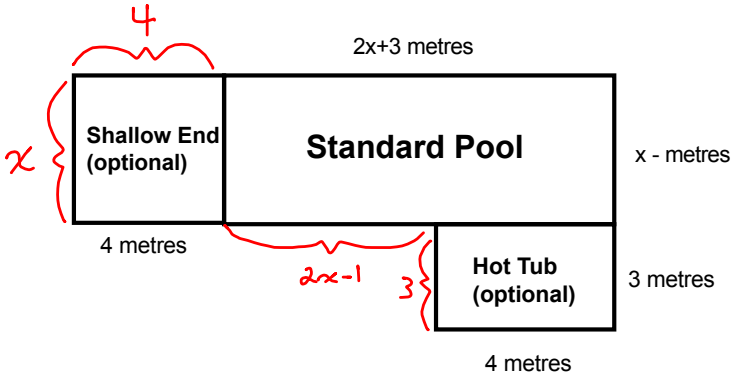
3.6 Adding and Subtracting Polynomials

Part 1: DO IT NOW

The Cool Pool Company makes pools and uses the following diagram to calculate the perimeter of pool with different options:

Option 1 – ***Bronze package*** *(standard pool only)*
Option 2 – ***Silver package*** *(standard pool and shallow pool)*
Option 3 – ***Gold package*** *(all sections of the pool are included)*



a) In your group choose either the Bronze, Silver, or Gold package and create a simplified expression for the perimeter of your pool.

BRONZE: $P = (2x+3)+(2x+3)+x+x$
$= 6x+6$

SILVER: $P = (2x+3)+(2x+3)+x+x+4+4$
$= 6x+14$

GOLD: $P = (2x+3)+x+3+4+3+(2x-1)+4+x+4$
$= 6x+20$

b) What is the perimeter of your pool if $x=4$

BRONZE: $P = 6(4)+6 = 30m$

SILVER: $P = 6(4)+14 = 38m$

GOLD: $P = 6(4)+20 = 44m$

Part 2: Adding Polynomials

Polynomial: an algebraic expression consisting of one or more terms connected by addition or subtraction operators

When **adding** polynomials you can simply remove the brackets and collect the like terms

Example:

$$(4x+3)+(7x+2)$$

$= 4x+3+7x+2$ **Step 1:** Remove the Brackets

$= 4x+7x+3+2$ **Step 2:** Rearrange like terms into groups

$= 11x+5$ **Step 3:** Collect the like terms

Practice Adding Polynomials

1) $(3y + 5) + (7y - 4)$

$= 3y+5+7y-4$

$= 3y+7y+5-4$

$= 10y+1$

2) $(2p - 2) + (4p - 7)$

$= 2p-2+4p-7$

$= 2p+4p-2-7$

$= 6p-9$

3) $(6x - 12) + (-9x - 4) + (x + 14)$

$= 6x-12-9x-4+x+14$

$= 6x-9x+x-12-4+14$

$= -2x-2$

4) $(5x - 4y - 1) + (-2x + 5y + 13)$

$= 5x-4y-1-2x+5y+13$

$= 5x-2x-4y+5y-1+13$

$= 3x+y+12$

Part 3: Subtracting Polynomials

To **subtract** polynomials, add the opposite polynomial (switch the signs of the terms of the polynomial being subtracted)

Example:

$(3y + 5) - (7y - 4)$ **To subtract the polynomial we must add the opposite**

The opposite of (7y-4) is: $-7y+4$

$\therefore (3y+5) - (7y-4) = (3y+5)+(-7y+4)$

$= 3y+5-7y+4$

$= 3y-7y+5+4$

$= -4y+9$

OR

Subtracting Polynomials

To subtract polynomials, subtract each of the terms in the second polynomial.

$$(3y + 5) - (7y - 4)$$

$\therefore (3y+5) - (7y-4) = 3y+5-7y-(-4)$

$= 3y+5-7y+4$

$= 3y-7y+5+4$

$= -4y+9$

5) $(4x + 3) - (7x + 2)$

$= 4x+3-7x-(+2)$

$= 4x+3-7x-2$

$= 4x-7x+3-2$

$= -3x+1$

6) $(a^2 - 2a + 1) - (-a^2 - 2a - 5)$

$= a^2-2a+1-(-a^2)-(-2a)-(-5)$

$= a^2-2a+1+a^2+2a+5$

$= a^2+a^2-2a+2a+1+5$

$= 2a^2+6$

7) $(3x + y - 4z) - (7x + 3y - 2z)$

$= 3x+y-4z-7x-(+3y)-(-2z)$

$= 3x+y-4z-7x-3y+2z$

$= 3x-7x+y-3y-4z+2z$

$= -4x-2y-2z$

8) $(6x - 12) - (-9x - 4) - (x + 14)$

$= 6x-12-(-9x)-(-4)-x-(+14)$

$= 6x-12+9x+4-x-14$

$= 6x+9x-x-12+4-14$

$= 14x-22$

Part 4: Apply Our Knowledge!

The Burgh Birds players get a $\$x$ bonus added to their base salary for every goal that they score during the playoffs. Here are the salaries and goals scored for the 3 highest scoring players on the Burg Birds during the playoffs last season.

Player	Base salary	Goals in playoffs last season
Bardown Jensen	$1200	18
Wayne Goal	$1300	22
Timmy Toe Drag	$900	5

a) Write and simplify an expression for each player's year end salary.

Bardown Jensen: $1200 + 18x$

Wayne-G: $1300 + 22x$

Timmy: $900 + 5x$

b) Write and simplify an expression for the total amount of money that the owner of the team will need to pay the three players at the end of the season.

Total paid $= (1200 + 18x) + (1300 + 22x) + (900 + 5x)$

$= 45x + 3400$

c) If $x = 25$, what is the total amount of money that the owner will need to pay the three players at the end of the season?

Total paid $= 45(25) + 3400$

$= \$4525$

Review of Key Concepts

- To add polynomials, remove brackets and collect like terms

- To subtract a polynomial, add the opposite polynomial

Homework: Complete Worksheet