

Hawaii Content and Performance Standards III

STANDARD 9: Patterns, Functions, and Algebra: PATTERNS AND FUNCTIONAL RELATIONSHIPS: Understand various types of patterns and functional relationships.

Benchmark MA.AII.9.2: Use exponential functions to solve problems involving exponential growth and decay.

STANDARD 10: Patterns, Functions, and Algebra: SYMBOLIC REPRESENTATION: Use symbolic forms to represent, model, and analyze mathematical situations.

Benchmark MA.AII.10.3: Solve equations containing radical and exponents.

PROBLEM:

You want to convince your parents to buy you Apple’s new, second generation, i-Pad—specifically with 32 GB of space. However, your parents argue that Apple releases new generations so frequently, it would be a massive waste of money to buy the latest model. In fact, most gadgets depreciate exponentially.

BUT WAIT! Your parents have decided to make a deal with you. If you can mathematically prove that the i-Pad 2 will be worth at least \$200 in five years, they will buy you one.



So here’s the information you collected on the first generation i-Pad. In 2010, the cost was \$600. In 2011, the cost is \$500. Assuming the i-Pad 2 will follow the same exponential model, prove that the i-Pad 2 will be worth at least \$200 in five years. Construct a poster with the following information to convince your parents:

<p>Calculations:</p> <ul style="list-style-type: none"> Exponential model Value after 5 years Show work <p>Graph:</p> <ul style="list-style-type: none"> Exponential model 	<p>Essay:</p> <ul style="list-style-type: none"> Summary of methods and process (what you did in your calculations). Explanation of why you want an i-Pad 2 (how would you use it?)
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The task will be assessed on a four-point scale as follows:

4 (Advanced)	<ul style="list-style-type: none"> Student constructs the correct exponential decay model for the problem. Student uses an exponential function to solve the problem involving exponential decay with accuracy; Student determines the correct value after 5 years. Student clearly states what method was used to solve, and thoroughly explains how the amount was calculated—showing a deep conceptual understanding of the exponential decay model. Student clearly explains how he/she would use the i-Pad 2.
3 (Proficient)	<ul style="list-style-type: none"> Student identifies the correct exponential decay model for the problem. Student uses exponential function to solve the problem involving exponential decay with no significant errors. Student clearly states what method was used to solve, but briefly explains how the amount was calculated. Student clearly explains how he/she would use the i-Pad 2.
2 (Partially Proficient)	<ul style="list-style-type: none"> Student identifies an incorrect exponential decay model, with minor errors. Student uses an exponential function to solve the problem involving exponential decay with a few significant errors. Student vaguely states the method was used to solve, and briefly explains how the amount was calculated. Student briefly explains how he/she would use the i-Pad 2.
1 (Novice)	<ul style="list-style-type: none"> Student identifies an incorrect exponential decay model, with minor errors. Student uses an exponential function to solve a problem with exponential decay with many significant errors. Student vaguely discusses the method was used to solve. Student somewhat explains how he/she would use the i-Pad 2.
0 (No credit)	<ul style="list-style-type: none"> Student does not identify an exponential decay model. Student does not use an exponential function to solve. Student does not discuss the method used to solve. Student does not explain how he/she would use the i-Pad 2.