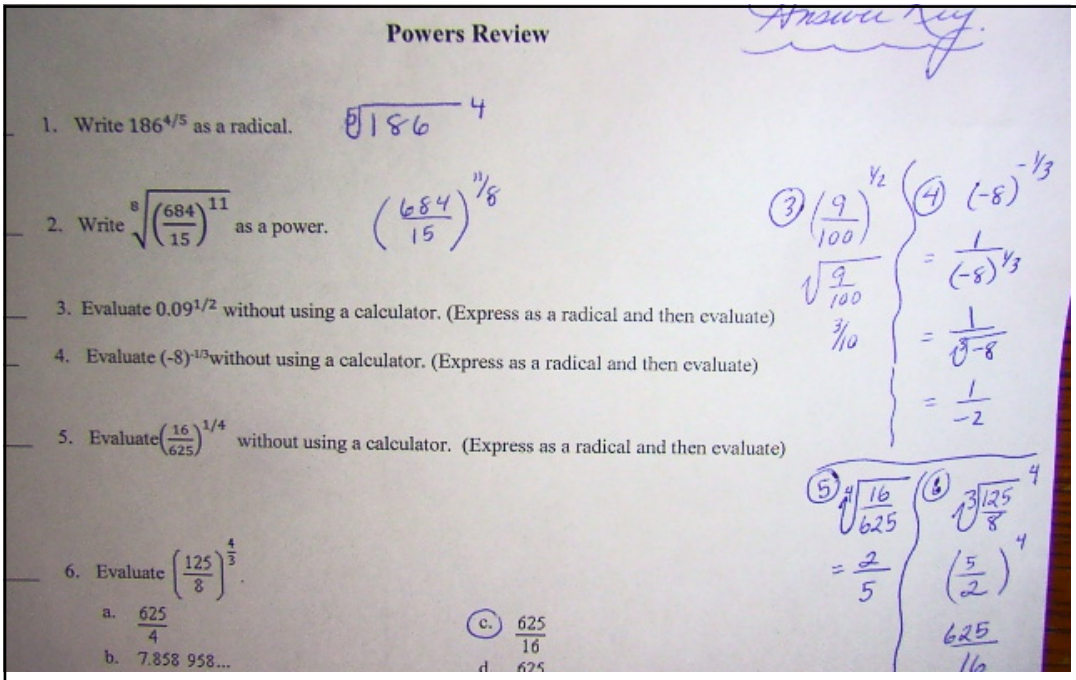


Powers Review

Answer Key.

1. Write $186^{4/5}$ as a radical. $\sqrt[5]{186^4}$

2. Write $\sqrt[8]{\left(\frac{684}{15}\right)^{11}}$ as a power. $\left(\frac{684}{15}\right)^{11/8}$

3. Evaluate $0.09^{1/2}$ without using a calculator. (Express as a radical and then evaluate)

$\sqrt{\frac{9}{100}} = \frac{3}{10}$

4. Evaluate $(-8)^{-1/3}$ without using a calculator. (Express as a radical and then evaluate)

$= \frac{1}{(-8)^{1/3}} = \frac{1}{\sqrt[3]{-8}} = \frac{1}{-2}$

5. Evaluate $\left(\frac{16}{625}\right)^{1/4}$ without using a calculator. (Express as a radical and then evaluate)

$\sqrt[4]{\frac{16}{625}} = \frac{2}{5}$

6. Evaluate $\left(\frac{125}{8}\right)^{\frac{4}{3}}$.

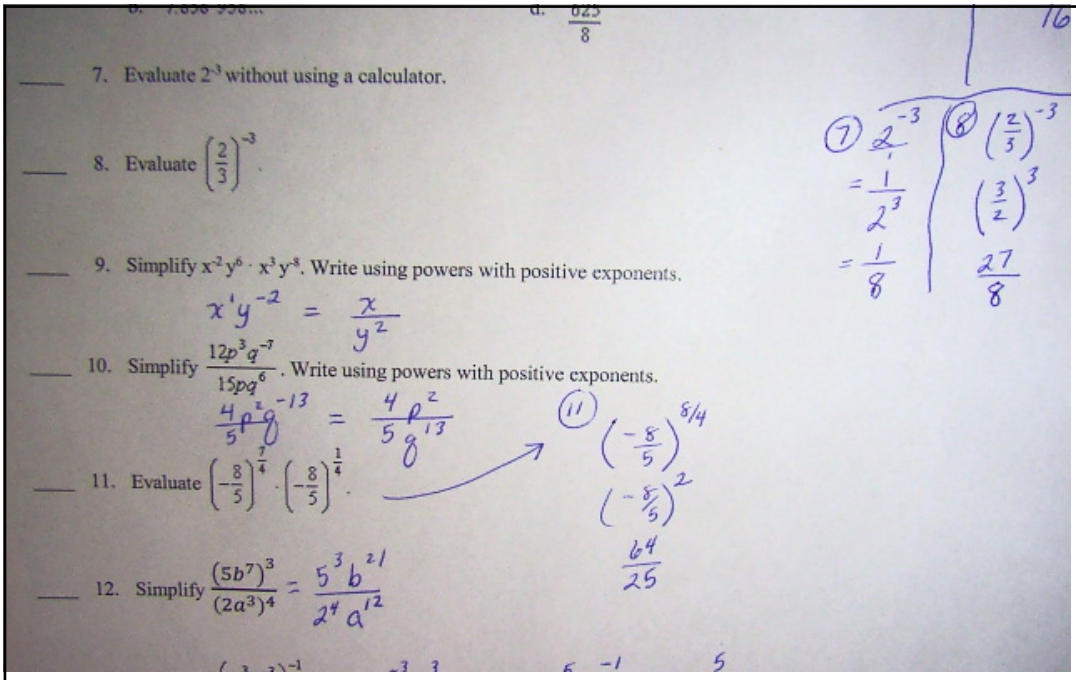
a. $\frac{625}{4}$

b. 7.858 958...

c. $\frac{625}{16}$

d. 625

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



d. $\frac{625}{8}$

7. Evaluate 2^{-3} without using a calculator.

8. Evaluate $\left(\frac{2}{3}\right)^{-3}$.

9. Simplify $x^{-2}y^{6} \cdot x^{3}y^{-8}$. Write using powers with positive exponents.

$x^{1}y^{-2} = \frac{x}{y^{2}}$

10. Simplify $\frac{12p^{3}q^{-7}}{15pq^{6}}$. Write using powers with positive exponents.

$\frac{4}{5}p^{2}q^{-13} = \frac{4p^{2}}{5q^{13}}$

11. Evaluate $\left(-\frac{8}{5}\right)^{\frac{7}{4}} \cdot \left(-\frac{8}{5}\right)^{\frac{1}{4}}$.

12. Simplify $\frac{(5b^{7})^{3}}{(2a^{3})^{4}} = \frac{5^{3}b^{21}}{2^{4}a^{12}}$

16

(7) $2^{-3} = \frac{1}{2^{3}} = \frac{1}{8}$

(8) $\left(\frac{2}{3}\right)^{-3} \left(\frac{3}{2}\right)^{3} \frac{27}{8}$

(11) $\left(-\frac{8}{5}\right)^{8/4} \left(-\frac{8}{5}\right)^{2} \frac{64}{25}$

___ 13. Simplify $\frac{(m^3n^{-3})^{-1}}{(m^{-2}n)^4}$. $= \frac{m^{-3}n^3}{m^{-8}n^4} = \frac{m^5n^{-1}}{1} = \frac{m^5}{n^1}$

Evaluate:

a) $2401^{3/4}$

$\sqrt[4]{2401}^3$

7^3

343

b) $32^{-0.4}$

$= 32^{-4/10}$

$= 32^{-2/5}$

$= \frac{1}{32^{2/5}}$

$= \frac{1}{\sqrt[5]{32}^2}$

$= \frac{1}{2^2} = 1/4$

Simplify:

a) $\left(\frac{(6x^8y^{-3}\cdot x^{11}y^3)}{(2xy^7)}\right)^{-2}$

$\left(\frac{6x^{19}y^0}{2xy^7}\right)^{-2}$

$(3x^{18}y^{-7})^{-2}$

$\frac{3^{-2}x^{-36}y^{14}}{1} = \frac{y^{14}}{3^2x^{36}}$

b) $\left(\frac{5^6x^3y^5}{5x^{-2}y^3}\right)^3$

$(5^5x^5y^2)^3$

$5^{15}x^{15}y^6$

Powers Worksheet

2. $\frac{m^8n^{-2}}{m^{-5}n^{-3}}$

2. $\left(\frac{a^{-2}b^{-3}}{(b^5)^{-2}a^5}\right)^{-2}$

3. $\frac{24p^4q^{-3}}{6p^2q^3}$

4. $(3s^{-2}t^3)^{-2}$

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

6. $4m^3n^{-2} \times 3m^{-2}n^5$

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

8. $\left(\frac{a^4b^5}{a^{-3}b^2}\right)^3$

9. $\frac{\left(z^3(y^{-2})^3\right)^{-2}}{((z^{-2})^4y^{-2})^3}$

10. $(4b^2c^3)^2 \times (2b^{-2}c^{-2})^{-2}$

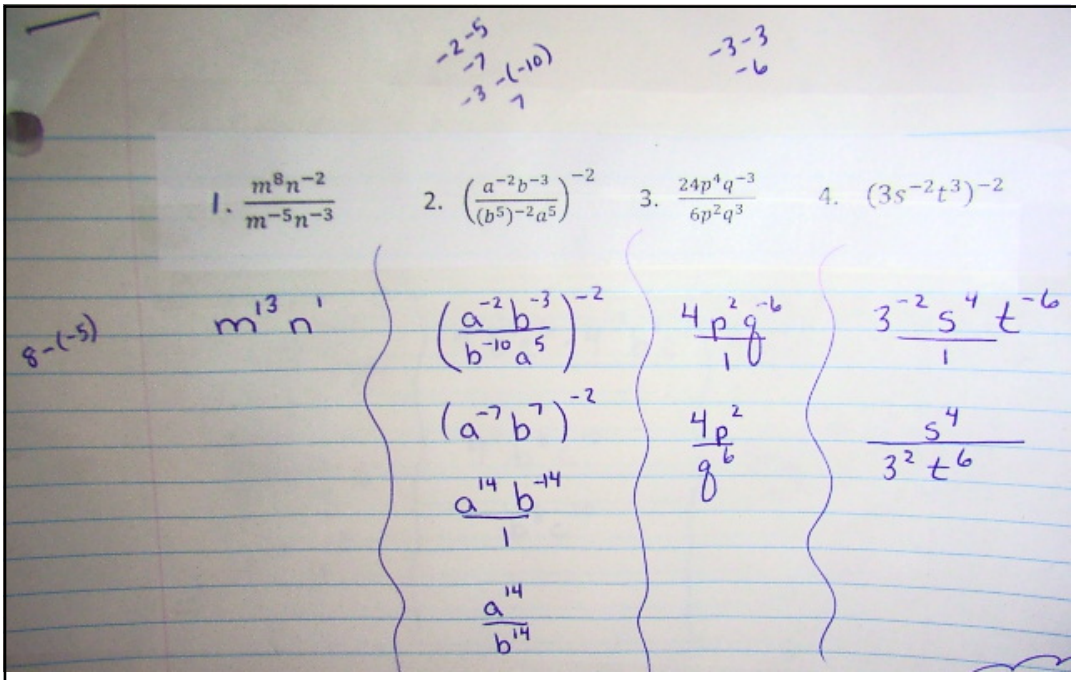
11. $\frac{36m^{-2}n^5}{9m^{-4}n^7}$

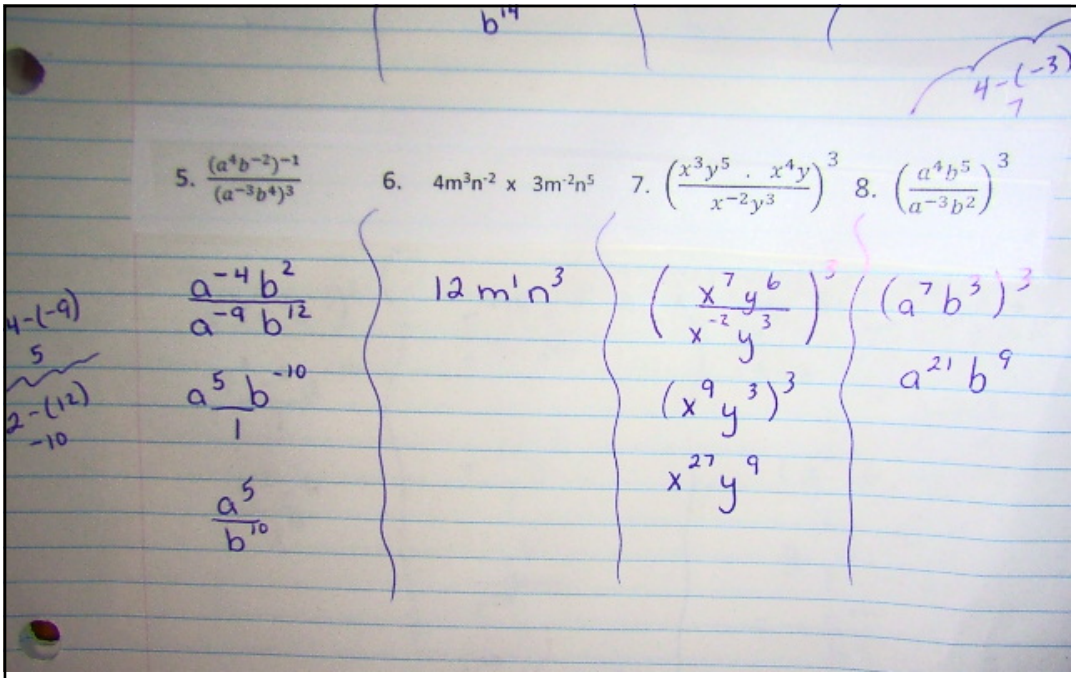
12. $\left(\frac{4}{3}p^4q^{-3}\right)^{-2}$

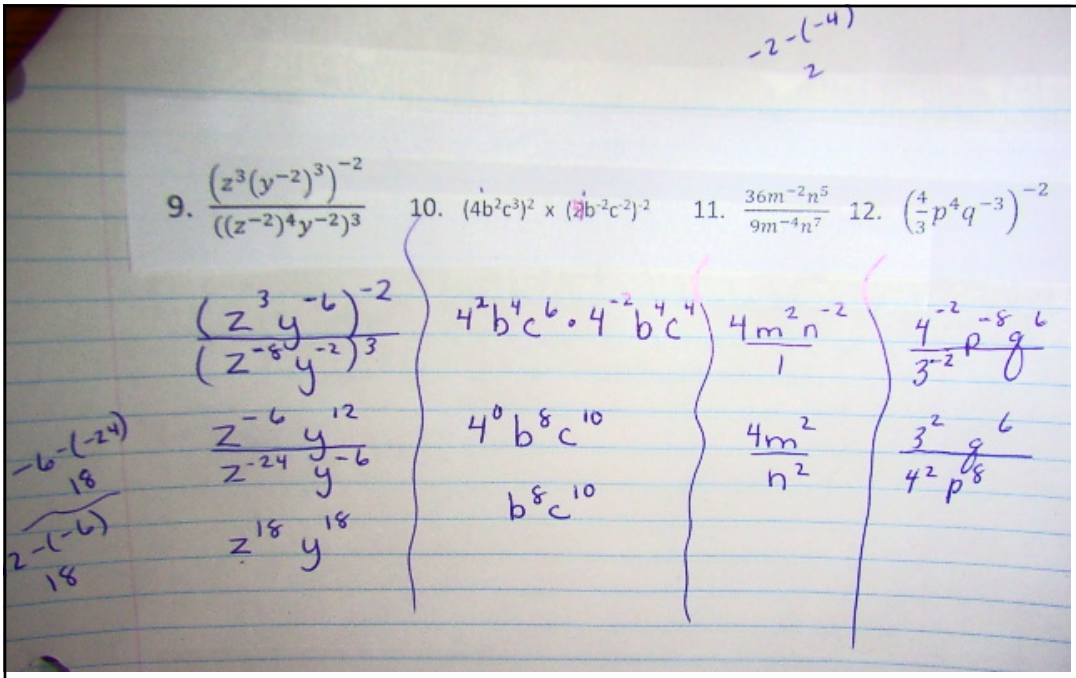
13. $\left(\frac{12c^5d^{-2}}{3c^{-2}d^3}\right)^2$

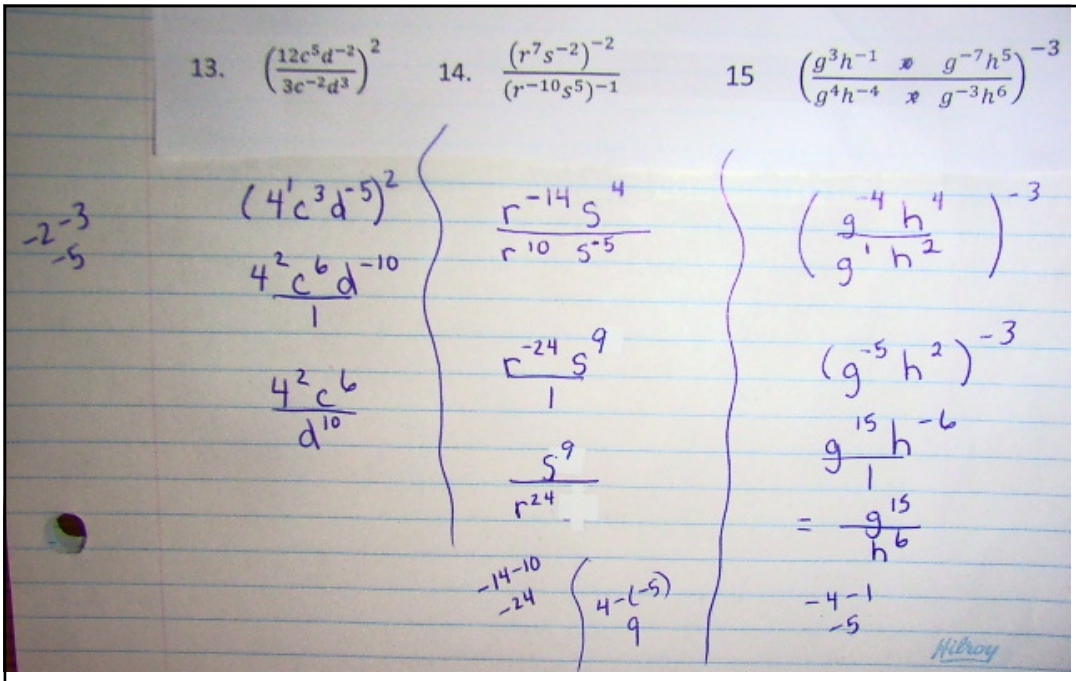
14. $\frac{(r^7s^{-2})^{-2}}{(r^{-10}s^5)^{-1}}$

15 $\left(\frac{g^3h^{-1} \times g^{-7}h^5}{g^4h^{-4} \times g^{-3}h^6}\right)^{-3}$


-2-5
-7
-3-(-10)
7
-3-3
-6
1. $\frac{m^8n^{-2}}{m^{-5}n^{-3}}$
2. $\left(\frac{a^{-2}b^{-3}}{(b^5)^{-2}a^5}\right)^{-2}$
3. $\frac{24p^4q^{-3}}{6p^2q^3}$
4. $(3s^{-2}t^3)^{-2}$
8-(-5)
$m^{13}n^1$
$\left(\frac{a^{-2}b^{-3}}{b^{-10}a^5}\right)^{-2}$
$(a^{-7}b^7)^{-2}$
$\frac{a^{14}b^{-14}}{1}$
$\frac{a^{14}}{b^{14}}$
$\frac{4p^2q^{-6}}{1}$
$\frac{4p^2}{q^6}$
$\frac{3^{-2}s^4t^{-6}}{1}$
$\frac{s^4}{3^2t^6}$


b^14
4-(-3)
7
5. $\frac{(a^4b^{-2})^{-1}}{(a^{-3}b^4)^3}$
6. $4m^3n^{-2} \times 3m^{-2}n^5$
7. $\left(\frac{x^3y^5 \cdot x^4y}{x^{-2}y^3}\right)^3$
8. $\left(\frac{a^4b^5}{a^{-3}b^2}\right)^3$
$\frac{a^{-4}b^2}{a^{-9}b^{12}}$
12 m^1 n^3
$\left(\frac{x^7y^6}{x^{-2}y^3}\right)^3$
$(a^7b^5)^3$
4-(-9)
5
$a^{21}b^9$
$a^5 b^{-10}$
1
2-(12)
-10
$(x^9y^3)^3$
$\frac{a^5}{b^{10}}$
$x^{27}y^9$


-2-(-4)
2
9. $\frac{(z^3(y^{-2})^3)^{-2}}{((z^{-2})^4y^{-2})^3}$
10. $(4b^2c^3)^2 \times (2b^{-2}c^{-2})^{-2}$
11. $\frac{36m^{-2}n^5}{9m^{-4}n^7}$
12. $\left(\frac{4}{3}p^4q^{-3}\right)^{-2}$
$\frac{(z^3y^{-6})^{-2}}{(z^{-8}y^{-2})^3}$
$\frac{z^{-6}y^{12}}{z^{-24}y^{-6}}$
$z^{18}y^{18}$
-6-(-24)
18
2-(-6)
18
$4^2b^4c^6 \cdot 4^{-2}b^4c^4$
$4^0b^8c^{10}$
b^8c^{10}
$\frac{4m^2n^{-2}}{1}$
$\frac{4m^2}{n^2}$
$\frac{4^{-2}p^{-8}q^6}{3^{-2}}$
$\frac{3^2q^6}{4^2p^8}$


13. $\left(\frac{12c^5d^{-2}}{3c^{-2}d^3}\right)^2$
14. $\frac{(r^7s^{-2})^{-2}}{(r^{-10}s^5)^{-1}}$
15 $\left(\frac{g^3h^{-1} \cdot g^{-7}h^5}{g^4h^{-4} \cdot g^{-3}h^6}\right)^{-3}$
$(4^1c^3d^{-5})^2$
$\frac{4^2c^6d^{-10}}{1}$
$\frac{4^2c^6}{d^{10}}$
$\frac{r^{-14}s^4}{r^{10}s^{-5}}$
$\frac{r^{-24}s^9}{1}$
$\frac{s^9}{r^{24}}$
$\left(\frac{g^{-4}h^4}{g^1h^2}\right)^{-3}$
$(g^{-5}h^2)^{-3}$
$\frac{g^{15}h^{-6}}{1}$
$= \frac{g^{15}}{h^6}$
-2-3
-5
-14-10
-24
4-(-5)
9
-4-1
-5
Hilroy