

(Simplify or perform the indicated operation.)

1. $x^4 + x^4 = 2x^4$

Add \rightarrow Keep exp.

2. $x^4 \cdot x^4 = x^8$

Mult. \rightarrow Add exp.

3. $(x^4)^4 = x^{16}$

Power \rightarrow Mult. exp.

4. $\left[\frac{x^4}{x} = x^3 \right.$

Div. \rightarrow Sub. exp.

$\left. \frac{x}{x^4} = \frac{1}{x^3} \right]$

(smaller from larger)

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(smaller from larger)

1) $(5a^7b^4)(-3a^2b^{10})$

$$\boxed{-15a^9b^{14}}$$

2) $(5a^{-7}b^4)(-3a^{-2}b^{10})$

$$-15a^{-9}b^{14}$$

$$\boxed{\frac{-15b^{14}}{a^9}}$$

3) $(9m^0n^7)^{-2}$

$$\frac{1}{(9^1 n^7)^2} = \frac{1}{81 n^{14}}$$

$9^2 \rightarrow$

4) $\frac{(t^6u^4)^2}{tu^{13}}$

$$\frac{t^{12} u^8}{t^1 u^{13}} = \frac{t^{11}}{u^5}$$

5) $(7km)^2$

$$7^2 \rightarrow 49k^2m^2$$

6) $(7k - 5)^2$

$$(7k - 5)(7k - 5)$$

$$49k^2 - 35k - 35k + 25$$

$$49k^2 - 70k + 25$$

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

$$\left(\frac{5^1 z^4}{2^1 x^7 y^1}\right)^3 = \frac{125 z^{12}}{8 x^{21} y^3}$$

$5^3 \rightarrow$ $2^3 \rightarrow$

8) $\left(\frac{5 \cdot 10 x^6 y^3 z}{12 \cdot 24 x y^{85}}\right)^2$

$$\left(\frac{5^1 x^5 z^1}{12^1 y^5}\right)^2 = \frac{25 x^{10} z^2}{144 y^{10}}$$

$5^2 \rightarrow$ $12^2 \rightarrow$

9) $(7k - m)^2$

$$(7k - m)(7k - m)$$

$$49k^2 - 7km - 7km + m^2$$

$$49k^2 - 14km + m^2$$

10) $\frac{15n^9 + 10n^7 - 5n^2}{5n^2}$

$$3 \frac{15n^9}{5n^2} + 2 \frac{10n^7}{5n^2} - \frac{5n^2}{5n^2}$$

$$3n^7 + 2n^5 - 1$$

11)

$$(7y + 10) - (3y - 4)$$

$$-3y + 4$$

$$\begin{array}{r} 7y + 10 \\ -3y + 4 \\ \hline 4y + 14 \end{array}$$

12)

$$(8x^6 - 9x^5 + 17) - (3x^6 + 5x^5 - 6)$$

$$-3x^6 - 5x^5 + 6$$

$$\begin{array}{r} 8x^6 - 9x^5 + 17 \\ -3x^6 - 5x^5 + 6 \\ \hline 5x^6 - 14x^5 + 23 \end{array}$$

13) Write the number in scientific notation:

$$0.0005207$$

$$5.207 \times 10^{-4}$$

14) Write the number in standard form:

$$9.013 \times 10^5$$

$$901300$$

$$901,300$$

15)

$$(7y + 10)(3y - 4)$$

$$21y^2 - 28y + 30y - 40$$

$$21y^2 + 2y - 40$$

16)

$$(2x - 5)(4x^2 + 6x - 7)$$

$$8x^3 + 12x^2 - 14x - 20x^2 - 30x + 35$$

$$8x^3 - 8x^2 - 44x + 35$$

17)

$$-4^2 + (-9)^2$$

$$4 \cdot 4 \quad (-9)(-9)$$

$$-16 + 81$$

$$65$$

$$\begin{array}{r} 71 \\ 81 \\ 16 \\ \hline 65 \end{array}$$

18)

$$(-13)^0 - 5(7)^0$$

$$1 - 5 \cdot 1$$

$$1 - 5$$

$$-4$$

19)

$$2r^{-3} = \frac{2}{r^3}$$

20)

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

21)

$$\left(\frac{x^4 y^0}{x^0 y^{-8}} \right)^{-2} = \frac{x^{-8}}{y^{16}} = \frac{1}{x^8 y^{16}}$$

22)

$$\left(\frac{x^{-13} y^{-7}}{x^{-10} y^{-8}} \right)^5 = \left(\frac{x^{10} y^8}{x^3 y^7} \right)^5 = \left(\frac{y^1}{x^3} \right)^5 = \frac{y^5}{x^{15}}$$

23)

$$\left(\frac{m^4 n^2}{m^{14} n^{-8}} \right)^0 = 1$$