Polynomials (Add and Subtract)

Example 1:

Simplify $(5x^2 - 2x + 7) - (3x^2 + 6x - 4)$ **?**

$$\begin{aligned}
(5x^2 - 2x + 7) - (3x^2 + 6x - 4) &\quad \text{Distribute negative through second part} \\
5x^2 - 2x + 7 - 3x^2 - 6x + 4 &\quad \text{Combine like terms } 5x^2 - 3x^3, -2x - 6x, \text{ and } 7 + 4 \\
2x^2 - 8x + 11 &\quad \text{Our Solution}
\end{aligned}$$

Practice:

Simplify these expressions

11) $(5p - 5p^4) - (8p - 8p^4)$

12) $(7m^2 + 5m^3) - (6m^3 - 5m^2)$

13) $(3n^2 + n^3) - (2n^3 - 7n^2)$

14) $(x^2 + 5x^3) + (7x^2 + 3x^3)$

15) $(8n + n^4) - (3n - 4n^4)$

16) $(3v^4 + 1) + (5 - v^4)$

17) $(1 + 5p^3) - (1 - 8p^3)$

18) $(6x^3 + 5x) - (8x + 6x^3)$

19) $(5n^4 + 6n^3) + (8 - 3n^3 - 5n^4)$

20) $(8x^2 + 1) - (6 - x^2 - x^4)$

21) $(3 + b^4) + (7 + 2b + b^4)$

22) $(1 + 6r^2) + (6r^2 - 2 - 3r^4)$

23) $(8x^3 + 1) - (5x^4 - 6x^3 + 2)$

Polynomials (multiply)

Example 1:

Simplify $(2x - 5)(4x^2 - 7x + 3)$ **?**

$(2x-5)(4x^2-7x+3)$	Distribute $(2x-5)$ through parenthesis
$4x^2(\mathbf{2x-5})-7x(\mathbf{2x-5})+3(\mathbf{2x-5})$	Distribute again through each parenthesis
$8x^3-20x^2-14x^2+35x+6x-15$	Combine like terms
$8x^3-34x^2+41x-15$	Our Solution

Practice:

Find each product.

1) $6(p-7)$

2) $4k(8k+4)$

3) $2(6x+3)$

4) $3n^2(6n+7)$

5) $5m^4(4m+4)$

6) $3(4r-7)$

7) $(4n+6)(8n+8)$

8) $(2x+1)(x-4)$

9) $(8b+3)(7b-5)$

10) $(r+8)(4r+8)$

11) $(4x+5)(2x+3)$

12) $(7n-6)(n+7)$

13) $(3v-4)(5v-2)$

14) $(6a+4)(a-8)$

15) $(6x-7)(4x+1)$

16) $(5x-6)(4x-1)$

17) $(5x+y)(6x-4y)$

18) $(2u+3v)(8u-7v)$

19) $(x+3y)(3x+4y)$

20) $(8u+6v)(5u-8v)$

Polynomials (multiply)-special

Example 1:

Simplify $(a+b)^2$ **?**

$(a+b)^2$	Squared is same as multiplying by itself
$(a+b)(a+b)$	Distribute $(a+b)$
$a(a+b)+b(a+b)$	Distribute again through final parenthesis
$a^2+ab+ab+b^2$	Combine like terms $ab+ab$
$a^2+2ab+b^2$	Our Solution

Practice:

Find each product.

1) $(x+8)(x-8)$

2) $(a-4)(a+4)$

3) $(1+3p)(1-3p)$

4) $(x-3)(x+3)$

5) $(1-7n)(1+7n)$

6) $(8m+5)(8m-5)$

7) $(5n-8)(5n+8)$

8) $(2r+3)(2r-3)$

9) $(4x+8)(4x-8)$

10) $(b-7)(b+7)$

11) $(4y-x)(4y+x)$

12) $(7a+7b)(7a-7b)$

13) $(4m-8n)(4m+8n)$

14) $(3y-3x)(3y+3x)$

15) $(6x-2y)(6x+2y)$

16) $(1+5n)^2$

17) $(a+5)^2$

18) $(v+4)^2$

19) $(x-8)^2$

20) $(1-6n)^2$

21) $(p+7)^2$

22) $(7k-7)^2$

23) $(7-5n)^2$

24) $(4x-5)^2$

Polynomials (division)

Example 1:

Simplify $\frac{8x^3+4x^2-2x+6}{4x^2}$ **?**

$$\frac{8x^3+4x^2-2x+6}{4x^2}$$ Divide each term in the numerator by $4x^2$

$$\frac{8x^3}{4x^2}+\frac{4x^2}{4x^2}-\frac{2x}{4x^2}+\frac{6}{4x^2}$$ Reduce each fraction, subtracting exponents

Remember negative exponents are moved to denominator

$$2x+1-\frac{1}{2x}+\frac{3}{2x^2}$$ Our Solution

Divide.

1) $\frac{20x^4+x^3+2x^2}{4x^3}$

2) $\frac{5x^4+45x^3+4x^2}{9x}$

3) $\frac{20n^4+n^3+40n^2}{10n}$

4) $\frac{3k^3+4k^2+2k}{8k}$

5) $\frac{12x^4+24x^3+3x^2}{6x}$

6) $\frac{5p^4+16p^3+16p^2}{4p}$

7) $\frac{10n^4+50n^3+2n^2}{10n^2}$

8) $\frac{3m^4+18m^3+27m^2}{9m^2}$

9) $\frac{x^2-2x-71}{x+8}$

10) $\frac{r^2-3r-53}{r-9}$

11) $\frac{n^2+13n+32}{n+5}$

12) $\frac{b^2-10b+16}{b-7}$

13) $\frac{v^2-2v-89}{v-10}$

14) $\frac{x^2+4x-26}{x+7}$

15) $\frac{a^2-4a-38}{a-8}$

16) $\frac{x^2-10x+22}{x-4}$