3 \cdot 3} = \frac{1}{1}$

$1{,}027^0 = 1$

$3{,}824^0 = 1$

$(\quad)^0 = 1$

$0^0 \neq 1$

$8 = 2^3$

change of base

$\frac{8^4}{2^7} = \frac{(2^3)^4}{2^7} = \frac{2^{12}}{2^7} = 2^{12-7} = \boxed{2^5}$

1.) $125^{2/3}$ ← root, exponent →

$\left(\sqrt[3]{125}\right)^2 = (5)^2 = \boxed{25}$

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

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

$\downarrow \qquad \downarrow$

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

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

$3^{12+10} = \boxed{3^{22}}$

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

$3 \cdot 3 = \boxed{3^{22}}$

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

$2^{12-5} = \boxed{2^7}$

$4^a = 2^6$

$\downarrow$

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

$\underline{\underline{2}}^{\boxed{2a}} = \underline{\underline{2}}^{\boxed{6}}$

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

$\boxed{a = 3}$

$4^3 = 2^6$

$64^{2-3n} = \frac{1}{16}$ $\qquad$ $\frac{1}{4^2} = 4^{-2}$

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

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

$6 - 9n = -2$

$-6 \qquad -6$

$-9n = -8$

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

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

$25^{3m+1} = 125^{m+2}$

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

$5^{6m+2} = 5^{3m+6}$

$6m + 2 = 3m + 6$

$-3m \qquad -3m$

$3m + 2 = 6$

$-2 \quad -2$

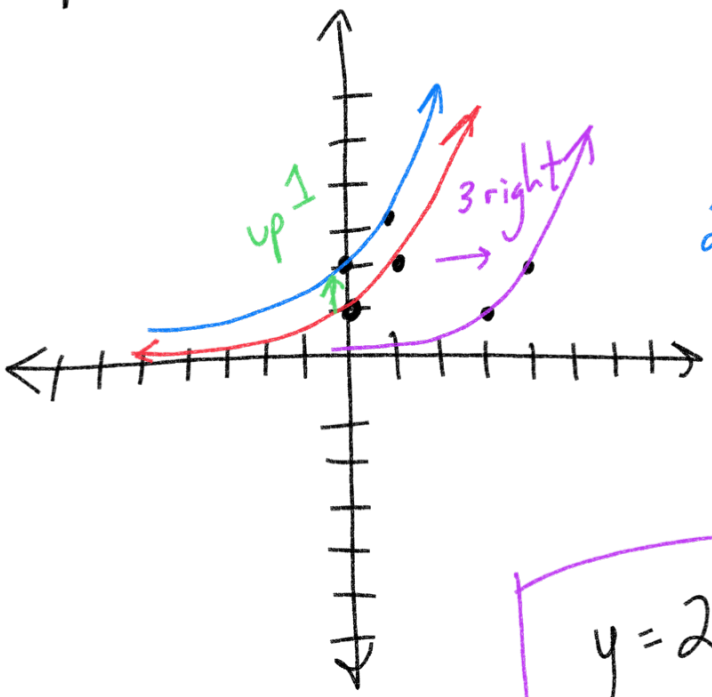
$\frac{3m}{3} = \frac{4}{3}$

$\boxed{m = \frac{4}{3}}$

Graphing Exponents

$y = 2^x$

$x=0$	$x=1$
$2^0 = 1$	$2^1 = 2$
$(0,1)$	$(1,2)$



$y = 2^x$ up 1 $+1$

$x=0$	$x=1$
2^0+1	2^1+1
$1+1$	$2+1$
2	3
$(0,2)$	$(1,3)$

$y = 2^{(x-3)}$ $\ominus$ right $\oplus$ ~~left~~

shift 3 right