**Warm Up
Grade 9**

Determine the product or the quotient.

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

b) $(-7m^4n^2 + 2mn - 10n^2)(-3mn)$

c) $\dfrac{80t^5 + 14t^4 - 18t}{-2t}$
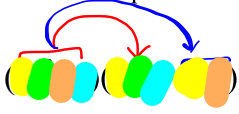
d) $(3x^2 - 12x + 7) - (5x^2 - 12x - 8)$
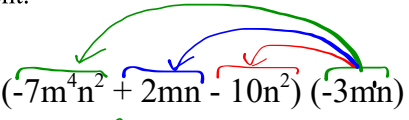
e) $(-12x^2 + 6x - 5) + (4x^2 - 8x - 1)$

Warm Up
Grade 9
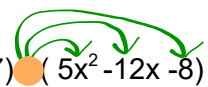
Determine the product or the quotient.

a) ( )( )

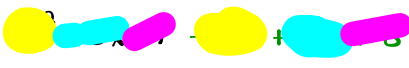$36r^5xy^2 - 18r^3x^2y$

b) $(-7m^4n^2 + 2mn - 10n^2)(-3mn)$

$21m^5n^3 - 6m^2n^2 + 30mn^3$

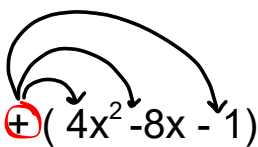c) $\dfrac{80t^5 + 14t^4 - 18t}{-2t}$

$\dfrac{80t^5}{-2t} + \dfrac{14t^4}{-2t} - \dfrac{18t}{-2t}$

$\boxed{-40t^4 - 7t^3 + 9}$

d) $(3x^2 - 12x + 7)(5x^2 - 12x - 8)$

$3x^2 - 5x^2 \quad -12x + 12x \quad +7 + 8$

$\boxed{-2x^2 + 15}$

e) $(-12x^2 + 6x - 5) \oplus (4x^2 - 8x - 1)$

$-12x^2 + 4x^2 \quad +6x - 8x \quad -5 - 1$

$\boxed{-8x^2 - 2x - 6}$

MATH 9 SKILLS CHECKLIST   NAME:_____
UNIT 4 – POLYNOMIALS
M. Burns

GENERAL CURRICULUM OUTCOME (GCO):   **Patterns and Relations (PR) – Represent algebraic expressions in multiple ways.**

SPECIFIC CURRICULUM OUTCOMES (SCOs):   **PR5, PR6 and PR7**

_____ 1.   **(PR5) Demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2).**

ACHIEVEMENT INDICATORS:

_____   **Create a concrete model or a pictorial representation for a given polynomial expression.**

Ex.:   Model $3x^2 + 4$ using algebra tiles.   **MODEL:** ☐ ☐ ☐ ☐☐ ☐☐

_____   **Write the expression for a given model of a polynomial.**

Ex.:   Identify the polynomial represented by the following collection of algebra tiles: ■ ■ ■

ANSWER: $-3x^2$

_____   **Identify the variables, degree, number of terms and coefficients, including the constant term, of a given simplified polynomial expression.**

Ex.: $4m^2 - n - 7$

VARIABLES: m and n   NUMERICAL COEFFICIENTS: 4 and -1
DEGREE: 2   CONSTANT TERM: -7
NUMBER OF TERMS: 3

_____   **Describe a situation for a given first degree polynomial expression.**

Ex.:   Let "x" represent the height of a student.
Ex.:   Let "2a" represent the length of one side in an equilateral triangle.

_____   **Match equivalent polynomial expressions given in simplified form.**

Ex.: $4x - 3x^2 + 2$ is equivalent to $-3x^2 + 4x + 2$

_____ **2.**   **(PR6)** **Model, record and explain the operations of addition and subtraction of polynomial expressions concretely, pictorially and symbolically (limited to polynomials of degree less than or equal to 2).**

ACHIEVEMENT INDICATORS:

_____ **Identify like and unlike terms.**
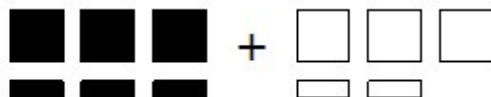
Ex.:   From the list, which terms are "like" $8x^2$?

$-3x$; $5x^2$; 4 ; $3x$; 9 ; $-11x^2$; $7x$; -3

ANSWERS: $5x^2$ and $-11x^2$

_____ **Model addition of two given polynomial expressions concretely or pictorially and record the process symbolically.**

Ex.:   Use algebra tiles to model the sum of the binomials below then record your answer symbolically.

$(-3x^2 - 3x) + (3x^2 + 2x)$:

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

_____ **Apply a personal strategy for addition and subtraction of given polynomial expressions and record the process symbolically.**

Ex.: $(-2a^2 + a - 1) - (a^2 - 3a + 5)$
= $(-2a^2 + a - 1) + (-a^2 + 3a - 5)$ **(ADD the OPPOSITE of each term in the 2nd polynomial.)**
= $-2a^2 + a - 1 - a^2 + 3a - 5$
= $-2a^2 - a^2 + a + 3a - 1 - 5$
= $-3a^2 + 4a - 6$

_____ **Identify the error(s) in a given simplification of a given polynomial expression.**

Ex.:   A student incorrectly subtracted $(2x^2 + 5x + 10) - (x^2 - 3)$ like this:

$(2x^2 + 5x + 10) - (x^2 - 3)$
= $2x^2 + 5x + 10 - x^2 - 3$
= $x^2 + 2x + 10$

Identify the errors and correct them.

ANSWER: The student forgot to add the opposite of the second polynomial, then grouped unlike terms ($5x$ and -3). They should have done the following:

$(2x^2 + 5x + 10) - (x^2 - 3)$
= $(2x^2 + 5x + 10) + (-x^2 + 3)$
= $2x^2 + 5x + 10 - x^2 + 3$
= $x^2 + 5x + 13$

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3.   **(PR7) Model, record and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials concretely, pictorially and symbolically.**

ACHIEVEMENT INDICATORS:

_____ **Apply a personal strategy for multiplication and division of a given polynomial expression by a given monomial.**

Ex.: $2x(-3x + 5)$ Ex.: $\dfrac{24d^2 - 12d}{-12d}$

       $= \quad -6x^2 + 10x$

                                                    $= \quad -2d + 1$

_____ **Provide examples of equivalent polynomial expressions.**

Ex.:   Are $5j^2 + 20$ and $5(j^2 + 4)$ equivalent expressions?

        ANSWER: Yes, these are equivalent expressions because $5(j^2 + 4) = 5j^2 + 20$.

_____ **Identify the error(s) in a given simplification of a given polynomial expression.**

Ex.:   A student incorrectly multiplied $-3d\,(-2d + 9)$ like this:

                $-3d(-2d + 9)$

    $= \quad 6d - 27$

Identify and correct the errors.

    ANSWER: The student did not multiply the variables in their work. They should have done the following:

                $-3d(-2d + 9)$

    $= \quad 6d^2 - 27d$

VOCABULARY:

_____	variable	_____	polynomial	_____	equivalent polynomials
_____	expression	_____	monomial	_____	like terms
_____	term	_____	binomial	_____	unlike terms
_____	constant term	_____	trinomial	_____	algebra tiles
_____	(numerical) coefficient	_____	degree		

Class/Homework

Pg 259 - 261
  #2
  #6
  #9
  #10
  #11
  #12 a, d
  #15 a, e, g,h
  #16
  #19 b
  #22 a,c,h,k,l
  #24 a
  #26 a,c,e,g
  #28 b, d, f
  #29 a, b

Check Answers in back of textbook

Pg 262
Questions 1 to 8