

$$25. 3 \times 10^5 \cdot 8 \times 10^{-2}$$

$$(3 \cdot 8)(10^5 \cdot 10^{-2})$$

$$(24) \left( \frac{\cancel{10 \cdot 10 \cdot 10 \cdot 10 \cdot 10}}{\cancel{10 \cdot 10}} \right)$$

$$24 \times 10^3 = 24000$$

$$(2.4 \times 10^4)$$

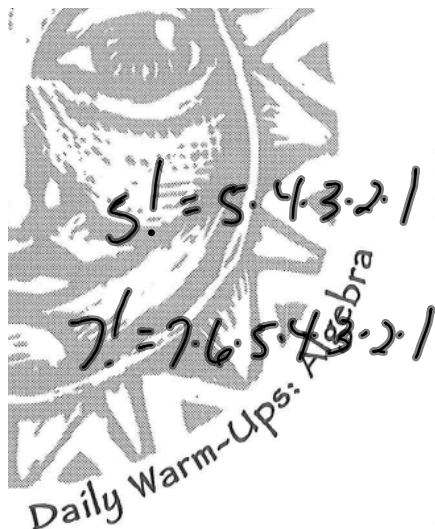
$$21) \frac{(2pm^{-1}q^0)^{-4} \cdot 2m^{-1}p^3}{2pq^2}$$

$$= \frac{2p^3}{(2pm^{-1})^4} 2pq^2m$$

$$= \frac{2ppp}{2pqqm2pm^{-1}2pm^{-1}2pm^{-1}2pm^{-1}}$$

$$= \frac{mmmm}{16p^3q^2m}$$





$$= \frac{m^3}{16p^3q^2}$$



On January 13 of this year, Robert C. Weaver became the first African-American cabinet member when President Lyndon Johnson appointed him Secretary of Housing and Urban Development. Learn the year by solving this puzzle.

- The two digit number formed by my hundreds and tens digits is equal to  $\sqrt{144} \times \sqrt{64}$ .
- My units digit is equal to 3!. 3 · 2 · 1
- The sum of all of my digits is equal to the number of inches in  $1\frac{5}{6}$  feet.

What year am I?

 _____	 _____	 _____	 _____
Thousands	Hundreds	Tens	Units



Chuck Norris can make orange juice out of bananas

$$10) \underline{x^2 y^{-4} \cdot x^3 y^2}$$

$$= \frac{\cancel{xx} \cdot \cancel{xxxx} \cdot \cancel{yy}}{\cancel{yyyy}}$$

$$= \frac{x^5}{y^2}$$

$$12) (2x^2)^{-4} =$$

$$\frac{1}{(2x^2)^4} =$$

$$\frac{1}{2xx2xx2xx2xx} = \frac{1}{16x^8}$$

$$14) (4a^3)^2 = 16 a^6$$

$$(4aaa)(4aaa)$$

$$a^{-m} = \frac{1}{a^m}$$

$$\frac{1}{a^{-m}} = a^m$$

$$16) (4xy)^{-1}$$

$$\frac{1}{(4xy)^1} = \frac{1}{4xy}$$

$$\begin{aligned}
 18) (x^2 y^{-1})^2 \\
 (x^2 y^{-1})(x^2 y^{-1}) \\
 = \frac{x x}{y} \cdot \frac{x x}{y} = \left( \frac{x^4}{y^2} \right)
 \end{aligned}$$

$$\begin{aligned}
 22) \frac{x^{-1}}{4x^4} &= \frac{1}{4xxxxx} = \\
 &= \left( \frac{1}{4x^5} \right)
 \end{aligned}$$

$$\begin{aligned}
 20) (3m)^{-2} &= \\
 \frac{1}{(3m)^2} &= \frac{1}{3m 3m} \\
 &= \left( \frac{1}{9m^2} \right)
 \end{aligned}$$

$$\begin{aligned}
 24) \frac{m^4}{2m^4} &= \frac{\cancel{m m m m}}{\cancel{2 m m m m}} = \left( \frac{1}{2} \right)
 \end{aligned}$$

$$7. \frac{(-4)^5}{(4)^5} = \frac{\cancel{(-4)}\cancel{(-4)}\cancel{(-4)}\cancel{(-4)}\cancel{(-4)}}{\cancel{(4)}\cancel{(4)}\cancel{(4)}\cancel{(4)}\cancel{(4)}} = -1$$

$$19. \frac{3x^6}{y^{-3}} = 3 \cdot 1 y^3 = 3y^3$$

$$\frac{a}{a} = 1 \quad \left( \frac{3x^{-1}y^{-3}}{x^2y^{-3}} \right) \quad \left( \frac{2x^{-3}y^4}{x^{-1}y^2} \right)$$

$$\frac{x \cdot x \cdot x}{x \cdot x \cdot x} = 1$$



$$27. -6 \cdot (-6)^{-1} = -6 \cdot \frac{1}{(-6)^1}$$

$$\frac{-6}{(-6)^1} = \frac{-6}{-6} = 1$$

$$25. \frac{-9x^5y^7}{x^2y^3} \cdot \frac{(2xy)^2}{-6x^2y^2} = 3$$

~~$$\frac{-9xxxxxyyyyy2xy2xy}{-6xxxyxyxyxy}$$~~

$$\frac{-36x^3y^4}{-6} = 6x^3y^4$$

$$\frac{5}{a^{-4}} = \frac{5a^4}{1} = \textcircled{5a^4}$$

=?

$$\frac{10}{4} = ?$$

$$26) \frac{2x^4 y^{-4} z^{-3}}{3x^2 y^{-3} z^4}$$

$$28) \frac{2h^3 j^{-3} k^4}{3jk}$$

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$$= \frac{2hhhk kkk}{3jjjjk}$$

$$\frac{2h^3 k^3}{3j^4}$$

$j \neq j$

$$30) \frac{3x^3 y^{-1} z^{-1}}{x^{-4} y^0 z^0}$$

$$= \frac{3xxxxxxx}{yz \cdot 1}$$

$$= \frac{3x^7}{yz}$$

~~$3x^7 yz$~~

31.)

$$\frac{-10x^2y}{3x^4y^3} \cdot \frac{9x^2y}{2x}$$

$$\frac{-10 \cancel{x \cancel{x} y^{\cancel{3}} \cancel{y}}{3 \cancel{x \cancel{x} \cancel{x} \cancel{y} \cancel{y} \cancel{y}} \cdot \frac{9 \cancel{x \cancel{x} y}}{2 \cancel{x}}$$

$$= \frac{-10 \cdot 9}{6xy} \rightarrow \frac{-90}{6xy}$$

$$= \frac{-15}{xy}$$

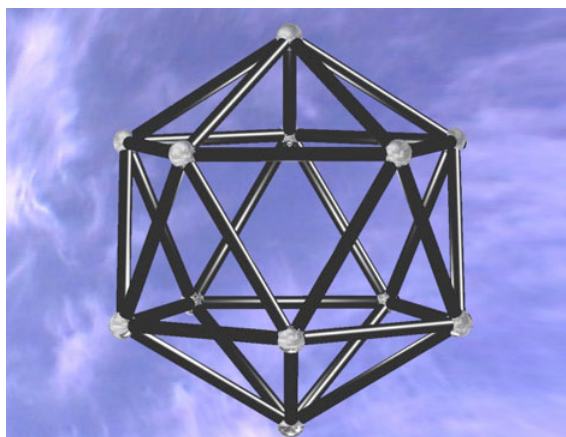
32.)

$$\frac{5ab^3}{3a^2b} \cdot \frac{12a^4b}{b^5}$$

$$= \frac{5 \cancel{a} \cancel{b} \cancel{b} \cancel{b} 12 \cancel{a} \cancel{a} \cancel{a} \cancel{a} \cancel{b}}{3 \cancel{a} \cancel{a} \cancel{b} \cancel{b} \cancel{b} \cancel{b} \cancel{b}}$$

$$\frac{5 \cdot 12 \cancel{a \cancel{a} \cancel{a}}}{3 \cancel{b}^2} = \frac{60a^3}{3b^2}$$

$$= \frac{20a^3}{b^2}$$



icosahedron



$$3^{-3} = \frac{1}{3^3} = \frac{1}{27}$$

$$a^{-m} = \frac{1}{a^m}$$

$$\begin{aligned}\left(\frac{x}{y}\right)^{-2} &= \frac{1}{\left(\frac{x}{y}\right)^2} = \frac{1}{\left(\frac{x}{y}\right)\left(\frac{x}{y}\right)} = \frac{1}{\frac{x^2}{y^2}} \\ &= 1 \div \frac{x^2}{y^2} = 1 \cdot \frac{y^2}{x^2} = \frac{y^2}{x^2}\end{aligned}$$



$$\left(\frac{3}{5}\right)^{-2} = \left(\frac{5}{3}\right)^2 = \left(\frac{5}{3}\right)\left(\frac{5}{3}\right) = \frac{25}{9}$$

$$\left(\frac{2x}{y}\right)^{-2} = \left(\frac{y}{2x}\right)^2 = \frac{y}{2x} \cdot \frac{y}{2x} = \frac{y^2}{4x^2}$$

$$23. \left( \frac{2x^2y}{3y} \right)^{-3} \cdot \left( \frac{4y^3}{x^4} \right)^2$$

$$= \left( \frac{3y}{2x^2y} \right)^3 \cdot \left( \frac{4y^3}{x^4} \right)^2 =$$

$$\left( \frac{\cancel{3y}}{2x\cancel{x}y} \right) \left( \frac{\cancel{3y}}{2x\cancel{x}y} \right) \left( \frac{\cancel{3y}}{2x\cancel{x}y} \right) \left( \frac{\cancel{4}y\cancel{y}y}{x\cancel{x}x\cancel{x}} \right) \left( \frac{\cancel{4}y\cancel{y}y}{x\cancel{x}x\cancel{x}} \right) =$$

$$\frac{4/32y^6}{8x^{14}} = \frac{54y^6}{x^{14}}$$

$$17. \frac{x^{12}}{1} \cdot \frac{1}{x^3} = \frac{\cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{x}}{\cancel{x} \cancel{x} \cancel{x}} = x^9$$

$$7. \frac{(-4)^5}{(4)^5} = \frac{\cancel{-4} \cdot \cancel{-4} \cdot \cancel{-4} \cdot \cancel{-4} \cdot \cancel{-4}}{\cancel{4} \cdot \cancel{4} \cdot \cancel{4} \cdot \cancel{4} \cdot \cancel{4}} = \textcircled{-1}$$

$-1 \quad -1 \quad -1 \quad -1 \quad -1$

9.  $9,220,000 \times 0.0046$

$$42,412 = 4.2412 \times 10^4$$

$$19. \frac{3xy^4}{2x^5y} \cdot \frac{6x^{-3}y^2}{4y} =$$

$$\frac{3xy^4}{2x^5y} \cdot \frac{6y^2}{4yx^3} = \frac{\cancel{3x}y\cancel{y}\cancel{y}\cancel{y}\cancel{6y}\cancel{y}}{\cancel{2x}\cancel{x}\cancel{x}\cancel{x}\cancel{y}\cancel{4y}\cancel{x}\cancel{x}\cancel{x}} = \frac{18y^4}{8x^7} = \frac{9y^4}{4x^7}$$

On January 21 of this year, the first law requiring that drivers of automobiles have licenses went into effect. To learn the year, solve this puzzle.

- My units digit is equal to the value of  $x$  in this equation:  
 $-9 + 3x = 12$ .
- My tens digit is  $33\frac{1}{3}\%$  of my hundreds digit; their sum is 12.
- The sum of all of my digits is the same as the number of triangles that make up an icosahedron.

What year am I?

Chuck Norris uses paper to cut scissors.



Thousands

Hundreds

Tens

Units

$$\begin{aligned}
 33.) & \left( \frac{x y^{-1}}{x^{-3} y^2} \right)^2 \cdot \left( \frac{x^3 y^2}{2 y x^{-1}} \right)^{-2} \\
 &= \left( \frac{x x^3}{y^1 y^2} \right)^2 \cdot \left( \frac{x^3 x^1 y^2}{2 y} \right)^{-2} = \left( \frac{x x^3}{y^1 y^2} \right)^2 \cdot \left( \frac{2 y}{x^3 x^1 y^2} \right)^2 \\
 &= \left( \frac{x x x x}{y y y} \right) \left( \frac{x x x x}{y y y} \right) \cdot \left( \frac{2 y}{x x x x y y} \right) \left( \frac{2 y}{x x x x y y} \right) \\
 &= \frac{\cancel{4} \cancel{x x x x x x x x} \cancel{y y}}{\cancel{x x x x x x x x} \cancel{y y} y y y y y y y y} = \frac{4}{y^8}
 \end{aligned}$$



34.)

$$\frac{2x^2y}{x^3y^2} \cdot \frac{4x^7y^2}{2x^3}$$

35.)

$$\frac{-8x^6y^{-3}}{3x^{-2}y^{-5}} \cdot \frac{-6x^{-10}y}{-4x}$$

36.)

$$\frac{(4x^2y^3)^{-1}}{3y} \cdot \frac{(2xy^2)^2}{x^{-3}}$$

37.)

$$\frac{5x^{-1}y^3}{xy^{-4}} \cdot \frac{(-2x^2)^{-3}}{y}$$

*Using Scientific Notation*

a. Write  $6.7239 \times 10^{-4}$  in decimal form.

.....

b. Write  $1.884 \times 10^5$  in decimal form.

c. Write 26,645 in scientific notation.

d. Write 0.00829 in scientific notation.

e. Use properties of exponents to evaluate  $(2.6 \times 10^6)(4.7 \times 10^{-2})$ .

f.  $4 \times 10^{-6} \cdot 2 \times 10^5$

g.  $12 \times 10^3 \cdot 3 \times 10^{-6}$

h.  $2.345 \times 10^8$

i.  $0.008367$

j.  $8 \times 10^4 \cdot 10 \times 10^{-1}$

k.  $\frac{9.3 \times 10^7}{3.7 \times 10^9} \approx$

l.  $\frac{1.99 \times 10^{30}}{7.36 \times 10^{22}} \approx$

Identify the equations below as either exponential growth/decay, inverse, or linear.  
Then determine y-intercept and other important information you can.

$$y_1 = 30(1.8)^x$$

$$y_6 = \frac{40}{x}$$

$$y_2 = 107(2)^{x^2}$$

$$y_7 = 16(3.2)^{x^2}$$

$$y_3 = 42(0.7)^x$$

$$y_8 = 400(.95)^x$$

$$y_4 = 121(0.05)^x$$

$$y_5 = 3x + 4$$