

Vertical Progression:

8th 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, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. <p>8.EE.B Understand the connections between proportional relationships, lines, and linear equations.</p> <ul style="list-style-type: none"> 8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
Algebra 1	<p>ELG.MA.HS.A.1 Interpret the structure of expressions.</p> <ul style="list-style-type: none"> A-SSE.1 Interpret expressions that represent a quantity in terms of its context.* A-SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. A-SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i> A-SSE.2 Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i> [numerical expressions and polynomial expressions in one variable]
Algebra 2	<p>ELG.MA.HS.A.1 Interpret the structure of expressions</p> <ul style="list-style-type: none"> A-SSE.2 Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i> [polynomial (two variables), rational, or exponential expressions]

Students will demonstrate command of the ELG by:

- Re-writing an expression in different, equivalent forms, to reveal its properties (factors, difference/sum of squares, etc.)

Vocabulary:

- equivalent
- expression
- substitution
- term

Sample Instructional/Assessment Tasks:

1) Standard(s): A-SSE.2

Source: Adapted from PARCC Algebra 2 PBA Practice Test

Item Prompt:

Paul and Jose are solving the problem: What expression is equivalent to $a^2x^2 - 2cx^2 + a^2y - 2cy$? Paul says that $(x^2 + y)(a^2 - 2c)$ is equivalent, but Jose thinks that $(x^2 - y)(a^2 - 2c)$ is equivalent. Who is right? Justify your answer mathematically.

Correct Answer:

Paul is correct.

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

Source: Adapted from PARCC Algebra 2 EOY Practice Test

Item Prompt:

A scientist places 7.35 grams of a radioactive element in a dish. The half-life of the element is 2 days. After d days, the number of grams remaining in the dish is given by the function, $R(d) = 7.35\left(\frac{1}{2}\right)^{\frac{d}{2}}$. Which statement(s) is/are true about the equation when it is rewritten without a fractional exponent?

- A. An approximate equivalent equation is $R(d) = 7.35(0.250)^d$
- B. An approximate equivalent equation is $R(d) = 7.35(0.707)^d$
- C. The base of the exponent in this form of the equation can be interpreted to mean that the element decays by 0.250 grams per day.
- D. The base of the exponent in this form of the equation can be interpreted to mean that the element decays by 0.707 grams per day.
- E. The base of the exponent in this form of the equation can be interpreted to mean that about 25% of the element remains from one day to the next day.
- F. The base of the exponent in this form of the equation can be interpreted to mean that about 70.7% of the element remains from one day to the next day.

Correct Answer:

Both A and E are correct.