Olympiads School grade 9 Math homework on class 4

First name: _____ Last name: _____ Student ID: _____

Polynomials (2) Homework

1. Fill the blanks.

Expression	Monomial? Binomial? Trinomial?	Degree of the polynomial	Leading Coefficient	Constant Term
$-20x^2 + 15x + 17$				
$43t^3ps^4$				
$16yx^2 - 9yx$				
$-81/190$				

2. Expand and simplify.

1. $(-4x^2)(8x - 5)$

2. $y^5(5y^4 + 3y^3 - y^2)$

3. $4(2d - 5) + 3(d^2 - 3d) - 2d(d + 1)$

4. $(6x + 3)(-5x + 2)$

5. $3p^2q(p^3q^3 - pq^2 - 4p)$

6. $(8x - 3)(4x^2 + 10x - 3)$

7. $(4p^2 - 1)(2p^2 + 5)$

8. $(m^2 + 8)(3m + 7)$

9. $(2x + y)(3x^2 + 2xy + y^2)$

10. $(h - 5k)(h^2 - 2hk + 3k^2)$

11. $(\frac{1}{2}a - 2b + c)(a + 6b - c)$

12. $(x - 2)(x + 6)(2x + 1)$

3. Use the perfect square formula to expand and simplify the following.

Perfect square formula:

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

1. $(x - 7)^2$

2. $(a + 12)^2$

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

4. $(2x + 9y)^2$

5. $(-4y - 5)^2$

6. $(mn + 2m^2)^2$

Word problems

1. How much greater is $-16x^2 - 7x - 5$ than $18x^2 + 13x - 8$?

2. If the sides of a triangle are $a(3a + 2)$, $5a - 8$, and $11a^2 + 7$, what is the perimeter?

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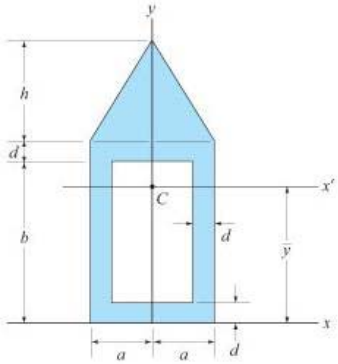
3. Find the shaded area of the following figure given a = x, b = 2x, d = 0.5, h = 1.5x



4. Simplify first and then evaluate the expression $2(3x^2 – 5x) – 4x(7 + x)$, when $x = –1$.

5. The side of a cube is represented by x + 1. Find, in terms of x, the volume of the cube.

6. Let an integer be represented by x. Find, in terms of x, the product of three consecutive integers starting with x.

7. A circular pond will be placed on a square piece of land. The length of a side of the square is 2x. The radius of the pond is x - 3. The part of the square not covered by the pond will be planted with flowers. What is the area of the region that will be planted with flowers? (use 3.14 for pi)

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8. The polynomial $70s^2 + 1500s - 10800$ models the profit a company makes on selling an item at price s. A second item sold at the same price brings in a profit of $30s^2 + 450s - 5000$.

   a) Write a polynomial that expresses the total profit from the sale of both items.

   b) What is the total profit if the price is $10?

9. Saraya sells chocolate bars to raise funds for the school trip to New York City. She is paid $20 each week and $6.00 for each carton of 12 chocolate bars sold.

a) Find an expression to represent her earnings if she sells *x* chocolate bars over the course of *w* weeks.

b) Use the answer to part (a) to find her earnings (revenue) after selling 252 chocolate bars over 5 weeks.

Extra: Divide monomial.

To Divide a Polynomial by a Monomial

If a, b, and c are polynomials such that $c \neq 0$, then

$$\frac{a+b}{c} = \frac{a}{c} + \frac{b}{c} \qquad \text{Similarly,} \qquad \frac{a-b}{c} = \frac{a}{c} - \frac{b}{c}$$

1. $\dfrac{12x^3 - 6x^2 + 3x}{3x}$

2. $(10c^3d - 15c^2d^2 + 2cd^3) / (5c^2d^2)$