

Jakarta International

Name: Solutionis

School

8<sup>th</sup> Grade - AG1

Date: \_\_\_\_\_

Practice Test - Green

Polynomials and

Score: 68

Quadratic Equations

### 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
$5a - 2 - 3a$	$2a - 2$	Linear binomial
$-7$	$-7$	Constant monomial
$3w - 4w^2 + 2$	$-4w^2 + 3w + 2$	quadratic trinomial

(4)

### 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. FALSE

Sometimes :  $x^2 - 5x + 6$   $\times$   $x^2 + 5x + 4$   
 $= (x - 3)(x - 2)$   $\times$   $= (x + 1)(x + 4)$  ✓

(2)

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

$$\begin{array}{ccc} x + 7 & & -5x + 2 \\ x - 7 & & x^3 + 7 \\ \hline & 1 \text{ term} & x^3 - 5x + 9 \\ & & \hline & & 3 \text{ terms} \end{array} \quad (2)$$

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

It is true because the coefficient of the quadratic term is negative, so the graph opens downwards. ✓ (2)

Solve the following and record all answers in standard form.

<p>4. Subtract the sum of <math>4x^2 - 3x + 2</math> and <math>5x^3 + 6x^2 - 3x - 3</math> from <math>5x^3 + 2x^2 + 3x - 7</math></p> $\begin{array}{r} 4x^2 - 3x + 2 \\ 5x^3 + 6x^2 - 3x - 3 \\ \hline 5x^3 + 10x^2 - 6x - 1 \end{array}$ $\begin{array}{r} 5x^3 + 2x^2 + 3x - 7 \\ - 5x^3 + 6x^2 - 3x - 3 \\ \hline - 8x^2 + 9x - 6 \end{array}$ <p>(4)</p>	<p>5. Multiply the polynomials vertically.</p> $\begin{array}{r} (a+4)(a^2+3-2a) \\ a^2 - 2a + 3 \\ a + 4 \\ \hline a^3 - 2a^2 + 3a \\ 4a^2 - 8a + 12 \\ \hline a^3 + 2a^2 - 5a + 12 \end{array}$ <p>(4)</p>
<p>6. Multiply the polynomials horizontally.</p> $(k^2 + 8k + 2)(k - 5)$ $= k(k^2 + 8k + 2) - 5(k^2 + 8k + 2)$ $= k^3 + 8k^2 + 2k - 5k^2 - 40k - 10$ $= k^3 + 3k^2 - 38k - 10$ <p>(4)</p>	<p>7. Multiply the polynomials using the F.O.I.L. method.</p> $(6x+5)(2x-3)$ $= 12x^2 - 18x + 10x - 15$ $= 12x^2 - 8x - 15$ <p>(4)</p>

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

<p>8. Factor Completely</p> $25x^2 - 20x + 4$ $= (5x - 2)(5x - 2)$ $= (5x - 2)^2$ <p>✓ ✓ ✓</p>	<p>Explain your processing in words, or mathematically.</p> <p>Quadratic Term <math>(25x^2)</math></p> <p>Linear Term <math>(-20x)</math></p> <p>Constant Term <math>(+4)</math></p> <p>Factors <math>\downarrow</math> <math>\swarrow</math> <math>\searrow</math> <math>\downarrow</math></p> <p><math>5</math> <math>\swarrow</math> <math>5</math> <math>\searrow</math> <math>2</math></p> <p>cross multiply</p> <p>Linear Term <math>(-20x)</math></p> <p>Constant Term <math>(-20x)</math></p> <p>Add <math>\left\{ \begin{array}{l} -10x \\ -10x \end{array} \right.</math> <math>\left( \frac{-20x}{20x} \right)</math></p> <p>iners</p> <p>outers</p> <p>Check:</p> $= (5x - 2)(5x - 2)$ $= 25x^2 - 10x - 10x + 4$ <p>(4)</p>
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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:
<p>9. <math>8x^2 + 1 = 6x</math></p> <p>1. <math>8x^2 - 6x + 1 = 0</math></p> <p>2. <math>(2x-1)(4x-1) = 0</math></p> <p>3. <math>2x-1 = 0</math>      <math>4x-1 = 0</math></p> <p style="padding-left: 40px;"><math>x = \frac{1}{2}</math>                      <math>x = \frac{1}{4}</math></p> <p>4. Check  <math>8x^2 + 1 = 6x</math>      <math>8x^2 + 1 = 6x</math>  <math>8(\frac{1}{2})^2 + 1 = 6(\frac{1}{2})</math>      <math>8(\frac{1}{4})^2 + 1 = 6(\frac{1}{4})</math>  <math>2 + 1 = 3</math>              <math>8(\frac{1}{16}) + 1 = \frac{6}{4}</math>  <math>3 = 3 \checkmark</math>                      <math>\frac{1}{2} + 1 = \frac{3}{2}</math>  <math>3 = 3 \checkmark</math></p> <p>5. Solution set is <math>\{\frac{1}{2}, \frac{1}{4}\}</math>.</p>	<p>1. Write the equation in standard form <math>ax^2 + bx + c = 0</math></p> <p>2. Factor the left hand side.</p> <p style="text-align: center;"> <math>\begin{array}{cc} \cancel{8} &amp; \cancel{1} \\ 4 &amp; 1 \\ \cancel{2} &amp; \cancel{1} \end{array}</math> </p> <p style="text-align: center;"> <math>\begin{array}{l} \text{K.I.} \\ -4x \\ -2x \\ -6x \end{array}</math> </p> <p>3. Set each factor to 0.</p> <p>4. Check.</p> <p>5. Solution set.</p> <p style="text-align: right;">(8)</p>
<p>10. <math>36m^2 - 4 = 0</math></p> <p>1. <math>4(9m^2 - 1) = 0</math></p> <p>2. <math>4[(3m)^2 - (1)^2] = 0</math></p> <p>3. <math>4(3m-1)(3m+1) = 0</math></p> <p>4. <math>3m-1 = 0</math>      <math>3m+1 = 0</math></p> <p style="padding-left: 40px;"><math>m = \frac{1}{3}</math>                      <math>m = -\frac{1}{3}</math></p> <p>5. <math>36m^2 - 4 = 0</math>      <math>36m^2 - 4 = 0</math></p> <p style="padding-left: 40px;"><math>36(\frac{1}{3})^2 - 4 = 0</math>      <math>36(\frac{1}{3})^2 - 4 = 0</math></p> <p style="padding-left: 80px;"><math>36(\frac{1}{9}) - 4 = 0</math>      <math>36(\frac{1}{9}) - 4 = 0</math></p> <p style="padding-left: 120px;"><math>4 - 4 = 0</math>              <math>4 - 4 = 0</math></p> <p style="padding-left: 160px;"><math>0 = 0 \checkmark</math>                      <math>0 = 0 \checkmark</math></p> <p>6. Solution set is <math>\{\frac{1}{3}, -\frac{1}{3}\}</math></p>	<p>1. Look for the highest common factor.</p> <p>2. Identify the difference of squares.</p> <p>3. Factor using the sum and difference pattern.</p> <p>4. Set each factor to 0</p> <p>5. Check.</p> <p>6. Solution set.</p> <p style="text-align: right;">(8)</p>

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.

<p>Graph this equation.</p> $y = x^2 - 6x + 5$ $x^2 - 6x + 5 = 0$ $(x-5)(x-1) = 0$ $x-5 = 0 \quad x-1 = 0$ $x = 5 \quad x = 1$ <p>The x-coordinates: (5,0) and (1,0)</p> <p>The x-coordinate of the vertex:</p> $x = \frac{-b}{2a}$ $= \frac{-(-6)}{2(1)} = +\frac{6}{2} = 3$ <p>The y intercept of the vertex:</p> $y = x^2 - 6x + 5$ $= (3)^2 - 6(3) + 5$ $= 9 - 18 + 5$ $= -4$	<p>QT. CT.</p> <p>Axis of Symmetry.</p> <p>(5)</p>	<p>Graph</p> <p>(2)</p>
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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 x is the number of years since 2000.

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

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

Female population =  $P - M$

$$F = (3x^2 + 4x - 5) - (2x^2 - 3x - 2)$$

$$= 3x^2 + 4x - 5 - 2x^2 + 3x + 2$$

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

(2)

13. Mr. Suarez's Hot Dog Stand

A.  $(1+.1n)$  is the price of the hot dogs. The original price is \$1.  $.1n$  is the amount the price increases after being raised  $n$  times.  
 $(210-3n)$  represents the total # of hot dogs sold. At first Mr. Suarez has 210 customers.  $-3n$  is the number of customers who stop buying hot dogs after Mr. Suarez raises the price  $n$  times.

B.  $R = (1+.1n)(210-3n)$

Step 1: Find the x-intercepts

$(1+.1n) = 0$  AND  $(210-3n) = 0$   
 $-1$   $-1$   
 $210 = 3n$   
 $70 = n$

$.1n = -1$   
 $n = -10$

$70 = n$

Step 2: Find the vertex by finding the midpoint of the x-intercepts.

midpoint  $\frac{-10+70}{2} = 30$

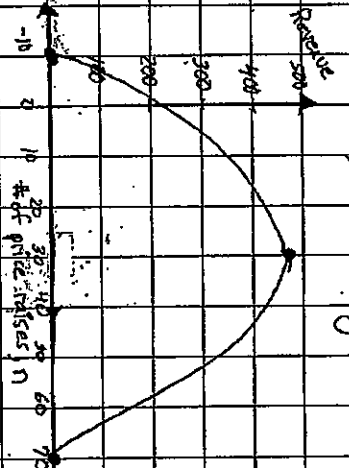
then find the y-coordinate of the vertex

$R = (1+.1 \times 30)(210 - 3 \times 30)$

$R = (4)(120)$

$R = 480$

So, the vertex is at  $(30, 480)$



C. Mr. Suarez should raise the price 30 times. So the new price should be  $1 + 30 \times .1 = 4$

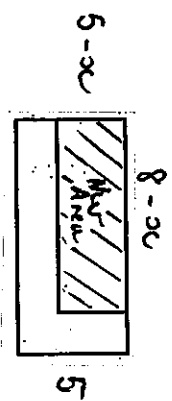
D. He would need to raise the price 70 times as you can see from the graph.

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  $22 \text{ m}^2$ . Find the dimensions of the new rectangle.

Let  $x$  be the amount by which each dimension is decreased.



$5-x$

The new dimensions are  $8-x$  and  $5-x$

Original Area - Decreased Area = New Area.

$$40 - x^2 = (8-x)(5-x)$$

$$18 = x^2 - 13x + 40$$

$$x^2 - 13x + 40 - 18 = 0$$

$$x^2 - 13x + 22 = 0$$

$$(x-2)(x-11) = 0$$

$$x-2 = 0$$

$$x = 2 \quad \checkmark$$

~~$$x-11 = 0$$~~
~~$$x = 11$$~~

This would give you a negative measure.

New Rectangle

If  $x$  is 2 then the length is  $8-x$

$$= 8-2$$

New length = 6 meters

and the width is  $5-x$

$$= 5-2$$

New width = 3 meters.

Check .  $x^2 - 13x + 22 = 0$

$$(2)^2 - 13(2) + 22 = 0$$

$$4 - 26 + 22 = 0$$

$$26 - 26 = 0$$

$$0 = 0 \quad \checkmark$$