

Vertical Progression:

8 th Grade	<p>8.EE.A Work with radicals and integer exponents.</p> <ul style="list-style-type: none"> ○ 8.EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
Algebra 1	<p>ELG.MA.HS.A.2 Write expressions in equivalent forms to solve problems.</p> <ul style="list-style-type: none"> ○ A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* ○ A-SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines. ○ A-SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. ○ A-SSE.3c Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%</i> [exponential expressions with integer exponents]
Algebra 2	<p>ELG.MA.HS.A.2 Write expressions in equivalent forms to solve problems.</p> <ul style="list-style-type: none"> ○ A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* ○ A-SSE.3c Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%</i> [exponential expressions with integer and rational or real exponents] ○ A-SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.*

Students will demonstrate command of the ELG by:

- Using properties of exponents to write equivalent exponential expressions.
- Using the formula for the sum of a finite geometric series to find such a sum given a finite geometric series.

Vocabulary:

- exponential expression
- finite
- geometric series

Sample Instructional/Assessment Tasks:

1) Standard(s): A-SSE.4

Source: Adapted from PARCC Algebra 2 EOY Practice Test

Item Prompt:

An investor deposits g dollars into an account at the beginning of each year for n years. The account earns an annual interest rate of r , expressed as a decimal. The amount of money S , in dollars, in the account can be determined by the formula

$$S = \frac{g}{r} [(1 + r)^n - 1]$$

Part A

Suppose the investor deposits \$500 a year for 10 years into an account that earns an annual interest rate of 5%. If no additional deposits or withdrawals are made, what will be the balance in the account at the end of 10 years?

Part B

Enter a number in the answer box to complete the sentence. Give your answer to the nearest cent.

Suppose the investor wanted the balance in the account to be at least \$12,000 at the end of 10 years. At an annual interest rate of 5%, the amount of the yearly deposit should be at least \$.

Correct Answer:

Part A: \$6,288.95

Part B: \$954.06

2) Standard(s): A-SSE.B.3

Source: Adapted from PARCC Algebra 2 PBA Practice Test

Item Prompt:

During a 1-year period, a population of tropical insects grew according to the model $P = P_0(1.46)^t$, where P is the population, P_0 is the initial population, and t is time in years. Which equation can be used to model the approximate weekly growth rate? (Assume 52 weeks in a year.)

Correct Answer:

$$P = P_0(1.0073)^{52t}$$