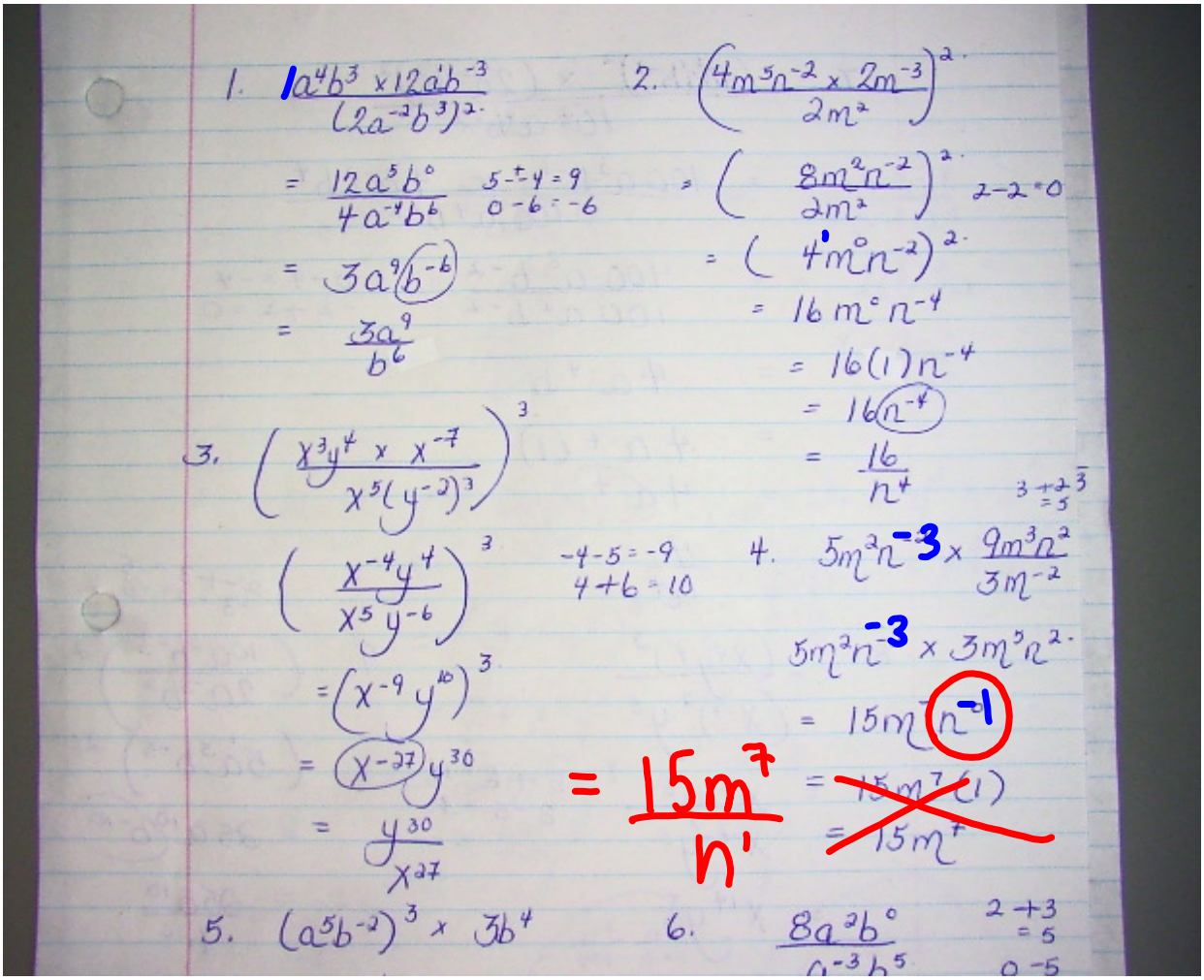


1. $\frac{a^4b^3 \times 12a^1b^{-3}}{(2a^{-2}b^3)^2}$

$= \frac{12a^5b^0}{4a^{-4}b^6}$ $\quad 5+4=9$, $0-6=-6$

$= 3a^9b^{-6}$

$= \frac{3a^9}{b^6}$

2. $\left(\frac{4m^5n^{-2} \times 2m^{-3}}{2m^2}\right)^2$

$= \left(\frac{8m^2n^{-2}}{2m^2}\right)^2$ $\quad 2-2=0$

$= (4m^0n^{-2})^2$

$= 16m^0n^{-4}$

$= 16(1)n^{-4}$

$= 16n^{-4}$

$= \frac{16}{n^4}$

3. $\left(\frac{x^3y^4 \times x^{-7}}{x^5(y^{-2})^3}\right)^3$

$\left(\frac{x^{-4}y^4}{x^5y^{-6}}\right)^3$ $\quad -4-5=-9$, $4+6=10$

$= (x^{-9}y^{10})^3$

$= x^{-27}y^{30}$

$= \frac{y^{30}}{x^{27}}$

4. $5m^2n^{-3} \times \frac{9m^3n^2}{3m^{-2}}$ $\quad 3+2=5$

$5m^2n^{-3} \times 3m^5n^2$

$= 15m^7n^{-1}$

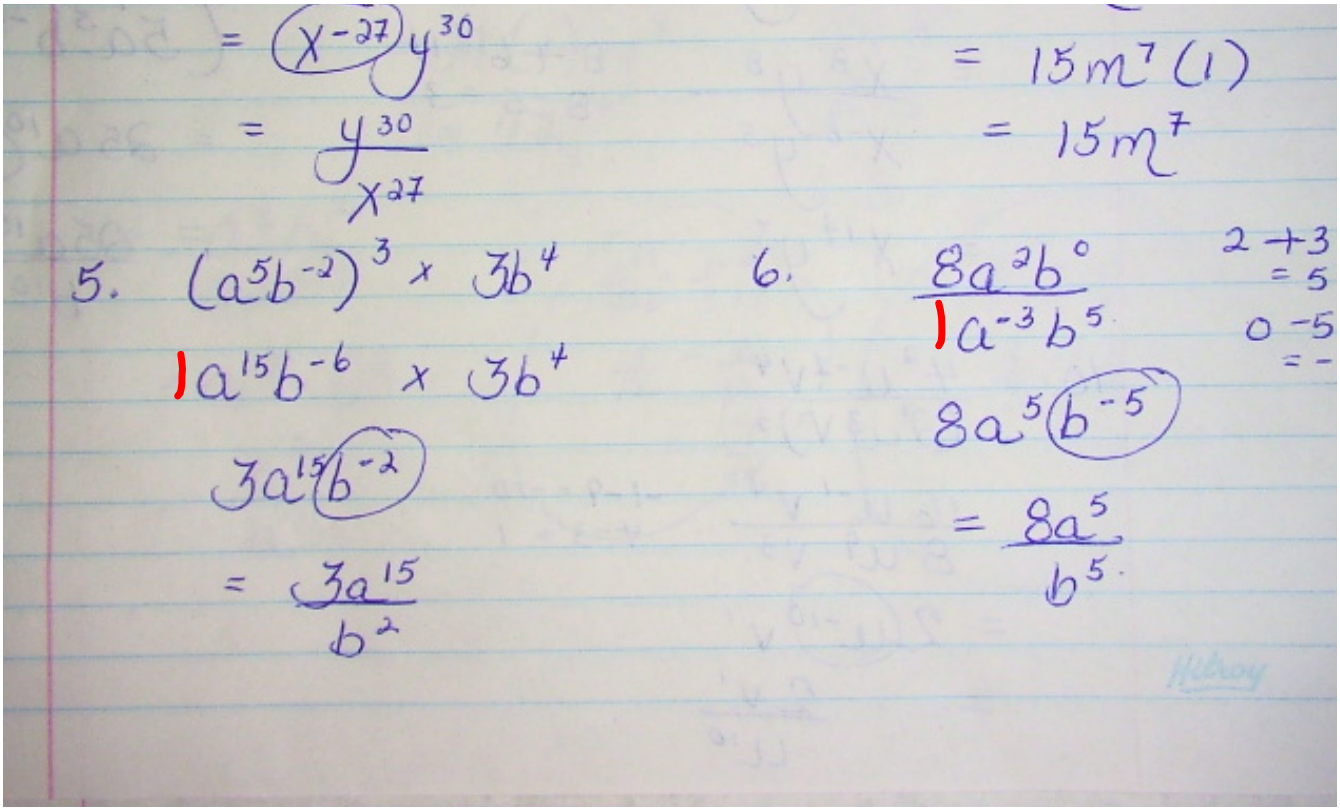
$= \frac{15m^7}{n^1}$

~~$= 15m^7(1)$~~

~~$= 15m^7$~~

5. $(a^5b^{-2})^3 \times 3b^4$

6. $\frac{8a^2b^0}{a^{-3}b^5}$ $\quad 2+3=5$, $0-5$



$= x^{-27} y^{30}$

$= \frac{y^{30}}{x^{27}}$

$= 15m^7(1)$

$= 15m^7$

5. $(a^5b^{-2})^3 \times 3b^4$

$a^{15}b^{-6} \times 3b^4$

$3a^{15}b^{-2}$

$= \frac{3a^{15}}{b^2}$

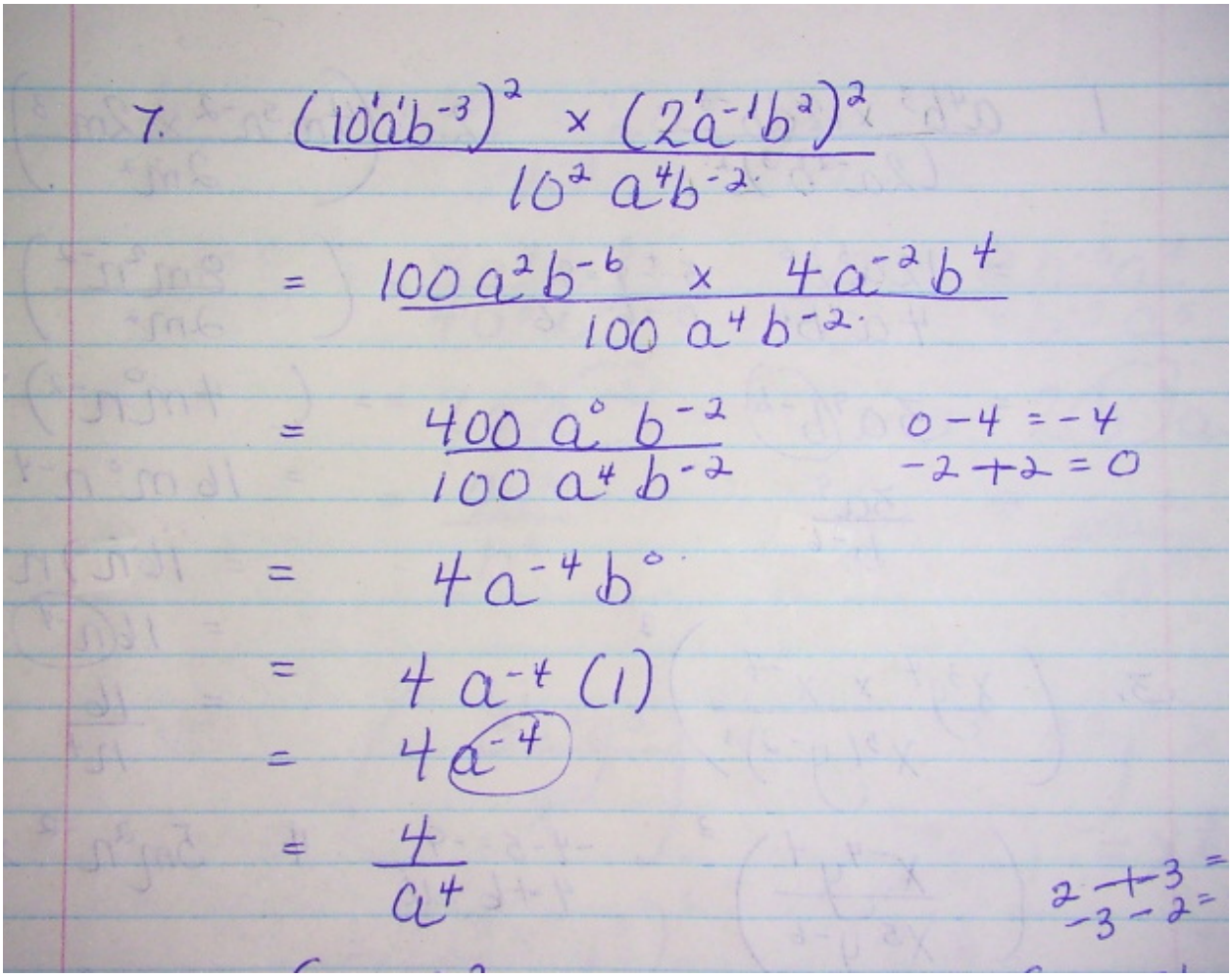
6. $\frac{8a^2b^0}{a^{-3}b^5}$

$8a^5b^{-5}$

$= \frac{8a^5}{b^5}$

$2+3 = 5$

$0-5 = -$



7. $\dfrac{(10^1a^1b^{-3})^2 \times (2^1a^{-1}b^2)^2}{10^2 a^4 b^{-2}}$

$= \dfrac{100a^2b^{-6} \times 4a^{-2}b^4}{100a^4b^{-2}}$

$= \dfrac{400a^0b^{-2}}{100a^4b^{-2}}$ $\quad 0-4=-4$, $-2+2=0$

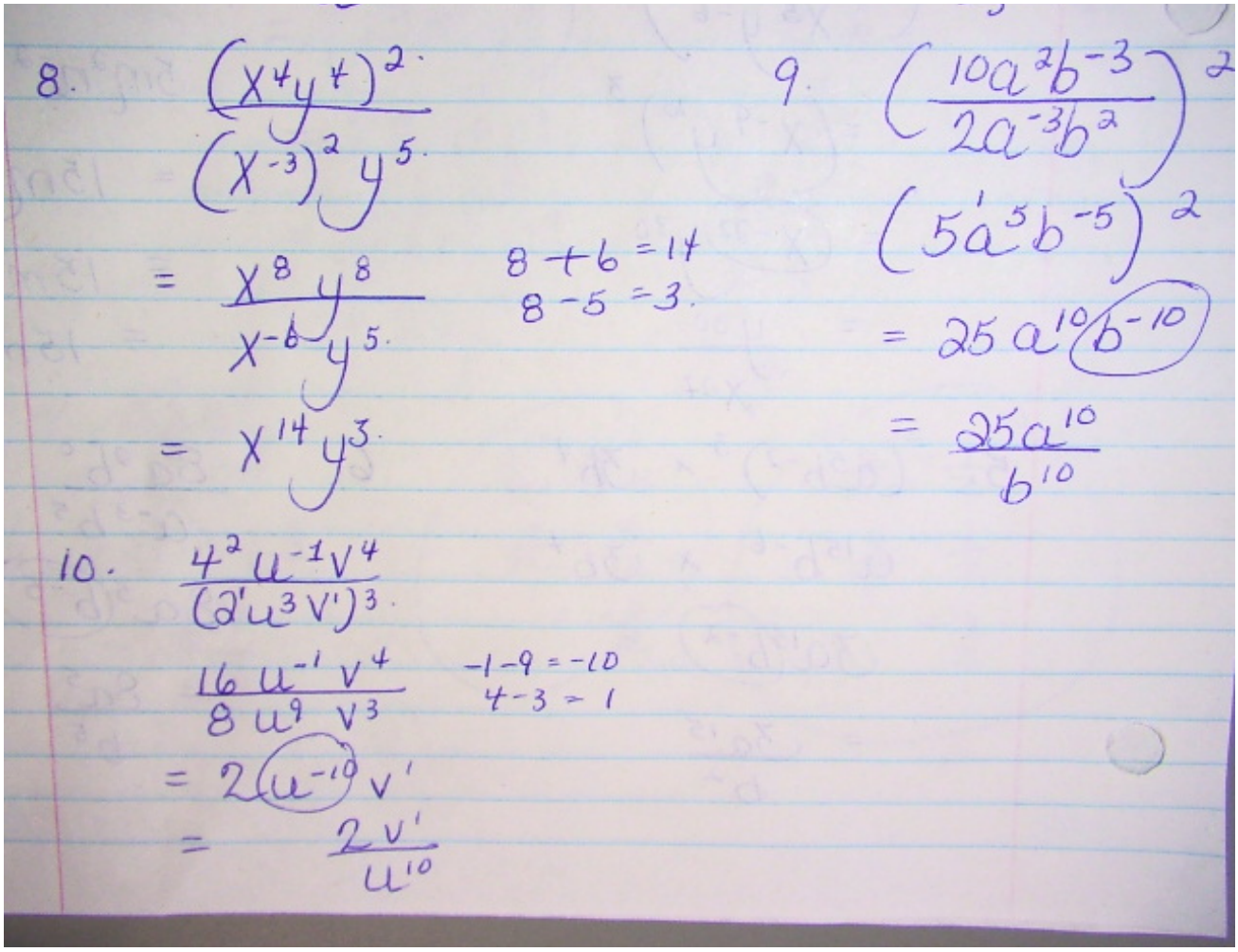
$= 4a^{-4}b^0$

$= 4a^{-4}(1)$

$= 4a^{-4}$

$= \dfrac{4}{a^4}$

$2+3=$
$-3-2=$



8. $\frac{(x^4y^4)^2}{(x^{-3})^2y^5}$

$= \frac{x^8y^8}{x^{-6}y^5}$ $\quad 8+6=14$, $\quad 8-5=3$.

$= x^{14}y^3$

9. $\left(\frac{10a^2b^{-3}}{2a^{-3}b^2}\right)^2$

$(5a^5b^{-5})^2$

$= 25a^{10}b^{-10}$

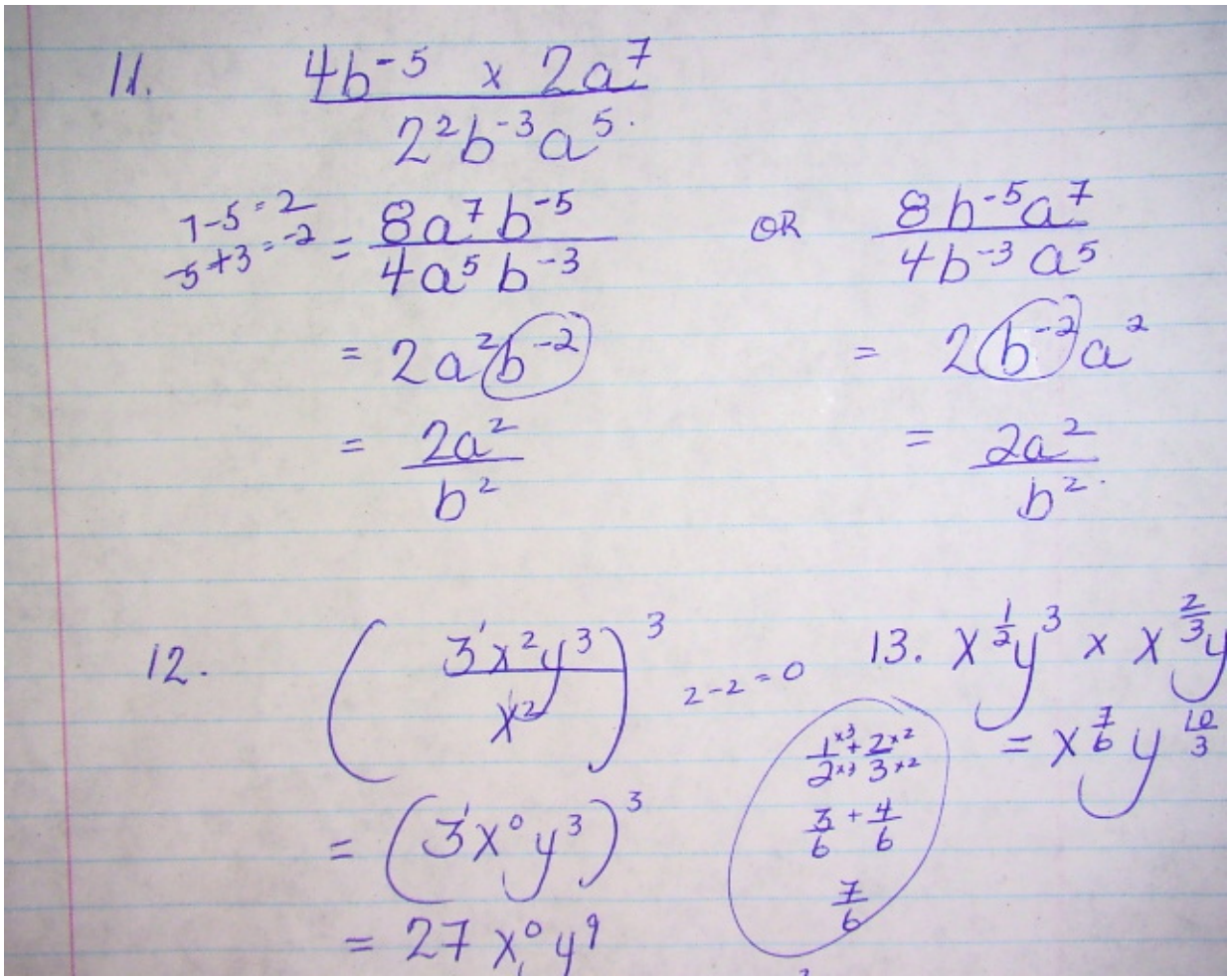
$= \frac{25a^{10}}{b^{10}}$

10. $\frac{4^2u^{-1}v^4}{(2^1u^3v^1)^3}$

$\frac{16u^{-1}v^4}{8u^9v^3}$ $\quad -1-9=-10$, $\quad 4-3=1$

$= 2u^{-10}v^1$

$= \frac{2v^1}{u^{10}}$



11. $\frac{4b^{-5} \times 2a^{7}}{2^{2}b^{-3}a^{5}}$

$1-5=2$, $-5+3=-2$

$= \frac{8a^{7}b^{-5}}{4a^{5}b^{-3}}$ OR $\frac{8b^{-5}a^{7}}{4b^{-3}a^{5}}$

$= 2a^{2}b^{-2}$ $= 2b^{-2}a^{2}$

$= \frac{2a^{2}}{b^{2}}$ $= \frac{2a^{2}}{b^{2}}$

12. $\left(\frac{3x^{2}y^{3}}{x^{2}}\right)^{3}$ $2-2=0$

$= (3x^{0}y^{3})^{3}$

$= 27x^{0}y^{9}$

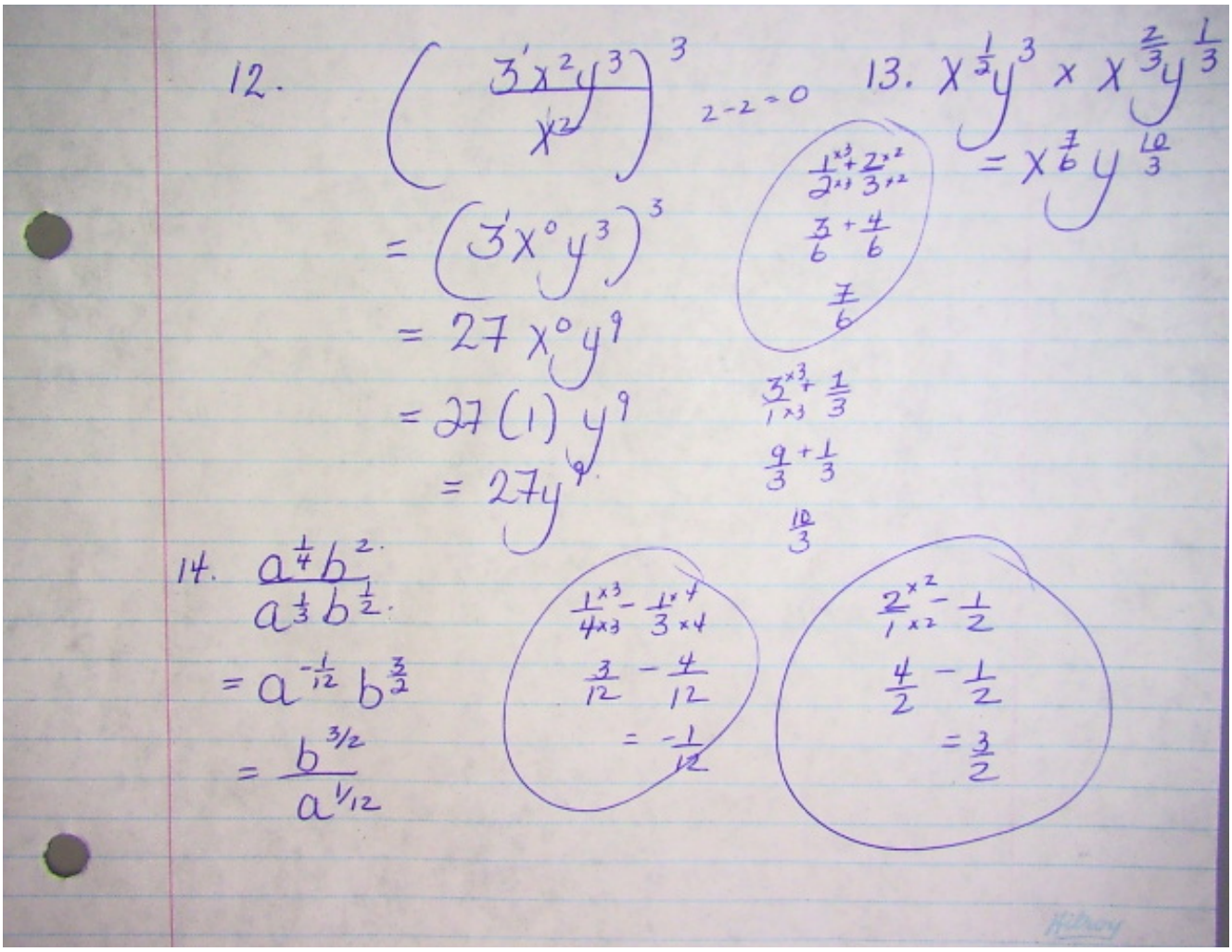
13. $x^{\frac{1}{2}}y^{3} \times x^{\frac{2}{3}}y$

$= x^{\frac{7}{6}}y^{\frac{10}{3}}$

$\frac{1^{\times 3}}{2_{\times 3}} + \frac{2^{\times 2}}{3^{\times 2}}$

$\frac{3}{6} + \frac{4}{6}$

$\frac{7}{6}$



12. $\left(\frac{3x^2y^3}{x^2}\right)^3$ $2-2=0$

$= (3x^0y^3)^3$

$= 27x^0y^9$

$= 27(1)y^9$

$= 27y^9$

13. $x^{\frac{1}{2}}y^3 \times x^{\frac{2}{3}}y^{\frac{1}{3}}$

$= x^{\frac{7}{6}}y^{\frac{10}{3}}$

$\frac{1^{\times3}}{2_{\times3}} + \frac{2^{\times2}}{3_{\times2}}$

$\frac{3}{6} + \frac{4}{6}$

$\frac{7}{6}$

$\frac{3^{\times3}}{1_{\times3}} + \frac{1}{3}$

$\frac{9}{3} + \frac{1}{3}$

$\frac{10}{3}$

14. $\frac{a^{\frac{1}{4}}b^2}{a^{\frac{1}{3}}b^{\frac{1}{2}}}$

$= a^{-\frac{1}{12}}b^{\frac{3}{2}}$

$= \frac{b^{3/2}}{a^{1/12}}$

$\frac{1^{\times3}}{4_{\times3}} - \frac{1^{\times4}}{3_{\times4}}$

$\frac{3}{12} - \frac{4}{12}$

$= -\frac{1}{12}$

$\frac{2^{\times2}}{1_{\times2}} - \frac{1}{2}$

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

$= \frac{3}{2}$