

Name: _____ Date: _____ Period: _____

Chapter 6 Tiered Activities

SHOW ALL WORK and INCLUDE UNITS!

A2.A.REI.A.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

A2.A.REI.A.2 Solve rational and radical equations in one variable and identify extraneous solutions when they exist.

A2.A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and rational and exponential functions.

Tier 1 (up to 70 points) Complete #1-4

Tier 2 (up to 85 points) Complete #1-5 Do not move up to Tier 2 if you have not completed all of Tier 1.

Tier 3 (up to 100 points) Complete #1-6 Do not move up to Tier 3 if you have not completed all of Tier 1 & Tier 2.

1. (15 points) The temperature T in degrees Celsius ($^{\circ}\text{C}$) of a liquid t minutes after heating is given by the formula $T = 8\sqrt{t}$. When is the temperature 48°C ?

2. (15 points) A mound of trash at a plant is growing at a rate of $V = 0.2(t^3 + 1)$, where V is the volume of the trash in cubic meters and t is the time in hours. When is the volume equal to 549 m^3 ?

3. (20 points) The velocity of a falling ball is given by the formula $v^2 = 64h$, where v is the velocity (in feet per second) and h is the distance the ball has already fallen.
 - a. What is the velocity of the object after a 10-foot fall? Round to the nearest tenth.

 - b. How much does the velocity increase if the object falls 20 feet rather than 10 feet? Round your answer to the nearest tenth.

4. (20 points) A high school principal uses the formula $y = 150x + 180$ to predict a student's score on a state achievement test using the student's 11th grade GPA, x .
- What is the inverse of this formula?
 - Is the inverse a function? Explain.
 - Using the inverse, what GPA does a student need to get a score of 600 on the exam?
5. (15 points) A car salesman earns a 3% bonus on weekly sales over \$5000. Consider the functions $f(x) = 0.03x$ and $g(x) = x - 5000$.
- Explain what each function represents in the context of this situation.
 - Write and simplify a composition function, $h(x)$, that represents the weekly bonus. Explain how you came up with this equation.
 - What does x represent in your composition function $h(x)$?
 - Suppose Avery's weekly sales were \$8000. Use the proper composition function to determine Avery's weekly bonus.
6. (15 points) The volume of a sphere of radius, r is $V = \frac{4}{3}\pi r^3$.
- Use the formula to find r in terms of V . Be sure to rationalize the denominator.
 - Use your formula from part a to find the radius of a sphere with a volume of 200 cubic inches. Round to the nearest hundredth.