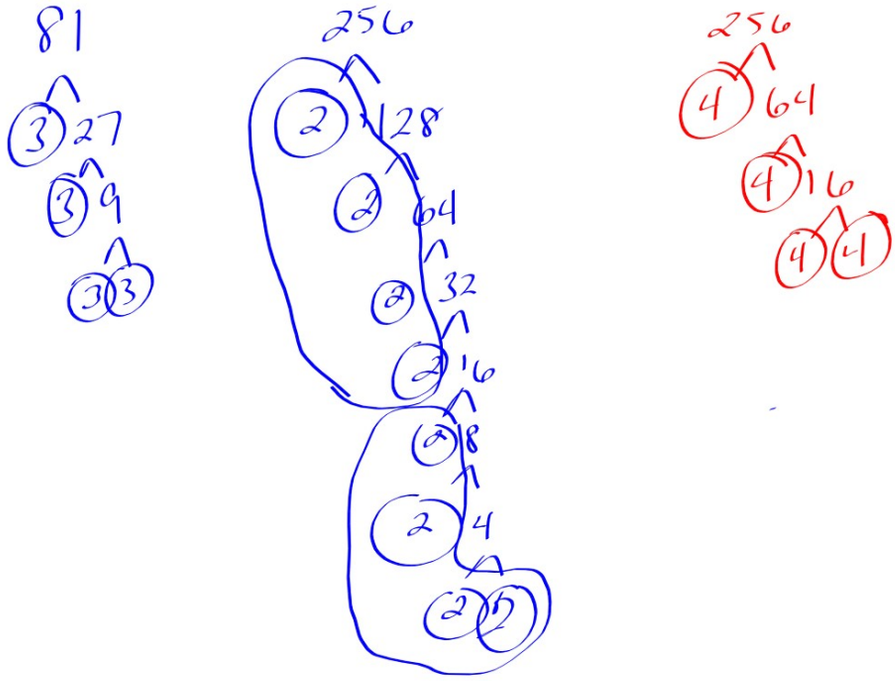
12. $\left(\frac{81}{256}\right)^{1/4} \rightarrow \frac{\sqrt[4]{81}}{\sqrt[4]{256}} = \frac{3}{2 \cdot 2} = \frac{3}{4}$



13. $\left(\frac{16}{625}\right)^{1/4} = \frac{\sqrt[4]{16}}{\sqrt[4]{625}} = \frac{2}{5}$

16
4 4
2 2 2 2

625
5 125
5 25
5 5

14. Evaluate:

$729^{5/6} \rightarrow \sqrt[6]{729^5} \rightarrow \left(\sqrt[6]{729}\right)^5$

$729 = 9 \cdot 81$

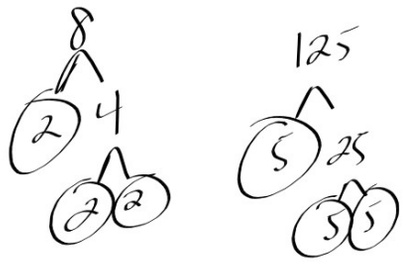
$9 \cdot 9 \cdot 9$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

$= 3^5$

$= 243$

15. $\left(\frac{8}{125}\right)^{4/3} = \frac{\sqrt[3]{8}^4}{\sqrt[3]{125}^4} = \frac{2^4}{5^4} = \frac{16}{625}$



For insects, the resting metabolic rate can be determined by $r = 4.14m^{\frac{2}{3}}$, where r is the resting metabolic rate in cubic millimeters of oxygen per hour and m is the body mass of the insect in milligrams. Determine the resting metabolic rate of a 125-mg ebony jewelwing damselfly.

$r = 4.14m^{2/3}$

$r = 4.14(125)^{2/3}$

$r = 4.14(25)$

$r = 103.5$

$125^{2/3}$

$= \sqrt[3]{125}^{2}$

$= 5^2 = 25$