

1. Evaluate each expression:

a) $(-6)^2$

$$(-6)^2 = (-6)(-6)$$

$$= \boxed{36}$$

b) -6^2

$$-6^2 = -6 \cdot 6$$

$$= \boxed{-36}$$

c) $-4^3 - 3^2$

$$= -64 - 9$$

$$= \boxed{-73}$$

2. Simplify each expression:

a) $(-5y^4)(4y^3)$

$$= \boxed{-20y^7}$$

b) $(2x^2)^3$

$$= \boxed{8x^6}$$

c) $\frac{2x^4y^8}{6x^2y^3}$

$$= \boxed{\frac{1}{3}x^2y^5} \text{ or } \boxed{\frac{x^2y^5}{3}}$$

3. Add or Subtract as indicated

a) $(3x^2 - 7xy + 7y^2) - (4x^2 - xy + 9y^2)$

$$= 3x^2 - 7xy + 7y^2 - 4x^2 + xy - 9y^2$$

$$= \boxed{-x^2 - 6xy - 2y^2}$$

b) $(3x^2 + 2x + 6) + (5x^2 + x)$

$$= 3x^2 + 2x + 6 + 5x^2 + x$$

$$= \boxed{8x^2 + 3x + 6}$$

4. Subtract $(3x - y)$ from $(7x - 14y)$

$$= (7x - 14y) - (3x - y)$$

$$= 7x - 14y - 3x + y$$

$$= \boxed{4x - 13y}$$

5. Multiply each expression:

a) $3x^3(2x - 3y)$

$$= \boxed{6x^4 - 9x^3y}$$

b) $(2x - 5)(4x + 2)$

$$= 8x^2 + 4x - 20x - 10$$

$$= \boxed{8x^2 - 16x - 10}$$

c) $(4x - 3y)^2$

$$= \boxed{16x^2 - 24xy + 9y^2}$$

These can both be
'FOIL'ed if you need to!

d) $(2x - 3y)(2x + 3y)$

$$= \boxed{4x^2 - 9y^2}$$

d) $(2x + 3)(4x^2 - 3x - 1)$

$$= 8x^3 - 6x^2 - 2x + 12x^2 - 9x - 3$$

$$= \boxed{8x^3 + 6x^2 - 11x - 3}$$

6. Simplify each expression. Make sure any exponents in your answers are positive only.

a) -7^2
 $= -49$

b) 7^{-2}
 $= \frac{1}{7^2}$
 $= \frac{1}{49}$

c) $\frac{y^{-2}}{y^{-3}}$
 $= y^{-2-(-3)}$
 $= y^1$
 $= y$

d) $\frac{2^{-1}x^3y^{-4}}{2^{-3}x^{-2}y^5}$
 $= 2^{-1-(-3)} \cdot x^{3-(-2)} \cdot y^{-4-5}$
 $= 2^2 \cdot x^5 \cdot y^{-9}$
 $= \frac{4x^5}{y^9}$

e) $\left(\frac{-3x^4y}{x^2y^{-2}}\right)^3$
 $= (-3x^{4-2} \cdot y^{1-(-2)})^3$
 $= (-3x^2y^3)^3$
 $= -27x^6y^9$

7. Write each number in scientific notation:

a) 0.00000121
 1.21×10^{-6}

b) 35,000,000,000
 3.5×10^{10}

8. Write each number in standard notation:

a) 1.302×10^4
 13,020

b) 2.009×10^{-3}
 0.002009

9. Perform each indicated operation and write your result in standard notation:

a) $\frac{12 \times 10^6}{6 \times 10^{-3}}$
 $= 2 \times 10^{6-(-3)}$
 2×10^9
 2,000,000,000

b) $(5 \times 10^{-4})(7 \times 10^{-3})$
 $= 35 \times 10^{-7}$
 $= 0.0000035$

10. Divide:

a) $\frac{16x^6 + 20x^3 - 12x}{4x^2}$
 $= \frac{16x^6}{4x^2} + \frac{20x^3}{4x^2} - \frac{12x}{4x^2}$
 $= \frac{5x^4}{2} + 5x - \frac{3}{x}$

b) Divide $4x^2 + 8x - 7$ by $2x + 1$ using long division.

$$\begin{array}{r} 2x+3 \\ 2x+1 \overline{) 4x^2+8x-7} \\ \underline{-4x^2+2x} \\ 6x-7 \\ \underline{-6x+3} \\ -10 \end{array}$$

$2x+3 - \frac{10}{2x+1}$

or
 $2x+3 + \frac{-10}{2x+1}$

6. Simplify each expression. Make sure any exponents in your answers are positive only.

a) -7^2
 $= -49$

b) 7^{-2}
 $= \frac{1}{7^2}$
 $= \frac{1}{49}$

c) $\frac{y^{-2}}{y^{-3}}$
 $= y^{-2-(-3)}$
 $= y^1$
 $= y$

d) $\frac{2^{-1}x^3y^{-4}}{2^{-3}x^{-2}y^5}$
 $= 2^{-1-(-3)} \cdot x^{3-(-2)} \cdot y^{-4-5}$
 $= 2^2 \cdot x^5 \cdot y^{-9}$
 $= \frac{4x^5}{y^9}$

e) $\left(\frac{-3x^4y}{x^2y^{-2}}\right)^3$
 $= (-3x^{4-2}y^{1-(-2)})^3$
 $= (-3x^2y^3)^3$
 $= -27x^6y^9$

7. Write each number in scientific notation:

a) 0.00000121
 1.21×10^{-6}

b) 35,000,000,000
 3.5×10^{10}

8. Write each number in standard notation:

a) 1.302×10^4
 13,020

b) 2.009×10^{-3}
 0.002009

9. Perform each indicated operation and write your result in standard notation:

a) $\frac{12 \times 10^6}{6 \times 10^{-3}}$
 $= 2 \times 10^{6-(-3)}$
 2×10^9
 2,000,000,000

b) $(5 \times 10^{-4})(7 \times 10^{-3})$
 $= 35 \times 10^{-7}$
 $= 0.0000035$

10. Divide:

a) $\frac{16x^6 + 20x^3 - 12x}{4x^2}$
 $= \frac{16x^6}{4x^2} + \frac{20x^3}{4x^2} - \frac{12x}{4x^2}$
 $= \frac{5x^4}{2} + 5x - \frac{3}{x}$

b) Divide $4x^2 + 8x - 7$ by $2x + 1$ using long division.

$$\begin{array}{r} 2x+3 \\ 2x+1 \overline{) 4x^2+8x-7} \\ \underline{-4x^2+2x} \\ 6x-7 \\ \underline{-6x+3} \\ -10 \end{array}$$

$2x+3 - \frac{10}{2x+1}$
 or
 $2x+3 + \frac{-10}{2x+1}$