

Name: _____

Date: _____

HW # 4 Quotient Rule

Simplify each of the following.

the preferred answer is starred *

$$1) \frac{5^4}{5} \quad 5^{4-1}$$

$$\boxed{5^3 \text{ or } 125}^*$$

$$2) \frac{2^4}{2^2} \quad 2^{4-2}$$

$$\boxed{2^2 \text{ or } 4}^*$$

$$3) \frac{8x^3}{2x^2} \quad \frac{8}{2} x^{3-2}$$

$$\boxed{4x}$$

$$4) \frac{16m^5}{32m^2}$$

$$\frac{16}{32} m^{5-2}$$

$$\boxed{\frac{1}{2} m^3 \text{ or } \frac{m^3}{2}}^*$$

$$5) \frac{3^4 x^8}{3x^4} \quad 3^{4-1} x^{8-4}$$

$$3^3 x^4$$

$$\boxed{27x^4}$$

$$6) \frac{6 \times 10^4}{3 \times 10^3} \quad \frac{6}{3} \cdot 10^{4-3}$$

$$\boxed{2 \cdot 10 \text{ or } 20}^*$$

$$7) \frac{10x^6 y^{10}}{5x^2 y^7}$$

$$\frac{10}{5} x^{6-2} y^{10-7}$$

$$\boxed{2x^4 y^3}$$

$$8) \frac{6f^{10}}{2f}$$

$$\frac{6}{2} f^{10-1}$$

$$\boxed{3f^9}$$

$$9) \frac{2x^4 y^5}{10x^3} \quad \frac{2}{10} x^{4-3} y^5$$

$$\boxed{\frac{1}{5} xy^5 \text{ or } \frac{xy^5}{5}}^*$$

$$10) \frac{4^5 a^2 b^7}{4^3 b^4} \quad 4^{5-3} a^2 b^{7-4}$$

$$\boxed{4^2 a^2 b^3 \text{ or } 16a^2 b^3}^*$$

Write all answers in both scientific notation and standard form.

Be careful that you think about if you should divide and how to say the ratio. Not all of them are division!

11. A blue whale can eat 3×10^8 krill in a day. The total weight of all that krill is approximately 6.3×10^9 milligrams. About how much does a single krill weigh?

$$\frac{6.3 \times 10^9}{3 \times 10^8}$$

$$\frac{6.3}{3} \cdot 10^{9-8}$$

$$\boxed{2.1 \cdot 10 \text{ milligrams}} \\ \text{or} \\ \boxed{21 \text{ milligrams}}$$

need weight per krill
 ↑ numerator ÷ denominator

distance = rate * time

12. Light travels at 6.71×10^8 miles per hour. The sun is 9.296×10^7 miles away from the earth. How long does it take light to travel from the sun to the earth?

should know from previous science classes $d = r \cdot t$

$$\text{SO } t = \frac{d}{r} \quad \frac{9.296 \times 10^7}{6.71 \times 10^8}$$

$$\frac{9.296}{6.71} \cdot 10^{7-8}$$

$\approx 1.39 \cdot 10^{-1}$ hours or 0.139 hours

≈ 8 minutes



13. Silver Dollar City had $2.42 \cdot 10^5$ people visit on Thanksgiving Day of 2015. On the same day of 2016 they had $2.53 \cdot 10^6$ people visit. How many more visitors did Silver Dollar City have in 2016?

Subtract

$$\begin{array}{r} 2.53 \cdot 10^6 = 2,530,000 \\ - 2.42 \cdot 10^5 = 242,000 \\ \hline 2,288,000 \end{array}$$

2,288,000 more visitors
or
 $2.288 \cdot 10^6$

14. Visible light waves have a frequency of 3×10^{15} . Radio waves have a frequency of 3×10^9 . How many times bigger is a visible light wave than a radio wave?

finding what is was multiplied by, so divide

$$\frac{\text{radio} \cdot ?}{\text{radio}} = \frac{\text{visible}}{\text{radio}} \quad \frac{3 \cdot 10^{15}}{3 \cdot 10^9}$$

$1 \cdot 10^6$ times
or 1,000,000 times bigger



15. A computer can perform 4.66×10^8 calculations per second. In 2011, we had calculated 1×10^{12} digits of pi. How long did it take the computer to come up with those digits?

$$\frac{1 \times 10^{12}}{4.66 \times 10^8}$$

$$\approx 0.21 \times 10^4$$

$$2.1 \times 10^{-1} \times 10^4$$

2.1×10^3 seconds or 2100 seconds

$$\pi = 3.14159265$$

9502884197
07816406286
9821480865
2317253590
2317253590

≈ 35 minutes