

ALGEBRA PROBLEM SESSION # 6 - PRACTICE PROBLEMS

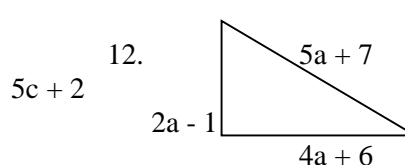
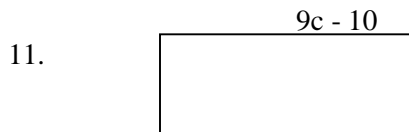
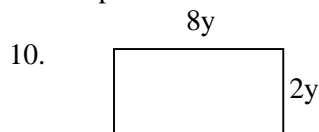
Introduction to Polynomials and Polynomial Functions

1. What is a polynomial function?
2. What do we mean when we describe the graph of a polynomial function as smooth and continuous?
3. Explain how to determine the leading coefficient of a polynomial.
4. Explain how to recognize like terms and then explain why the terms x^2y and xy^2 are not like terms.
5. Find the difference when $3x^2 + 4x - 3$ is subtracted from the sum of $-2x^2 - x + 7$ and $5x^2 + 3x - 1$.
6. Find the sum when $2x^2 - 4x + 3$ minus $8x^2 + 5x - 3$ is added to $-2x^2 + 7x - 4$.
7. Find the sum when $7x^3 - 4x$ minus $x^2 + 2$ is added to $5 + 3x$.
8. Explain how to find the degree of a polynomial by finding the degree of $9x^2y + 13x^2y^2 + 8x^4y^4$.
9. Analyze the claim the text makes that “the sum of two polynomials is a polynomial.” Does $(x^2 - 2x) + (2x - x^2)$ refute the claim?
10. Subtract $(-13m^3 - 8m^2 - 16m - 11)$ from the sum of $(12m^2 + 4m + 7)$ and $(-13m^2 - 9m + 17)$
11. $(-12n^2 + 22n - 21) - (15n^2 - 2n - 6) - (20n^2 - 5n - 8)$
12. $(-x^2 - 3x - 4) - (-5x^2 - x - 2) - (-2x - 5 + 3x^2)$
13. $(3x^2 - 2x - 9 + 5x^2 + 2x - 14) - (-2x^2 - 9) + (-4x - 16)$
14. Write two polynomials that add to give $3x^3 - 2x^2 + x - 7$
15. Write two polynomials whose difference is $2x^3 + 5x^2 + 6x - 12$
16. Simplify: $4(2x^2 + 3x - 9) - 7(3x^2 - 3x - 8)$

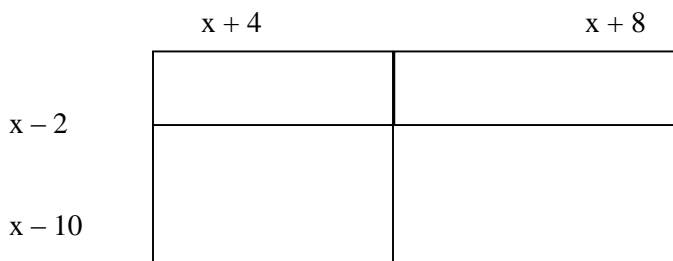
Multiplication of Polynomials

1. Find the product of $3r - 2t$ and $4r - t$.
2. Simplify: $4(2x^2 + 3x - 9) - 7(3x^2 - 3x - 8)$
3. Find the product of $rs + t$ and $rs - 2t$.
4. Find the product of $2x^2 + 5x$ and $-3x^2 - 4$.
5. Find the product of $y^2 + 2y$ and $y^2 - 3y$.
6. Simplify: $(x + y + 4)(x + y - 4)$
7. Simplify: $(7x + 5y - 2)(7x + 5y + 2)$
8. Compare $(a + b)^3$ and $a^3 + b^3$, and determine whether they are equal. If yes, explain why; if no, give a counter example.
9. How can the graph of function fg be obtained from the graphs of functions f and g ?

Find the perimeter and area:



14. Write a polynomial that represents the area of this figure.



15. If $f(x) = x + 3$ and $g(x) = x^2 - 3x + 9$ find $(fg)(x)$; $(fg)(-2)$ and $(fg)(0)$.

16. If $f(x) = x - 4$ and $g(x) = x + 10$ find $(fg)(x)$; $(fg)(-1)$; $(fg)(0)$.

Finding the Greatest Common Factor and Factoring by Grouping

- Explain how to find the greatest common factor of two natural numbers.
- Use 2 approaches to factor $ac - ad + bd - bc$. Are the results the same? Explain why or why not.
- True or False: $28x^3 - 7x^2 + 36x - 9$ is equivalent to $(28x^3 + 36x) + (-7x^2 - 9)$ when factoring by grouping.
- Factor completely: $-28xyz + 42x^2y^2 - 21y^2z^2$ $4uv - 6u^2v - 8v^2$
 $35mn - 5m^2n^2$ $48x^3y^3 + 72x^2y^2 - 64x^2y^3$
- Factor by grouping: $24 + 3x^2 + 3x + 24x$ $r(r - 2) + (2 - r)$ $5x(2 - x) + 4(2 - x)$
 $12y^2 - 20y + 40 - 24y$ $10x^2 - 15x + 12x - 18$

Factoring Trinomials

- Explain what clues one should look for to assist in factoring:
 (a) a polynomial of two terms (b) a polynomial of three terms
- Factor: (a) $2x^2 - 4x - 30$ (b) $10x^2 - 9x - 7$ (c) $105 - 24x^2 - 18x$
- True or False: $8y^2 - 51y + 18$ has a factor of $8y - 3$.
- Is it possible to factor $x^6 - 7x^3 + 10$ without using substitution?
- Factor: $6x^2 + 23x + 20$ $10x^2 - 17x + 3$ $3y^2 - 19y - 14$
 $5r^2 + 85r + 260$ $2y^2 + 3y - 15$ $2x^2 - 19x - 60$
- Factor: $7rx^3 - 28rx^2 + 21r$ 7. Factor: $9m^3 - 30m^2 + 21m$
- Factor: $9n^3 + 27n^2 - 90r$