

Circleville High School

Honors Algebra 2 Summer Assignment

Part II – Free Response

1. Trey needs to prove that the expression $(5 + x)(3) - 2(x - 4)$ is equal to $x + 23$.

A. This table shows some of the steps he uses and the reasons for each step. List the missing steps that go with each algebraic property, and explain why each property you listed is used.

Step	Reason
1. $(5 + x)(3) - 2(x - 4)$	1. Given
2. $3(5 + x) - 2(x - 4)$	2. Commutative property of multiplication
3. $3(x + 5) - 2(x - 4)$	3. Commutative property of addition
4.	4. Distributive property
5.	5. Commutative property of addition
6. $3x - 2x + 23$	6. Addition fact
7.	7. Reverse of the distributive property
8. $1 \cdot x + 23$	8. Subtraction fact
9.	9. Identity property of multiplication

B. Evaluate $(5 + x)(3) - 2(x - 4)$ and $x + 23$ for $x = -30$. Show your work algebraically.

2. The surface area (A), of a right circular cylinder with radius r and height h is given by $A = 2\pi r^2 + 2\pi r h$.
- Solve the formula for h . Show your work algebraically, and explain how you found your answer.
 - Use your equation from Part A to find the height of a right circular cylinder with surface area $30\pi \text{ cm}^2$ and radius 3 cm. Show your work algebraically, and explain how you found your answer.
 - Check your answer to Part B by using the original equation to find the height of the cylinder. Show your work algebraically.

3. Sam needs to completely factor the expression $3x^5 - 4x^2 + 7x^5 - x^2$. He factors the expression as shown.

Step 1	$3x^5 - 4x^2 + 7x^5 - x^2$
Step 2	$3x^5 - 7x^5 + 4x^2 - x^2$
Step 3	$-4x^{10} + 3x^4$
Step 4	$x^4 \left(-4x^{\frac{5}{2}} + 3 \right)$

- A. Explain what Sam did incorrectly.
- B. Completely factor the expression. Show your work algebraically.

4. Kaleb keeps a record of his algebra quiz scores but forgot to record 1 score. He knows the mean of his 7 quiz scores is 84% and that the quiz scores he recorded are 85%, 79%, 92%, 81%, 82%, and 79%.
- Let x represent the missing quiz score, given as a percent correct. Write an equation that can be solved to find the missing quiz score. Explain why your equation is correct.
 - Solve your equation from Part A to find the missing quiz score. Show your work, and explain how you found your answer.
 - After Kaleb recorded his missing score, Kaleb's teacher returned 2 more quizzes. After he recorded these 2 new scores, the mode and median of his quiz scores changed, but there is still only one mode. What are all the possibilities for these 2 quiz scores? Explain how you found your answers.

5. The point $(-9, -10)$ is on the graph of a linear equation. Another point on the graph of the same equation can be found by going 20 units up and 27 units to the right from $(-9, -10)$.
- What is the slope of the line represented by the equation? Explain how you found your answer.
 - Write the equation in standard form. Show your algebraic work, and explain step-by-step how you found your answer.

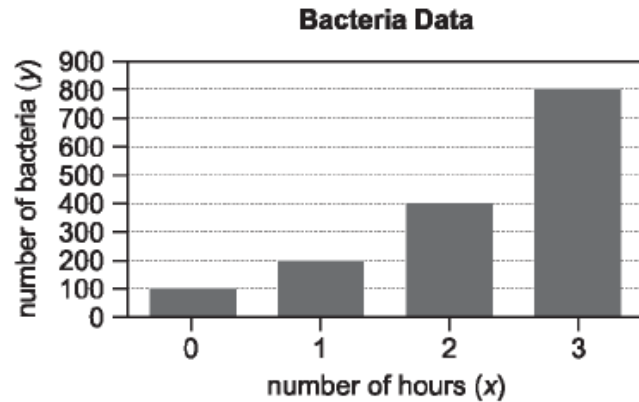
6. A. Find the solutions to the equation $x^2 - 2x - 3 = 0$ using factoring. Show your work, and explain how you factored the equation for a classmate who missed class when you learned this concept.
- B. Make a table of y -values for $y = x^2 - 2x - 3$ with all integer x -values from -4 to 4. Explain the process you used to find the y -values.
- C. Sketch the graph of $y = x^2 - 2x - 3$ using your table of values from Part B. Be sure to label the axes appropriately.
- D. Find the solutions to the equation $x^2 - 2x - 3 = 0$ using the graph. Explain how the solutions can be obtained from the graph.

7. Seybian needs to solve the equation $(16x^4 - 9)(x^2 + 10x + 25) = 0$.

- A. Completely factor the left side of the equation. Explain your method to factor the expression in each set of parentheses.
- B. Use your factored expression from Part A to find all the solutions to the equation. Show your work algebraically, and explain how you found your answers.

8. Consider the expression $\left(\frac{5a^{-3}b^8c^{-2}}{3a^4b^2c^{-5}}\right)^{-2}$. Simplify the expression completely, leaving no negative exponents. Show your work algebraically. Explain how you found your answer as if you were explaining the process to a classmate who missed class when you learned this concept.

9. Dr. Rodriguez does an experiment with bacteria. She starts with 100 bacteria and records the number of bacteria every hour after the experiment starts. Assume that the bacteria growth continues in the pattern shown.



- A. How many bacteria will there be 5 hr after the experiment starts? Show your work algebraically, and explain how you found your answer.
- B. Write an exponential equation of the form $y = a \cdot b^x$ to represent this situation. Explain why you chose the values of a and b that you did.
- C. Using your equation from Part B, find how many bacteria there will be 8 hr after the experiment starts. Show your work algebraically, and explain how you found your answer.

10. Tom needs to lay sod in the triangular area shown. To the nearest square meter, what is the area of $\triangle JKL$? Show your work, and explain how you found your answer.

