



Name \_\_\_\_\_

## CLUE! An Algebra 2 Topic 5 Mystery

Mr. Little received an anonymous note concerning treasure that is buried somewhere at Henry Clay. Along with that note was a clue sheet: a list of 8 possible suspects (people who buried the treasure), 8 possible locations, and 8 treasures. Unfortunately that means that there are 512 possible solutions to the mystery of “who, what, and where”. Stranger still is a set of clues which

allows someone to solve the mystery by a process of elimination. There are 7 sets of three Topic 3 problems. It is your job to solve the mystery.

As you solve each problem on the sheet provided, place the problem set number in the space provided to the right. If you find your solutions amongst the choices, you have eliminated that suspect, treasure, or place. When you have solved all seven sets of problems, the answers which are blank represent the solution to the mystery. If you have duplicate answers, you know which problems to check. When you have finished, please show me your answer sheet along with your work.

Suspects	Clue Solution	Clue Set #
Mr. Jones	49	
Officer Wright	$4x^4y^3$	
Mrs. Timoney	Neither	
Mr. McDavid	Increasing	
Sgt. Hunt	6.5	
Coach Gay	24.25	
Ms. Cabble	16.4	
Ms. Donovan	Decreasing	

Treasure	Clue Solution	Clue set #
PS 4	$x - 49$	
Tickets to Superbowl	$x^2 - 49$	
Neverending Hallpass	6	
Amazon gift card	$\frac{\sqrt{7} - 1}{2}$	
Lifetime supply of Chik-fil-A	$y = -5 + (x+2)^3$	
\$10,000,000	$\frac{8 - x}{3}$	
College Tuition	All values of $x \mid x \geq 0$	
Macbook	4	

Locations	Clue Solution	Clue set #
Gym	$x \leq -3$	
Band Room	$x \leq 5$	
Café	Real	
Orchestra Room	Non-real	
Purple Hallway	$x \geq -3$	
Rooftop Pool	$(V \circ s)(t)$	
Main Entrance	9	
Football field	25	

FINAL Solution!
What is the treasure?
Where is it hidden?
Who hid it?

Work each problem. For each **Suspect, Location, and Treasure** problem use your solution to eliminate a possibility for who, what, and where!

Clue Set 1		
<p>Suspect Clue: Is the function increasing, decreasing, or neither? <math>y = -\sqrt{x+5}</math></p>	<p>Location Clue: Solve <math>\sqrt{x} + \sqrt{x+11} = 11</math></p>	<p>Treasure Clue: Solve <math>\sqrt{x+5} = 1 + \sqrt{x}</math></p>

Clue Set 2		
<p>Suspect Clue: Simplify <math>\sqrt[3]{64x^{12}y^9}</math></p>	<p>Location Clue: Solve <math>(x+7)^{\frac{9}{2}} = (x-5)^9</math></p>	<p>Treasure Clue: <math>f(x) = 8 - 3x</math>. Find the equation of <math>f^{-1}(x)</math></p>

Clue Set 3		
<p>Suspect Clue: A cylinder has a height of 4 and a volume of 844.963 in<sup>3</sup>. What is the <i>diameter</i>? (Round to nearest tenth)</p>	<p>Location Clue: Real or non-real? <math>\sqrt[4]{-8}</math></p>	<p>Treasure Clue: Write an equivalent expression by rationalizing the denominator <math>\frac{3}{1+\sqrt{7}}</math></p>

Clue Set 4		
<p>Suspect Clue: Simplify <math>\sqrt[4]{7^8}</math></p>	<p>Location Clue: For a function <math>f(x)</math>, the domain is <math>x \geq 5</math> and the range is <math>y \leq -3</math>. Find the domain of <math>f^{-1}(x)</math></p>	<p>Treasure Clue: Multiply <math>(\sqrt{x}-7)(\sqrt{x}+7)</math></p>

**Clue Set 5**

Suspect Clue: The volume of a cube is  $274.625 \text{ ft}^3$ . What is the length of a side?

Location Clue: The volume of a cube with side length  $x$  can be represented by the function  $V(x) = x^3$ . If the side length is increasing at 5 inches per minute, the function  $s(t) = 5t$  can be used to find the side length at time  $t$  minutes. What function gives the volume at time  $t$ ?

Treasure Clue: Solve  $\sqrt{x^2} = x$

**Clue Set 6**

Suspect Clue: Is the function increasing, decreasing, or neither?  
 $y = \sqrt{x^2}$

Location Clue:  
 Real or non-real?  $\sqrt[3]{-8}$

Treasure Clue: Use the table showing the values of  $f(x)$  to find  $f^{-1}(2)$

x	1	4	2	6
y	3	1	5	2

**Clue Set 7**

Suspect Clue: Multiply:  
 $\sqrt{8} \left( \sqrt{\frac{1}{128}} + 3\sqrt{8} \right)$   
 (hint-use a calculator!)

Location Clue:  $f(x) = \sqrt{x}$   
 and  $g(x) = 5 - x$   
 Find the domain of  $f(g(x))$ .

Treasure Clue: Write the equation of the graph of  $y = x^3$  translated 5 units down and 2 units left