

Task Model 1	Prompt Features: The student identifies the factored form of a
	quadratic expression that represents $f(x)$ as best for revealing
Response Type:	zeros and chooses the zeros.
Hot Spot	
	Stimulus Guidelines:
DOK Level 2	Equivalent forms of quadratic equations are given in
	different forms.
A-SSE.B.3a	Difficulty level can be altered by varying the type of
Choose and produce an	expression, and by using different variables and
	coefficients.
and explain properties	TM1a
of the quantity	Stimulus: The student is presented with equivalent quadratic
represented by the	equations for $f(x)$
expression.	
a. Factor a quadratic	Example Stem:
expression to reveal	
the zeros of the	Part A: Three equations that all represent the same function f are
function it defines.	shown. Select the equation that includes the zeros of $f(x)$ as
	numbers that appear in the equation.
Evidence Required:	
1. The student	Part B: Select all values of x for which $f(x) = 0$.
understands that the	
auguratic expression	Dart A:
reveals the zeros of the	$f(x) = -2x^2 + 24x - 54$
function it defines.	
	f(x) = -2(x - 3)(x - 9)
Tools: None	
	$f(x) = -2(x-6)^2 + 18$
Accessibility Note:	
Hot Spot items are not	
currently able to be	
Brailled. Minimize the	Part B:
number of items	54 19 0 6 2
	-54 -16 -9 -6 -5
	0 3 6 9 18 54
	Rubric:
	(1 point) The student selects the correct equation for $f(x)$ and
	selects the correct zeros.







Task Model 1	Prompt Features: The student identifies the standard form of a
	quadratic expression that represents $f(x)$ as best for finding the
Response Type:	value of $f(0)$.
Hot Spot	
	Stimulus Guidelines:
DOK Level 2	Equivalent forms of quadratic equations are given in
A CCE B 2-	different forms.
A-SSE.D.Sd	• Difficulty level can be altered by using unreferit variables
equivalent form of an	
expression to reveal	TM1b
and explain properties	Stimulus: The student is presented with equivalent quadratic
of the quantity	expressions for $f(x)$.
represented by the	
expression.	Example Stem:
a. Factor a quadratic	Part A: Three equations that all represent the same function f are
expression to reveal	shown. Select the equation that includes the value of $f(0)$ as a
the zeros of the	number that appears in the equation.
function it defines.	
	Part B: Identify f(0).
Evidence Required:	
1. The student	
factored form of a	Part A:
quadratic expression	$f(x) = -2x^2 + 24x - 54$
reveals the zeros of the	
function it defines.	f(x) = -2(x - 3)(x - 9)
	$f(x) = 2(x - \xi)^2 + 10$
Tools: None	$T(X) = -2(X - 6)^2 + 18$
Accessibility Note:	
Hot Spot items are not	Part B:
Braillod Minimizo the	
number of items	-54 -18 -9 -6 -3
developed to this TM.	31 10 5 0 5
	0 3 6 9 18 54
	Rubric:
	(1 point) The student selects the correct equation for $f(x)$ and
	selects the correct value for $f(0)$.







Task Model 2	Prompt Features: The student identifies the form of a quadratic expression that represents $f(x)$ that reveals the maximum or
Response Type: Hot Spot	minimum value of the function and chooses the maximum or minimum value of the function.
DOK Level 2	 Stimulus Guidelines: The completed square form is a(x - h)² + k, knowing that
A-SSE.B.3b Choose and produce an equivalent form of an expression to reveal	 h = -b/2a and k = c - b²/4a Difficulty level can be altered by using different variables and coefficients
and explain properties of the quantity represented by the expression.	TM2a Stimulus: The student is presented with equivalent quadratic expressions for $f(x)$.
 b. Complete the square in a quadratic expression to reveal the 	Example Stem: Part A: Three equations that all represent the same function f are shown. Select the equation that includes the maximum value of f as a number that appears in the equation.
maximum or minimum value	Part B: Select the maximum value of $f(x)$.
of the function it defines.	Part A: $f(y) = 2y^2 + 24y = 54$
Evidence Required: 2. The student understands that completing the square for a quadratic expression reveals the maximum or minimum	$f(x) = -2x^{2} + 24x - 34$ $f(x) = -2(x - 3)(x - 9)$ $f(x) = -2(x - 6)^{2} + 18$
value of the function it defines.	<i>Part B:</i> −54 −18 −9 −6 −3
Tools: None	0 3 6 9 18 54
Accessibility Note: Hot Spot items are not currently able to be Brailled. Minimize the number of items developed to this TM.	Rubric: (1 point) The student selects the correct equation for $f(x)$ and selects the maximum value.







Task Model 2	Prompt Features: The student identifies the form of a given
Pesnonse Tyne:	quadratic expression that reveals the maximum or minimum of the
Multiple Choice,	
single correct	Stimulus Guidelines:
response	• The completed square form is $a(x - h)^2 + k$, knowing that $h =$
	$-b/2a$ and $k = c - b^2/4a$.
DOK LEVEI I	Difficulty level can be altered by using different variables and coefficients.
A-SSE.B.3b	
Choose and produce an	TM2b
equivalent form of an expression to reveal	Stimulus: The student is presented with four quadratic equations.
and explain properties	Example Stem: Which equation includes the minimum or
of the quantity	maximum value of <i>f</i> as a number that appears in the equation?
represented by the	
b. Complete the	A. $f(x) = (x-1)^2 - 4$
square in a	B. $f(x) = x^2 - 2x - 3$
quadratic	C. $f(x) = x^2 - 3x + x - 3$
expression to reveal the	D. $f(x) = (x+1)(x-3)$
maximum or	Rubric: (1 point) The student correctly chooses the equation that
minimum value	reveals the maximum or minimum of the quadratic function (e.g.,
defines.	A).
	Response Type: Multiple Choice, single correct response
Evidence Required:	
understands that	
completing the square	
for a quadratic	
expression reveals the	
maximum or minimum	
defines.	
Tools: None	



Task Model 2	Prompt Features: The student completes the square for a quadratic expression to reveal the maximum or minimum of the
Response Type: Equation/Numeric	expression.
• •	Stimulus Guidelines:
DOK Level 2	• The completed square form which is $a(x - h)^2 + k$, knowing that $h = -b/2a$ and $k = c - b^2/4a$
A-SSE.B.3b Choose and produce an	 Difficulty level can be altered by using different variables and coefficients.
equivalent form of an expression to reveal	TM2c
and explain properties of the quantity represented by the	Stimulus: The student is presented with a quadratic function in standard form.
expression. b. Complete the square in a	Example Stem 1: Enter the function $f(x) = x^2 - 7x - 18$, in the form $f(x) = a(x - h)^2 + k$, where <i>a</i> , <i>h</i> , and <i>k</i> are constants.
quadratic expression to	Enter your answer in the first response box.
reveal the maximum or	Enter the x -coordinate of the vertex of the graph of f in the second response box.
minimum value	
of the function it	
defines.	Example Stem 2: Enter the function $f(x) = 28x^2 + 16x - 80$, in the form $f(x) = a(x - h)^2 + k$, where <i>a</i> , <i>h</i> , and <i>k</i> are constants.
Evidence Required:	
2. The student understands that	Enter your answer in the first response box.
completing the square for a quadratic expression reveals the	Enter the x -coordinate of the vertex of the graph of f in the second response box.
maximum or minimum	
value of the function it	Rubric:
defines.	(2 points) The student correctly enters the function in the appropriate form and enters the <i>x</i> -coordinate of the vertex of the
Tools: None	graph [e.g., $f(x) = \left(x - \frac{7}{2}\right)^2 - \frac{121}{4}$ and $\frac{7}{2}$;
	$28\left(x+\frac{2}{7}\right)^2-\frac{576}{7}$ and $-\frac{2}{7}$].
	(1 point) The student correctly enters the function in the equivalent form or enters the <i>x</i> -coordinate of the vertex of the
	graph [e.g., $f(x) = \left(x - \frac{7}{2}\right)^2 - \frac{121}{4}$ or $\frac{7}{2}$;
	$28\left(x+\frac{2}{7}\right)^2-\frac{576}{7}$ or $-\frac{2}{7}$].
	Response Type: Equation/Numeric (two response boxes)





Task Model 3	Prompt Features: The student uses the properties of exponents
Response Type: Equation/Numeric;	to produce an equivalent expression for an exponential expression (transforming expressions into both simpler and expanded forms, as specified in the stem).
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DOK Level 2	Stimulus Guidelines:
A-SSE.B.3c Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $\approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.	 Exponential algebraic expressions with one of more variables, integer and rational coefficients, and rational exponents involving operations of addition, subtraction, multiplication, and division Difficulty level can be altered by using different variables and exponents.
	TM3a Stimulus: The student is presented with an exponential expression and the form in which it is to be transformed.
	Example Stem 1: Enter an expression equivalent to $\left(\frac{a^9}{a^3}\right)$ in the form a^m .
Evidence Required: 3. The student uses the properties of exponents to transform exponential	Example Stem 2: Enter an expression equivalent to a^{20} in the form $(a^n)^m$.
expressions.	Example Stem 3: Enter an expression equivalent to a^{-12} in the form $(a^n)^m$.
Ioois: None	
	Example Stem 4: Enter an expression equivalent to $(a^2a^4b)^5$ in the form a^mb^n .
	Rubric: (1 point) The student correctly enters an equivalent expression in the given form [e.g., a^6 ; $(a^4)^5$; $(a^{-3})^4$; $a^{30}b^5$].
	Multiple correct answers may be possible for some items.
	Response Type: Equation/Numeric



Task Model 3	Prompt Features: The student is prompted to use the properties of exponents to transform exponential expressions.
Response Type: Multiple Choice,	Stimulus Guidelines:
response	 All humbers, variables, and operations should be changed to create an item. Difficulty level can be altered by using different variables.
DOK Level 2	and coefficients.
A-SSE.B.3c Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $\approx 1.012^{12t}$ to reveal the approximate equivalent	 TM3b Stimulus: The student is presented with a contextual situation and an exponential expression representing an exponentially increasing or decreasing quantity within the given situation. Example Stem: This expression defines a function that models the future population of wolves in a park after <i>t</i> years. 3280(1.15)^t
monthly interest rate if the annual rate is 15%.	Which expression best defines the function that represents the wolf population after x months?
Evidence Required: 3. The student uses the properties of exponents to transform exponential expressions.	A. $3280(1.0125)^{x}$ B. $3280(1.0117)^{x}$ C. $3280(1.12)^{x}$ D. $3280(1.2)^{x}$
Tools: Calculator	Rubric: (1 point) Student selects the correct expression (e.g., B). Response Type: Multiple Choice, single correct response



Task Model 3	Prompt Features: The student is prompted to use the properties
	of exponents to transform exponential expressions to find the
Response Type:	growth or decay rate for different units of time.
Equation/Numeric	
	Stimulus Guidelines:
DOK Level 2	 All numbers, variables, and operations should be changed to create an item
A-SSE.B.3c	 Difficulty level can be altered by using different variables
Use the properties of	and coefficients.
exponents to transform	
expressions for	ТМЗс
exponential functions.	Stimulus: The student is presented with a contextual situation
For example, the	and an exponential expression representing an exponentially
expression 1.15 ^t can be	increasing or decreasing quantity within the given situation.
rewritten as $\approx 1.012^{12t}$	
to reveal the	Example Stem: This expression defines a function that models
approximate equivalent	the future population of wolves in a park after x months.
the annual rate is 15%	$3280(10117)^{x}$
Evidence Required:	Enter the yearly growth rate for the wolf population as a percent.
3. The student uses the	Round to the nearest hundredth.
properties of exponents	
to transform	
exponential	Rubric:
expressions.	(1 point) Student produces the correct growth or decay rate (e.g., 14.98%).
Tools: Calculator	
	Response Type: Equation/Numeric