# Jakarta International School

8th Grade – AG1

**Practice Test -Green**

Polynomials and Quadratic Equations

*Name:* _____

Date: _____

*Grade*:

**Standard Level Learning Goals - Green**

| | |
|---|---|
| Understand and Operate with Polynomials | - Classify polynomials by degree and number of terms<br>- Understand how to add and subtract polynomials<br>- Multiply polynomials by using the distributive property or FOIL memory tool<br>- Understand, recognize, and use Special Product Patterns to multiply polynomials |
| Graph quadratic functions | - Understand how to graph parabolas using the "3 point method"<br>- Graph quadratic functions that have already been factored<br>- Graph quadratic functions using the x-intercepts and midpoint method |
| Solve and apply quadratic equations | - Solve quadratic equations that have already been factored<br>- Solve quadratic equations that have a leading coefficient of 1<br>- Solve quadratic equations with a leading coefficient that is not 1<br>- Solve quadratic equations that contain special product patterns<br>- Problem solve with quadratic equations |

**Additional Advanced Concepts - Blue**

- Transforming expressions
- Using substitution to solve quadratic equations
- Applying the Quadratic Formula when factoring isn't possible
- Working with similar rectangles

**Additional Highly Advanced Concepts - Black**

- Deriving the equation for a quadratic function given information about its graph
- Deriving special product patterns geometrically
- Pythagorean Theorem applications
- Radical Equations

| | |
|---|---|
| A | - All learning goals are met within the standard<br>- The learner independently completes open-ended tasks.<br>- Assessment scores indicate a high level of understanding of skills and concepts.<br>- The learner demonstrates a sophisticated understanding through high order application and performance |
| B | - Most of the learning goals are met within the standard<br>- The learner occasionally needs support to complete open-ended tasks.<br>- Assessment scores indicate a good grasp of skills and concepts.<br>- The learner demonstrates considerable understanding through application and performance |
| C | - Some of the learning goals are met within the standard<br>- The learner needs some support to complete open-ended tasks.<br>- Assessment scores indicate satisfactory acquisition of skills and concepts.<br>- The learner demonstrates some understanding through application and performance |
| D | - Few of the learning goals are met within the standard<br>- The learner needs ongoing support to begin and/or complete tasks.<br>- Assessment scores indicate weak acquisition of skills and concepts.<br>- The learner demonstrates limited understanding through application and performance. |
| F | - None or almost none of the learning goals are met within the standard<br>- The learner needs significant support to begin and/or complete tasks.<br>- Rarely completes tasks even with support.<br>- Assessment scores indicate minimal grasp of skills and concepts.<br>- The learner does not demonstrate understanding through application and performance. |

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Polynomials and Quadratic Equations

*Name:* _____

Date: _____

*Score*: ( – )

## Polynomials Vocabulary

Write each polynomial in standard form. Then, identify each polynomial by degree AND terms.

| Variable Expression | Standard Form | Identified by Degree *and* Number of Terms |
|---|---|---|
| $5a-2-3a$ | | |
| $-7$ | | |
| $3w-4w^2+2$ | | |

## True or False

**For each statement, write true or false. Then, provide an explanation or example to demonstrate your understanding.**

1. In the factoring of a trinomial, if the constant term is positive, then the signs in both binomial factors will always be positive. _____

2. The sum of two binomials is always a polynomial with two or more terms. _____

3. The graph of $y=-x^2+3x-2$ opens downwards. _____

**Solve the following and record all answers in standard form**.

| | |
|---|---|
| 4. Subtract the sum of $4x^2-3x+2$ and $5x^3+6x^2-3x-3$ from $5x^3+2x^2+3x-7$ | 5. Multiply the polynomials vertically. $(a+4)(a^2+3-2a)$ |
| 6. Multiply the polynomials horizontally. $(k^2+8k+2)(k-5)$ | 7. Multiply the polynomials using the F.O.I.L method. $(6x+5)(2x-3)$ |

**In this problem** # 8, **we are interested in assessing your ability to show / explain the process you use when you factor the following trinomial:**

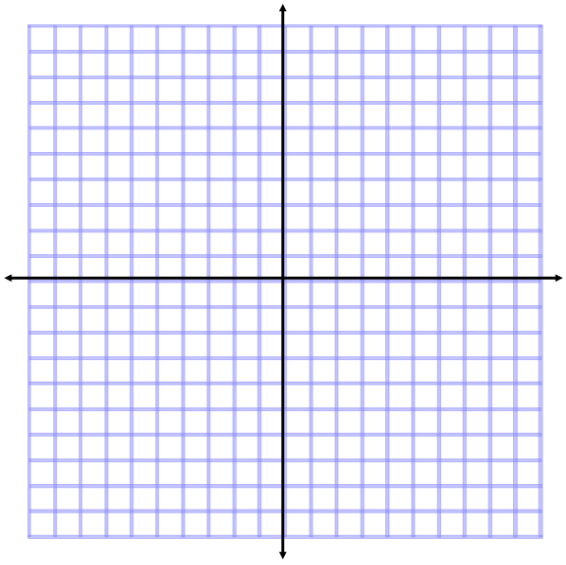
| 8. **Factor Completely** | **Explain your processing in words, or mathematically.** |
|---|---|
| $25x^2-20x+4$ | |

**In the following problems #** 9 and 10 **we would like you to demonstrate your understanding by explaining in words the steps you took to solve and check the following quadratic equations.**

| **Equation**: | **Steps taken**: |
|---|---|
| 9. $8x^2 + 1 = 6x$ | |
| | |
| 10. $36m^2 - 4 = 0$ | |

**11. Graph the following equation.**

- **Make sure you show your work**
- **Be sure to use the formula you learned for the parabola's axis of symmetry.**
- **Label the coordinates of the vertex and draw in your axis of symmetry.**

| **Graph this equation.** | **Graph** |
|---|---|
| $y = x^2 - 6x + 5$ |  |

**12. Read the following problem and create a model that represents the country's Female population since 2000 in the space below the problem.**

Population: Some fictional country's total population P and male population M can be modeled by the following equations, where t is the number of years since 2000.

Total Population: P = $3x^2 + 4x - 5$

Male Population: M = $2x^2 - 3x - 2$

## 13. Mr. Suarez's Hot Dog Stand

When he's not teaching, Mr. Suarez sells hot dogs for $1 each at a football stadium. He has about 210 loyal customers. Each will buy 1 hot dog from him each time they come to the stadium. One day, when he's feeling a little bit greedy, Mr. Suarez decides that he wants to increase the price of his hot dogs in order to try to make more money.

Mr. Suarez isn't stupid, though. He realizes that some of his customers will no longer buy hot dogs after the price goes up. He wants you to help him figure out how high he should raise the price in order to maximize his earnings.

Mr. Suarez learned from other hot dog sellers that he will lose 3 customers every time he increases the price of his hot dogs by $**.**10

The following equation models his hot dog sales revenue, $R$, where $n$ is the number of times he raises the price by $**.**10

**Revenue**, R, is a word that means "total income."

$$R = (1+0.1n)(210-3n)$$

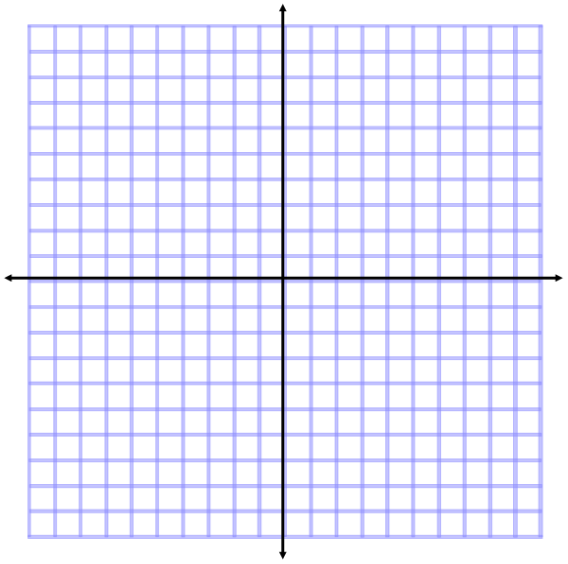
To find the total amount of money Mr. Suarez makes from selling hot dogs, you multiply the price of each hot dog by the total number of hot dogs Mr. Suarez sells.

A. In the formula above, what is the real-life meaning of each factor: $(1+0.1n)$ and $(210-3n)$?

B. Graph the Revenue function using the x-intercepts and midpoint method. Your graph will show the relationship between the number of times Mr. Suarez raises the price of his hot dogs and the total revenue he earns from his sales.

C. What price should Mr. Suarez charge for his hot dogs in order to maximize the amount of money he earns?

D. How many times would Mr. Suarez need to raise the price of his hot dogs by $**.**10 in order to make enough customers angry that he ends up losing all of his business and making no money at all?



**14.**

- **Read the following problem carefully.**
- **Make a sketch.**
- **Using the 4 step problem solving process solve the following problem.**

Originally a rectangle was 8 meters long and 5 meters wide. When both dimensions were decreased by the same amount, the area of the rectangle decreased by 22 $m^2$. Find the dimensions of the new rectangle.