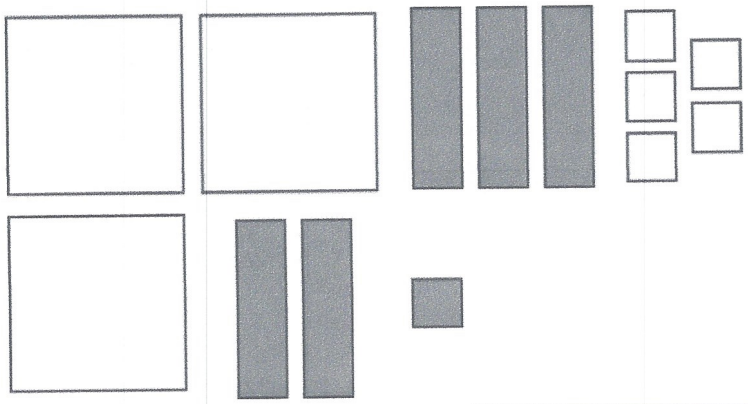
Worksheet: Addition of Polynomials

Use your tiles to model the additions and complete the chart:

Symbolic Form	Pictorial Form	Symbolic Result
$2x^2 - 3x + 5$ $x^2 - 2x - 1$		$3x^2 - 5x + 4$
$x^2 + 4x - 6$ $x^2 - 2x - 1$		
$5x - 3$ $-2x + 1$ $x - 2$		
$7 - 3x + x^2$ $-4 - x - x^2$		

Use the results to answer:

1. How do we add polynomials together, if we use only the symbolic form?

Worksheet: Addition of Polynomials (continued)

2. The tiles that have the same size and share area like; in symbolic form we call them like terms. Reword your observations in Question 1 using the phrase "like terms."

3. A term is a mathematical symbol that contains a numerical and/or a literal part. The term $7x^2$ has numerical coefficient 7 and literal coefficient x^2. Term $-6abc$ has numerical coefficient -6 and literal coefficient abc.

   Use these examples to help choose the appropriate entries for the chart:

Term	Numerical Coefficient	Literal Coefficient
$5x^3$		
$-3y^4$		
$82x^2y^5$		
	-99	p^2

Each term has a degree that depends on the number of literal factors it has. Term $5x^3$ has degree 3; term $-3y^4$ has degree 4; term $82x^2y^5$ has degree 7.

Use these examples to help you complete the chart:

Term	Numerical Coefficient	Literal Coefficient	Degree of the Term
$4a^5$	4	a	5
$-5c^4d^3$			
$24x^8y$			
$8a^2b^4$			
$-6c^5de^3$			

Worksheet: Addition of Polynomials (continued)

4. In the symbolic form, addition questions are often written horizontally, rather than vertically.

   e.g., $(5x^2 + 3x - 7) + (3x^2 - 4x + 2)$ means that we are to add the two bracketed polynomials. We add $3x^2$ to $5x^2$, $-4x$ to $3x$, and 2 to -7. We could communicate this question with fewer symbols if we wrote $5x^2 + 3x - 7 + 3x^2 - 4x + 2$. In a question written in string form like this, it is easiest to think of collecting like terms if we visually isolate two like terms, remembering to take any sign in front of the term as a positive or negative sign, and add.

   When we simplify $5x^2 + 3x - 7 + 3x^2 - 4x + 2$, we get $8x^2 - x - 5$. Model this question with tiles, to verify the result.

   Simplify the following questions.

   a) $2x^2 + 7x + 8x^2 - x - 6$

   b) $3x^2 - 6x^2 - 4x^2 + 7x^2$

   c) $10ab - 5c + 2ab + 7c$

   d) $9y^4 + 7y3 - y + 8y - 5y^3 + y^4$

   e) $7pqr + 2r - 3pqr - r$

   f) $8a^2 + 4a - a^2 - 9a$

   In your own words, write the pattern you are using to generate answers in the symbolic form.

   Notice that in the questions you have just simplified, you added both positive and negative terms. Another way of saying what you have done, is that you have added and subtracted terms. So all subtraction questions can be thought of as addition questions.