

What's Going On?

Checking In

Minds on What do we know?

Action! What can we do?

Consolidation Practice

Learning Goal - I will be able to perform simple operations with polynomials.

Please hand in your TIPS assignments.

Minds on

What do we know?

monomial - A polynomial with 1 term.

$$x^2 \quad | \quad 3x \quad | \quad 2.5y \quad | \quad 2a^2bc$$

binomial - A polynomial with 2 terms.

$$2x+1 \quad | \quad x^2+x \quad | \quad a^2b+ab^2$$

trinomial - A polynomial with 3 terms.

$$4x - 7x^2 + 8x^3$$

4-termed polynomial

- A polynomial with 4 terms.

n-termed polynomial

- A polynomial with n terms.

Minds on

What do we know?

degree of a term

- the sum of the exponents on its variables

Term	Degree
$3x^2$	2
$8abc^2$	4
x^3yza^2	7

degree of a polynomial

- highest degree of any of its terms

Polynomial	Degree
$x^2 - 2x^3 + y$	3
$a - b + a^2bc^4$	7
$a^2 - bc^4$	5

Minds on

What do we know?

like terms

- terms that have the same variable factors

$$x^2 \text{ and } 5x^2$$

$$7y \text{ and } 16y$$

$$xyz \text{ and } 3xyz$$

$$2x^2y \text{ and } \frac{1}{3}x^2y$$

$$x^{\frac{2}{3}} \text{ and } 5x^{\frac{2}{3}}$$

Action!

What can we do?

We are going to go through several questions.

All of these questions are review from Grade 9 Unit #1:
Polynomials.

After you have tried the question, we will take it up.

In the bottom right corner of each slide you will find homework that corresponds to the type of question we just did. If you are not 100% on the question, do some practice!

1. Evaluate $2x^2 - 3xy + 4y^2$ for $x = 2$, $y = -1$.

$$\begin{aligned}
 & 2x^2 - 3xy + 4y^2 \\
 = & 2(2)^2 - 3(2)(-1) + 4(-1)^2 \\
 = & 2(4) - \underbrace{3(-2)} + 4(1) \\
 = & 8 - (-6) + 4 \\
 = & 8 + 6 + 4 \\
 = & 18
 \end{aligned}$$

First, replace each occurrence of x with 2 and y with -1.

Then evaluate.

Having Trouble?

Practice
Pg. 131 #2

2. Write the following polynomial in *descending* order of x : $6x^2 - 5x - 4x^3 - 7$

$$6x^2 - 5x - 4x^3 - 7$$

$$-4x^3 + 6x^2 - 5x - 7$$

Descending means to start high and go down...

Just remember that the sign (+/-) in front of a term is part of that term!

Having Trouble?

Practice

Pg. 131 #3

3. Write the following polynomial in *ascending* order of x: $-4 + 3x^3 - 2x^2 - 5x^4$

$$-4 + 3x^3 - 2x^2 - 5x^4$$

$$-4 - 2x^2 + 3x^3 - 5x^4$$

Ascending means to start low and go up...

Just remember that the sign (+/-) in front of a term is part of that term!

Having Trouble?

Practice

Pg. 131 #4

4. Simplify $(2m - n) - (3m + 4n)$

$$\begin{aligned}
 & (2m - n) - (3m + 4n) \\
 = & (2m - n) - 1(3m + 4n) \\
 = & \underline{2m} - n - \underline{3m} - 4n \\
 = & 2m - 3m - n - 4n \\
 = & -1m - 5n \\
 = & -m - 5n
 \end{aligned}$$

First we have to get rid of the brackets.

*If we are subtracting a polynomial, we must change the sign of each term before dropping the brackets! The negative sign is distributed to each term... Just like multiplying each term by -1.

Then collect like terms and simplify.

Having Trouble?

Practice Pg. 131 #5

5. Simplify $(5x^2 - y^2) - (3x^2 - 2y^2) - (x^2 + 3y^2)$

$$\begin{aligned}
 & (5x^2 - y^2) - (3x^2 - 2y^2) - (x^2 + 3y^2) \\
 = & (5x^2 - y^2) - \overbrace{(3x^2 - 2y^2)} - \overbrace{(x^2 + 3y^2)} \\
 = & 5x^2 - y^2 - 3x^2 + 2y^2 - x^2 - 3y^2 \\
 = & 5x^2 - 3x^2 - x^2 - y^2 + 2y^2 - 3y^2 \\
 = & x^2 - 2y^2
 \end{aligned}$$

First we have to get rid of the brackets.

*If we are subtracting a polynomial, we must change the sign of each term before dropping the brackets! The negative sign is distributed to each term... Just like multiplying each term by -1.

Then collect like terms and simplify.

Having Trouble?

Practice Pg. 131 #6

6. Multiply $(3x)(-4x^5)$

$$(3x)(-4x^5)$$

$$= (3)(-4)(x)(x^5)$$

Remember... the
exponent on x is just 1!

$$= (3)(-4)(x^1)(x^5)$$

$$= -12x^{1+5}$$

$$= -12x^6$$

We multiply the coefficients as usual.

To multiply the variables we use

THE PRODUCT RULE

When you multiply powers of the same base add the exponents.

Having Trouble?

Practice Pg. 131 #7

7. Multiply $(-6m^2n^3)(-7mn^2)$

$$(-6m^2n^3)(-7mn^2)$$

$$= (-6)(-7)(m^2)(m)(n^3)(n^2)$$

Remember... the
exponent on m is just 1!

$$= (42)(m^2)(m^1)(n^3)(n^2)$$

$$= 42m^{2+1}n^{3+2}$$

$$= 42m^3n^5$$

We multiply the coefficients as usual.

To multiply the variables we use

THE PRODUCT RULE

When you multiply powers of the same base add the exponents.

Having Trouble?

Practice Pg. 131 #7

8. Multiply $(2xy)(-3x^2y^3)(-3x^2)$

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

$$= \underbrace{(2)(-3)(-3)}_{18} \underbrace{(x)(x^2)(x^2)}_{x^5} \underbrace{(y)(y^3)}_{y^4}$$

$$= 18x^{1+2+2}y^{1+3}$$

$$= 18x^5y^4$$

Having Trouble?
Practice Pg. 131 #7

9. Simplify $\frac{24x^4}{6x}$

$$\frac{24x^4}{6x}$$

$$= (24 \div 6)(x^4 \div x)$$

Remember... the
exponent on x is just 1!

$$= (24 \div 6)(x^4 \div x^1)$$

$$= 4x^{4-1}$$

$$= 4x^3$$

We divide the coefficients as usual.

To multiply the variables we use

THE QUOTIENT RULE

When you divide powers of the same base subtract the exponents.

Having Trouble?

Practice Pg. 131 #8

10. Simplify $\frac{-40x^3y^4z^2}{8x^3y^3}$

$$\frac{-40x^3y^4z^2}{8x^3y^3}$$

$$= \underbrace{(-40 \div 8)} \underbrace{(x^3 \div x^3)} \underbrace{(y^4 \div y^3)} (z^2)$$

$$= -5x^{3-3}y^{4-3}z^2$$

$$= -5x^0y^1z^2$$

$$= -5(1)yz^2$$

$$= -5yz^2$$

Where did x^0 go?

We divide the coefficients as usual.

To multiply the variables we use

THE QUOTIENT RULE

When you divide powers of the same base subtract the exponents.

Having Trouble?
Practice Pg. 131 #8

$$= -5x^0y^1z^2$$

$$= -5yz^2$$

Where did x^0 go?

Anything to the exponent 0 is 1!!!

Think about it: $a^5 \div a^5$

$$= a^{5-5}$$

$$= a^0$$

$$= \frac{a \times a \times a \times a \times a}{a \times a \times a \times a \times a}$$

EXPANDED FORM

11. Expand $2x(3x - 4)$

$$2x(3x - 4)$$

$$2x(3x - 4)$$

$$= 6x^2 - 8x$$

Use the distributive property and multiply everything in the brackets by $2x$.

Just remember that the (+/-) in front of a term is a part of that term!

Having Trouble?

Practice
Pg. 132 #9

12. Expand $2(x - 4) - 5(x + 3)$

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

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

$$= 2x - 8 - 5x - 15$$

$$= 2x - 5x - 8 - 15$$

$$= -3x - 23$$

Use the distributive property and multiply everything in the first set of brackets by 2 and everything in second set of brackets by **negative 5**.

Then collect like terms and simplify.

Having Trouble?

Practice
Pg. 132 #10

13. Expand $8(1 - 3y) + 4 - 2(8y - 7)$

$$\begin{aligned}
 & \overbrace{8(1 - 3y)} + 4 - \overbrace{2(8y - 7)} \\
 = & 8 - 24y + 4 - 16y + 14 \\
 = & -24y - 16y + 8 + 4 + 14 \\
 = & -40y + 26
 \end{aligned}$$

Use the distributive property and multiply everything in the first set of brackets by 8 and everything in second set of brackets by **negative 2**. Leave the +4 for now!

Then collect like terms and simplify.

Having Trouble?

Practice

Pg. 132 #10

14. Expand $6(3a - 4b - 9)$

$$\begin{aligned} & \overbrace{6(3a - 4b - 9)} \\ &= 18a - 24b - 54 \end{aligned}$$

Use the distributive property and multiply **everything** in the brackets by 6.

Having Trouble?

Practice
Pg. 132 #11

15. Expand $-a(3a + 4b - 2c)$

$$-a(3a + 4b - 2c)$$

$$= -3a^2 - 4ab + 2ac$$

Remember...

$$(a)(a) = a^2$$

$$(a)(b) = ab$$

$$3ab - ba$$

Use the distributive property and multiply **everything** in the brackets by $-a$.

Having Trouble?

Practice
Pg. 132 #11

16. Expand and simplify

$$3x(x - 4) - x(x + 5) - 2x(x - 1)$$

$$3x(x - 4) - x(x + 5) - 2x(x - 1)$$

$$= 3x^2 - 12x - x^2 - 5x - 2x^2 + 2x$$

$$= 3x^2 - x^2 - 2x^2 - 12x - 5x + 2x$$

$$= 0x^2 - 15x$$

$$= 0 - 15x$$

$$= -15x$$

Use the distributive property and multiply everything in the first set of brackets by 3x, everything in second set of brackets by **negative** x and everything in the third set by **negative** 2x.

Then collect like terms and simplify!

Having Trouble?

Practice

Pg. 132 #12

17. Expand $3s(2s - t - 1) + 2(st + 4s + 5)$

$$3s(2s - t - 1) + 2(st + 4s + 5)$$

$$= 6s^2 - 3st - 3s + 2st + 8s + 10$$

Remember...

We can only add or subtract
like terms.

Terms are "like" if their variable
factors are identical!

$$= 6s^2 - 3st + 2st - 3s + 8s + 10$$

$$= 6s^2 - st + 5s + 10$$

Use the distributive property and multiply everything in the first set of brackets by 3s, everything in second set of brackets by +2.

Then collect like terms and simplify!

Having Trouble?

Practice
Pg. 132 #12

Consolidation

Homework

Pg. 131-132

1-12 (1 or 2 from each)

13, 16, 19

These are the ones we worked
on together.