This is a District-Wide Summer Assignment for students taking Geometry/Trigonometry in September. The Geometry/Trigonometry teachers in all UCVTS programs will be using this for evaluation in their classes.

Are you ready for Geometry/Trigonometry? Next year you will be taking Geometry/Trigonometry which is an honors level math course. It is a rigorous course that begins with fundamental geometry concepts and continues with the exploration of various functions and their graphs. All topics will be explored graphically and analytically. This summer packet is designed to help you review the algebra concepts that will be the foundation for your success in Geometry/Trigonometry for next school year and for your subsequent math courses at UCVTS. This summer packet is due the first day of school.

Be prepared to take an assessment on the content of this assignment.

A successful outcome requires effective planning. This summer assignment provides a minimal number of exercises. It is strongly recommended that you find additional practice resources for the topics that you need extra help with. Do not wait until the end of the summer to look at this packet. You should work on this packet a little at a time. This will allow you to have time to review the topics that you are having trouble remembering. Schedule time to review and practice these topics. The following is a list of topics you need to review and master:

**Algebra Topics to Review**

- Polynomials: Add, Subtract, and Multiply
- Factoring: Common monomial factors, quadratics, cubics
- Solve equations: Multi-step equations, linear, absolute value, quadratic, rational
- Rules of Exponents: Simplify expressions
- Rational Expressions: Simplify, Add, Subtract, Multiply, & Divide (Complex)
- Radicals: Simplify, Add, Subtract, Multiply, Divide (rationalize)
- Equations of lines: Find slope, Graph lines, find equations
- Graph Quadratic equations and absolute value equations

There are many resources available online. I suggest that you start with the resources that you used in Combined Algebra. The following links provide practice quizzes and tests to help you identify the topics that you need to practice.

Algebra I:  [http://www.classzone.com/books/algebra_1/oltp_welcome.cfm](http://www.classzone.com/books/algebra_1/oltp_welcome.cfm)

Algebra II:  [http://www.classzone.com/books/algebra_2/oltp_welcome.cfm](http://www.classzone.com/books/algebra_2/oltp_welcome.cfm)

You can easily find other student resources and practice opportunities if you “google” the topic. Here are a few recommended resources.

www.purplemath.com  www.hippocampus.org
www.brightstorm.com  www.khanacademy.com
Directions:
• **Show all work** (In Space Provided) to receive full credit. **BOX IN your final answers!!**
• Do **NOT** use a calculator. All of the exercises can be completed **WITHOUT** a calculator.

1. Solve \(-x - 3y = 7\) for \(y\).

2. If \(g(x) = x^2 + 3x - 5\), what is \(g(-2)\)?

3. What is the equation of the line that passes through the point \((-1, 7)\) and is parallel to the line \(y = -2x - 1\)?

Find the product of the following polynomials and write in standard form.

4. \((x + 3)(x - 2)\)

5. \((x - 9)(x - 5)\)

6. \((3x - 5)(2x + 2)\)
Simplify the following radicals by writing in simplified radical form (no decimals)

7. \( \sqrt{162} \)

8. \( \frac{2}{\sqrt{15}} \)

Simplify the following exponential expressions (Do not leave negative exponents).

9. \((-5x^{-2})^3 x^7\)

10. \(\frac{-3x^2yz^{12}}{18x^{-3}y^8z^6}\)

Factor the following polynomials.

11. \(x^2 - 7x + 10\)

12. \(3x^2 - x - 4\)

13. \(2x^3 - x^2 - 5x - 2\)
14. $x^2 - 25$

15. $x^2 - 64$

16. $x^3 - 27$

Solve the following equations by completing the square.

17. $10x^2 - 9x - 9 = 0$

18. $x^2 - \frac{3}{2}x - 10 = 0$

Solve the following equations by quadratic formula and completely simplify.

19. $(2x^2 - 26x + 72) = 0$

20. $(56x^2 + 83x + 30) = 0$
Convert from standard form \((ax^2 + bx + c)\) to vertex form \(a(x - h)^2 + k\).

21. \((x^2 + 12x + 32)\)  
22. \((2x^2 + 12x - 4)\)

Solving the following absolute equations or inequalities.

23. \(|5x + 2| = 12\)  
24. \(|x + 2| > 5\)

Graph the following equations on the grids provided. Do not use your calculators to graph. Show all your work on the side.

25. \(y = |2x + 4|\)
26. \( y = |x - 2| \)

27. \( y = (2x^2 + 12x - 4) \)
28. \( y = -x^2 + 2x + 3 \)

29 and 30. **Graph the following piecewise functions.**

1) \( f(x) = \begin{cases} 
  -2x - 1, & x \leq 2 \\
  -x + 4, & x > 2 
\end{cases} \)

2) \( f(x) = \begin{cases} 
  -4, & x \leq -2 \\
  x - 2, & -2 < x < 2 \\
  -2x + 4, & x \geq 2 
\end{cases} \)
31. Multiple Choice
The expression \( \frac{9x^4 - 27x^6}{3x^3} \) is equivalent to

a) \( 3x(1 - 3x) \)  
* b) \( 3x(1 - 3x^2) \)  
 c) \( 3x(1 - 9x^5) \)  
 d) \( 9x^3(1 - x) \)

32.
Solve for \( x \): \( \frac{x + 1}{x} = \frac{-7}{x - 12} \)

33. Multiple Choice. Show work below
Which expression represents \( \frac{(2x^3)(8x^5)}{4x^6} \) in simplest form?

a) \( x^2 \)  
 b) \( x^9 \)  
* c) \( 4x^2 \)  
 d) \( 4x^9 \)

Simplify the following complex expressions, writing final answer in a + bi form.

34. \( (-5 - 2i)(3 + 7i) \)

35. \( \frac{3+i}{2+3i} \)
36. Which inequality is represented by the graph below?

\[ y < 2x + 1 \quad \overset{\text{**}}{\text{b)} y < -2x + 1} \quad c) y < \frac{1}{2}x + 1 \quad d) y < -\frac{1}{2}x + 1 \]

Indicate the domain and range of each of the following graphs/functions (37-39).

37.
Given the standard equation of a circle is \((x - h)^2 + (y - k)^2 = r^2\), answer questions 40-42.

40. Find the standard equation of a circle with the center at (3,4) and radius of 5
41. Find the standard equation of a circle with the center at (-2, 6) and radius of 20

42. Find the standard equation of a circle given the following equation: \( x^2 + 4x + y^2 - 6y - 3 = 0 \)

43. You have bought a new car for $26,500. The value \( y \) of the car decreases by 18% each year.
   a) Write an exponential decay model for the value of the car.
   b) Use the model to estimate the value of the car after three years.
   c) Graph the model.
   d) Use the graph to estimate when the car will have a value of $18,000.
44. Multiple Choice
For 10 days, Romero kept a record of the number of hours he spent listening to music. The information is shown in the table below.

<table>
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<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Which scatter plot shows Romeros data graphically?