HS Mathematics Item Specification C1 TD



IIS Machematics Iter			
Task Model 1	Prompt Features: The student is prompted to use the structure of an		
	expression to select another expression that is equivalent to the given		
Pesponse Type:	avpression		
Multiple Chains	cxpression.		
Multiple Choice,			
single correct	Stimulus Guidelines:		
response	Expressions may be:		
-	 difference of two squares 		
DOK Level 1	o sum/difference of two cubes		
DOR LEVEL I	the product of two three supressions		
	o the product of two or three expressions		
A-SSE.A.2	 sum/difference of expressions that have a common factor 		
Use the structure of an	o rational		
expression to identify	 exponential 		
ways to rewrite it <i>For</i>	• Difficulty level can be altered by varying the type of expression		
$example see x^4 - x^4$	and/or the order of factors in a compound expression, and by		
example, see x - y	and/of the order of factors in a compound expression, and by		
$as (x^2)^2 - (y^2)^2$, thus	using different variables and coefficients.		
recognizing it as a			
difference of squares	TM1a		
that can be factored as	Stimulus: The student is presented with an expression that is a		
$(x^2 - y^2)(x^2 + y^2)$	difference of two squares		
Evidence Required:	Example Stem: Select the expression that is equivalent to $x^2 - 4$.		
 The student uses 			
the structure of an	A. $(x-2)^2$		
expression to identify	B. $(x-2)(x+2)$		
ways of rewriting it	$C = r^2 + 2r + 4$		
ways of rewriting it.			
	D. $x^2 - 2x + 4$		
loois: None			
	Rubric: (1 point) The student selects the correct option (e.g., B).		
	Response Type: Multiple Choice, single correct response		
	TM1b		
	China has the student is nuccented with an evenession that is the		
	Stimulus: The student is presented with an expression that is the		
	sum/difference of expressions that have a common factor.		
	Example Stem: Select the expression that is equivalent to		
	$(x + 4)^2 - (x - 2)(x + 4)$		
	A. $4(x+4)$		
	B. $2(x+1)(x+4)$		
	C. $(x+4) - (x-2)$		
	D. $(x+4)[(x+4) - (x-2)]$		
	Pubric: (1 point) The student selects the correct option (e.g., D)		
	Been and Trans Multiple Chains at the		
	Kesponse Type: Multiple Choice, single correct response		

HS Mathematics Item Specification C1 TD Task Model 1



Response Type: Matching Tables

TM1c Stimulus: The student is presented with an expression that is a sum/difference of two cubes.

Example Stem 1: Determine whether each expression is equivalent to $(x^3 + 8)$. Select Yes or No for each expression.

	Yes	Νο
$(x + 2)^3$		
$(x-2)(x^2+2x+4)$		
$(x+2)(x^2-2x+4)$		

Example Stem 2: Determine whether each expression is equivalent to $(8x^3 - 64)$. Select Yes or No for each expression.

	Yes	No
$(2x-4)^3$		
$8(x-8)^3$		
$8(x-2)(x^2+2x+4)$		
$(2x-4)(4x^2+8x+16)$		

Rubric: (1 point) The student selects the correct options (e.g., NNY; NNYY).

Response Type: Matching Tables

DOK Level 1

A-SSE.A.2

Evidence Required:

1. The student uses the structure of an expression to identify ways of rewriting it.

Tools: None

ь: .:**:**: .+: C^{1}



HS Mathematics Iter	n Specification CL TD			Assessment Co	onsortium
Task Model 1	Prompt Features: The stude expressions to determine if the stude of	ent is promj vo expressi	pted to use	the structure of ivalent.	of
Response Type: Matching Tables DOK Level 2 A-SSE.A.2 Use the structure of an expression to identify ways to rewrite it. 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 $(x^2 - y^2)(x^2 + y^2)$.	 Stimulus Guidelines: Equivalences consist of involve: 	of equations of equations of two cub two or three of expressi sions pressions altered by v ctors in an e nts.	ons are equations of expressions that have been set of the set of	tions, which ma ons ave a common type of expres nd by using dif	ay factor ssion ferent
Evidence Required: 1. The student uses the structure of an	Example Stem 1: Determine if each equation is true for all values of <i>x</i> . Select Yes or No for each equation.				
expression to identify ways of rewriting it.		Y	'es	No	
Tools: None	$x^2 + 4 = (x + 2)^2$				
roois. None	$(2x+6)^2 = 4(x+3)^2$				
	$(x-3)(x-3) = (x-9)^2$				
	$x^2 - 10x + 25 = (x - 5)(x + 5)$				
	Example Stem 2: Determine if each equation is true for all values of <i>x</i> . Select Yes or No for each equation.				
	$2^{3x} - 6^{x}$	163		NO	-
	$100^{x} = 10^{2x}$				-
	$e^{x} \cdot e^{x} = e^{2x}$				-
	$2^{10x} = 10^{2x}$				-
	Rubric: (1 point) The studen NYYN). Response Type: Matching T	t selects the	e correct o	otions (e.g., NY	_ ∕NN;

HS Mathematics Item Specification C1 TD Assessment Consortion Task Model 1 Prompt Features: The student is prompted to use the structure of a



	TASK MOUEL I	Prompt reatures: The student is prompted to use the structure of a		
		rational expression to create an expression that is equivalent to the		
	Response Type: Drag	given expression.		
	and Drop			
		Stimulus Guidelines:		
	DOK Level 2	 Equivalences consist of equations of rational expressions. 		
		Difficulty level can be altered by varying the complexity of the		
	A-SSE.A.2	equations, the type of rational expressions, and by using		
	Use the structure of an	different variables and coefficients.		
	expression to identify			
	ways to rewrite it. For	TM1e		
	example, see $x^4 - y^4$ as	Stimulus: The student is presented with two equivalent rational expressions with missing components that may be found using structure without carrying out the calculation.		
	$(x^2)^2 - (y^2)^2$, thus			
	recognizing it as a			
	difference of squares	, , , ,		
	that can be factored as	Example Stem 1: Drag one or more expressions into each box to		
	$(x^2 - y^2)(x^2 + y^2)$	create an equation that is true for all values of x. (Assume no		
		denominator equals zero.)		
	Evidence Required:			
	1 The student uses the	3 4 3 + 4		
	structure of an	$\frac{3}{11+2} + \frac{3}{11} = \frac{3}{11+1}$		
	expression to identify	x + 2 - x		
	ways of rewriting it			
	hays of remning for	Preset Choices:		
	Tools: None	$x x^2 (x+2) x(x+2) (x^2+2)$		
	Accessibility Note:			
	Drag and Drop items	Example Stem 2: Drag one or more expressions into each box to		
	are not currently able to	create an equation that is true for all values of x. (Assume no		
	be Brailled. Minimize	denominator equais zero.)		
the number of items				
	developed to this TM.			
	·	$\frac{3}{3} + \frac{4}{7} + \frac{2}{7} = \frac{3 + 4 + 2}{7}$		
		$x + 2$ ' x ' x^2		
		Preset Choices:		
		$x x^2 (x+2) x(x+2) x^2(x+2)$		
Rubric: (1 point) The student drags the correct o		Rubric: (1 point) The student drags the correct options.		
		Example Stem 1: $x_{1}(x + 2), x(x + 2);$		
		Example Stem 2: x^2 , $x(x + 2)$, $(x + 2)$, $x^2(x + 2)$		
		Response Type: Drag and Drop		

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Task Model 1Prompt Feat
expression to
expression.Response Type:expression.Drag and Dropexpression.

DOK Level 2

A-SSE.A.2

Use the structure of an expression to identify ways to rewrite it. 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 $(x^2 - y^2)(x^2 + y^2)$.

Evidence Required:

1. The student uses the structure of an expression to identify ways of rewriting it.

Tools: None

Accessibility Note:

Drag and Drop items are not currently able to be Brailled. Minimize the number of items developed to this TM. **Prompt Features:** The student is prompted to use the structure of an expression to create an expression that is equivalent to the given expression.

Stimulus Guidelines:

- Equivalences consist of equations of expressions.
- Expressions may be:
 - difference of two squares
 - sum/difference of two cubes
 - the product of two or three expressions
 - sum/difference of expressions that have a common factor
 - rational
 - exponential
- Difficulty level can be altered by varying the type of expression and/or the order of factors in a compound expression, and by using different variables and coefficients.

TM1f

Stimulus: The student is presented with two equivalent expressions with missing numbers that may be found using structure without carrying out the calculation.

Example Stem 1: Drag a number into each box to create an equation that is true for all values of *x*.

$$2(4x+3)(3x+5) = x^2 + 58x + x^2$$

Palette Choices: 6 8 12 15 24 29 30 58

Example Stem 2: Drag a number into each box to create an equation that is true for all values of *x*.

$$\frac{3(n+2)(4n+1)}{6} = \boxed{n^2 + \frac{9}{2}n + \boxed{n^2 + n^2 + \boxed{n^2 + \frac{9}{2}n + \boxed{n^2 + n^2 + n^2 + n^2}}}}}}}}}}$$

Palette Choices: $\frac{1}{6}$ $\frac{1}{3}$ $\frac{1}{2}$ 1 2 4 6 12

Example Stem 3: Drag a number into the box to create an equation that is true for all values of *x*.

$$(x+2)^2 - 5 = x^2 + 4x +$$

Palette Choices: -4 -1 4 9

HS Mathematics Item Specification C1 TD Task Model 1

Example Stem 4: Drag a number into the box to create an equation that is true for all values of x.

Response Type: Drag and Drop

Use the structure of an

expression to identify

ways to rewrite it. For example, see $x^4 - y^4$

as $(x^2)^2 - (y^2)^2$, thus

DOK Level 2

A-SSE.A.2

Palette Choices: -14 0 2 14 49

Example Stem 5: Drag a number into the box to create an equation that is true for all values of x.

 $(x-10)(x+12) = 3(x+1)^2 - 363$

 $(x-7)^2 + 51 = x^2 + x + 100$

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recognizing it as a
difference of squares
that can be factored as
$$(x^2 - y^2)(x^2 + y^2)$$
.Palette Choices: -12 -1 1 3 10Evidence Required:
1. The student uses
the structure of an
expression to identify
ways of rewriting it.Rubric: (1 point) The student places the correct number in the box(es).
Example Stem 1: 24, 30;
Example Stem 2: 2, 1;
Example Stem 3: -1;
Example Stem 4: -14;
Example Stem 5: 3.Tools: NoneResponse Type: Drag and DropAccessibility Note:
to be Brailled.
Minimize the number
of items developed to
this TM.Response Type: Drag and Drop

