



Algebraic Reasoning Unit 0

Summative Assessment

2017-2018 Algebra I EOC Released Test Items Aligned to the Standards

Linear Functions

A.2 Linear functions, equations, and inequalities. The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations.

A.3 Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations.

Connected Knowledge and Skills A.4, A.5, A.12

Cluster

Subcluster

Content

Process

Stimulus

Units

A.2(A) determine the domain and range of a linear function in	
mathematical problems; determine reasonable domain and range values for	
real-world situations, both continuous and discrete; and represent domain and	
range using inequalities	

Analysis of Assessed Standards

Linear Functions

Readiness

Describing Linear Functions



Q1

What are the domain and range of f(x) = -37?

A Domain: All real numbers greater than or equal to -37 Range: All real numbers

B Domain: {−37}

Range: All real numbers

C Domain: All real numbers

Range: All real numbers greater than or equal to -37

D Domain: All real numbers

Range: {-37}

	Data Analysis					
Item			Error Analysis			
Α			☐ Guessing			
В			□ Careless Error			
С			☐ Stopped Too Early			
D			☐ Mixed Up Concepts			

A.2(A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities			Analysis of Assessed Standards		
	(Cluster		Linear	Functions
Q2	9	Subcluster		Describing Linear Functions	
The daily cost of hiring a plumber, y , to work x hours on a repair project can be model	led	Content		Readiness	
using a linear function. The plumber charges a fixed cost of \$80 plus an additional cost \$45 per hour. The plumber works a maximum of 8 hours per day.	t of	Process			
+ F · · · · · · · · · F · · · · ·	9	Stimulus			
For one day of work, what is the range of the function for this situation?					
A 0 < x < 8		Data Analysis			
M 0 ≤ X ≤ 0		Item			Error Analysis
B $80 \le y \le 440$		Α			☐ Guessing
c 0 < x < 10		В			□ Careless Error
		С			☐ Stopped Too Early
D 45 ≤ y ≤ 685		D			☐ Mixed Up Concepts
					from Mistakes al Implications

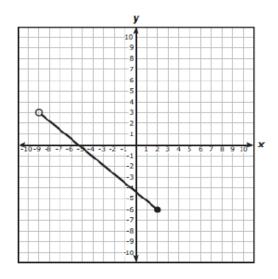
A.2(A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities	Analysis of Assessed Standards			
	Cluster	Linea	Linear Functions	
Q3	Subcluste	Descr	Describing Linear Functions	
A set of weights includes a 4 lb barbell and 6 pairs of weight plates. Each pair of plates weighs	Content	Readi	Readiness	
20 lb. If x pairs of plates are added to the barbell, the total weight of the barbell and plates in pounds can be represented by $f(x) = 20x + 4$.	Process			
What is the range of the function for this situation?	Stimulus			
What is the range of the function for this situation:				
A {0, 1, 2, 3, 4, 5, 6}		Data Analysis		
B {4, 24, 44, 64, 84, 104, 124}	Item		Error Analysis	
D {4, 24, 44, 04, 04, 104, 124}	Α		☐ Guessing	
C {0, 2, 4, 6}	В		□ Careless Error	
D 14 44 04 1343	С		☐ Stopped Too Early	
D {4, 44, 84, 124}	D		☐ Mixed Up Concepts	
			g from Mistakes onal Implications	

A.2(A) determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities

Analysis of Assessed Standards



The graph of part of linear function g is shown on the grid.



Which inequality best represents the domain of the part shown?

$$F -9 < x < 2$$

G
$$-9 \le x < 2$$

H
$$-6 < g(x) \le 3$$

J
$$-6 \le g(x) < 3$$

Cluster	Linear Functions
Subcluster	Describing Linear Functions
Content	Readiness
Process	
Stimulus	

Data Analysis					
Item	State	Local	Error Analysis ☐ Guessing		
F*	61		☐ Careless Error ☐ Stopped Too Early		
G	18		☐ Mixed Up Concepts		
Н	11				
J	9				

A.2(B) write linear equations in two variables in various forms, including y =
$mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and
given two points

Analysis of Assessed Standards

Q5

What is the equation in slope-intercept form of the line that passes through the points (-4, 47) and (2, -16)?

- **A** $y = -\frac{21}{2}x + \frac{979}{21}$
- $B \quad y = -\frac{2}{21}x + \frac{979}{21}$
- C $y = -\frac{21}{2}x + 5$
- $D \quad y = -\frac{2}{21}x + 5$

Cluster	Linear Functions
Subcluster	Writing Linear Equations
Content	Supporting
Process	
Stimulus	

Data Analysis				
Item			Error Analysis	
Α			☐ Guessing	
В			□ Careless Error	
С			☐ Stopped Too Early	
D			☐ Mixed Up Concepts	

Learning from Mista	kes
Instructional Implica	tions

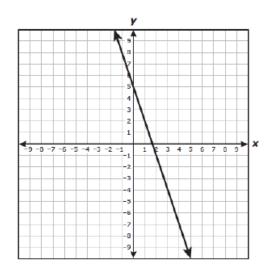
	2(C) write linear equations in two variables given a table of values, a graph, d a verbal description	Analysis of Assessed Standards		
_			Linear Functions	
Q		Subcluster	Writing Linear Equations	
	At a restaurant jars of tomato sauce are stored in boxes in the pantry. Each box contains	Content	Readiness	
	8 jars of tomato sauce. A cook uses 2 jars from 1 of the boxes.	Process		
	Which function shows the relationship between y , the total number of jars of tomato sauce remaining in the pantry, and x , the number of boxes in the pantry?	Stimulus		
		Data Analysis		
	A $y = 8x + 6$	Item	Error Analysis	
	$\mathbf{B} y = 8x$	А	□ Guessing	
	C $y = 8x - 2$	В	☐ Careless Error	
	C y = 8x - 2	С	☐ Stopped Too Early	
	$\mathbf{D} y = 6x$	D	☐ Mixed Up Concepts	
			Learning from Mistakes nstructional Implications	

A.2(C) write linear equations in two variables given a table of values, a graph, and a verbal description



Q7

The graph of a linear function is shown on the grid.



Which equation is best represented by this graph?

A
$$y + 7 = -3(x - 4)$$

B
$$y + 1 = -3(x + 2)$$

C
$$y-4=3(x+7)$$

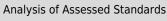
D
$$y-2=3(x-1)$$

	Analysis of Assessed Standards				
	Cluster	Linear Functions			
	Subcluster	Writing Linear Equations			
	Content	Readiness			
Process					
	Stimulus				

Data Analysis				
Item			Error Analysis ☐ Guessing	
Α			☐ Careless Error ☐ Stopped Too Early	
В			☐ Mixed Up Concepts	
С				
D				

A.2(C) write linear equations in two variables given a table of values, a graph and a verbal description	Anal	Analysis of Assessed Standards		
Q8		Linear I	Linear Functions	
		Writing	Writing Linear Equations	
Researchers in Antarctica discovered a warm sea current under a glacier that is causing the		Readine	Readiness	
glacier to melt. The ice shelf of the glacier had a thickness of approximately 450 m when it was first discovered. The thickness of the ice shelf is decreasing at an average rate of 0.06 m	Process			
per day.	Stimulus			
Which function can be used to find the thickness of the ice shelf in meters x days since the discovery?				
discovery?		Data Analysis		
A $t(x) = 450 - 0.06x$	Item		Error Analysis	
$\mathbf{B} \ t(x) = -0.06(x + 450)$	A		☐ Guessing	
	В		☐ Careless Error	
C t(x) = 450 + 0.06x	С		☐ Stopped Too Early	
D t(x) = 0.06(x + 450)	D		☐ Mixed Up Concepts	
			rom Mistakes al Implications	

A.2(C) write linear equations in two variables given a table of values, a graph, and a verbal description





Q9

The table represents some points on the graph of a linear function.

X	У
-20	-268
-14	-196
-8	-124
-1	-40

Which equation represents the same relationship?

$$F \quad y + 268 = \frac{1}{12}(x + 20)$$

G
$$y + 20 = \frac{1}{12}(x + 268)$$

H
$$y + 268 = 12(x + 20)$$

$$J y + 20 = 12(x + 268)$$

, , , , , , , , , , , , , , , , , , , ,				
Cluster	Linear Functions			
Subcluster	Writing Linear Equations			
Content	Readiness			
Process				
Stimulus				

Data Analysis				
Item			Error Analysis	
F			☐ Guessing	
			□ Careless Error	
G			☐ Stopped Too Early	
			☐ Mixed Up Concepts	
Н				
J				

A.2(F) write the equation of a line that contains a given point and is	
perpendicular to a given line	

Q10

- **39** What is the equation in slope-intercept form of the line that passes through the point (2, -2) and is perpendicular to the line represented by $y = \frac{2}{5}x + 2$?
 - **A** $y = \frac{5}{2}x 7$
 - **B** $y = \frac{5}{2}x + 7$
 - **C** $y = -\frac{5}{2}x 3$
 - **D** $y = -\frac{5}{2}x + 3$

Analysis of Assessed Standards			
Cluster	Linear Functions		
Subcluster	Writing Linear Equations		
Content	Supporting		
Process			
Stimulus			

Data Analysis					
Item			Error Analysis		
Α			☐ Guessing		
В			□ Careless Error		
С			☐ Stopped Too Early		
D			☐ Mixed Up Concepts		

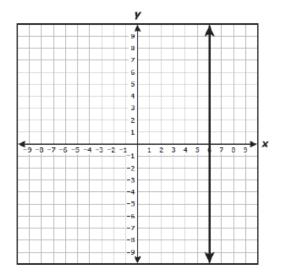
Learning from Mistakes	
Instructional Implications	

A.2(G) write an equation of a line that is parallel or perpendicular to the x- or y- axis and determine whether the slope of the line is zero or undefined



Q11

What are the equation and slope of the line shown on the grid?



- **F** y = 6; slope is $-\frac{1}{6}$.
- **G** x = 6; slope is zero.
- **H** y = 6; slope is 6.
- **J** x = 6; slope is undefined.

Analysis of Assessed Standards				
Cluster	Linear Functions			
Subcluster	Writing Linear Equations			
Content	Supporting			
Process				
Stimulus				

Data Analysis				
Item			Error Analysis ☐ Guessing	
F			☐ Careless Error ☐ Stopped Too Early	
G			☐ Mixed Up Concepts	
Н				
J				

A.2(G) write an equation of a line that is parallel or perpendicular to the x- or y- axis and determine whether the slope of the line is zero or undefined	Analysis of Assessed Standards			
0.10	Cluster	Linear	Linear Functions	
Q12	Subcluster	Writing	Writing Linear Equations	
What is the equation of the line that passes through the point (-2, 7) and has a slope of zero?	Content	Suppor	Supporting	
	Process			
F x=7	Stimulus			
G $y = -2$				
H x = -2		Data Analysis		
	Item		Error Analysis	
J y = 7	F		☐ Guessing	
	G		☐ Careless Error	
	Н		☐ Stopped Too Early	
	J		☐ Mixed Up Concepts	
			from Mistakes nal Implications	

A.3(A) determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$	
	Cluste
Q13	Subclu

What is the slope of the line that passes through the points (5, -11) and (-9, 17)?

- **A** −2
- B $-\frac{1}{2}$
- **C** 7
- **D** 2

Analysis of Assessed Standards						
Cluster	-	Linear Functions				
Subclu	ster	Writing Linear Equations				
Conten	nt	Supporting				
Proces	S					
Stimul	us					
		Data	Analysis			
Item			Error Analysis			
Α			☐ Guessing			
В			□ Careless Error			
С			☐ Stopped Too Early			
D			☐ Mixed Up Concepts			

Learning from Mistakes Instructional Implications

A.3(A) determine the slope of a line given a table of values, a graph, two
points on the line, and an equation written in various forms, including $y = mx$
+ b, $Ax + By = C$, and $y - y_1 = m(x - x_1)$

Q**14**

What is the slope of the line represented by 5x - 12y = 24?

- F -2
- $G = \frac{24}{5}$
- H -12
- $\frac{5}{12}$

Analysis of Assessed Standards

Linear Functions

Cluster

Subcluster	Writing Linear Equations
Content	Supporting
Process	
Stimulus	

Data Analysis					
Item			Error Analysis		
F			☐ Guessing		
G			□ Careless Error		
Н			☐ Stopped Too Early		
J			☐ Mixed Up Concepts		

Learning from Mistakes
Instructional Implications

0 Q15

A.3(E) determine the effects on the graph of the parent function f(x) =x when f(x) is replaced by af(x), f(x) + d, f(x - c), f(bx) for specific values

of a, b, c, and d

The graphs of linear functions f and g are shown on the grid.

Analysis of Assessed Standards

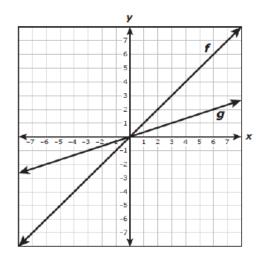
Describing Linear Functions



Subcluster

Stimulus

Process



Which function is best represented by the graph of g?

$$\mathbf{A} \quad g(x) = f(x) - 4$$

$$\mathbf{B} \quad g(x) = \frac{1}{3} f(x)$$

c
$$g(x) = f(x) - 2$$

$$\mathbf{D} \quad g(x) = 3f(x)$$

Data Analysis					
Item		Error Analysis Guessing			
Α		☐ Careless Err			
В		☐ Mixed Up Co	oncepts		
С					
D					

A.3(E) determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d	Analys	sis of Assessed Standards		
Q16 S		Linear Functions		
		Describing Linear Functions		
A student graphed $f(x) = x$ and $g(x) = f(x) + 3$ on the same coordinate grid. Which statement describes how the graphs of f and g are related?	Content	Supporting		
	Process			
A The graph of f is shifted 3 units up to create the graph of g.	Stimulus			
B The graph of f is steeper than the graph of g .				
C The graph of f is shifted 3 units down to create the graph of g .		Data Analysis		
D The graph of f is less steep than the graph of g .	Item	Error Analysis		
	A	☐ Guessing		
	В	☐ Careless Error		
	С	□ Stopped Too Early		
	D	☐ Mixed Up Concepts		
	Learning from Mistakes Instructional Implications			

A.5(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides	An	alysis of A	ssessed Standards	
	Cluster	Linear	Functions	
Q17	Subcluster	r Solvin	Solving Linear Equations	
What value of n makes the equation $4(0.5n-3) = n - 0.25(12-8n)$ true?	Content	Readi	ness	
	Process			
F 3	Stimulus			
G –9				
	Data Analysis			
H 0	Item		Error Analysis	
	F		☐ Guessing	
J _15	G		□ Careless Error	
	Н		☐ Stopped Too Early	
	J		☐ Mixed Up Concepts	
			from Mistakes	
		Instructio	nal Implications	

appl	A) solve linear equations in one variable, including those for which the ication of the distributive property is necessary and for which variables are ided on both sides	Analysis of Assessed Standards			
		Cluster		Linear	Functions
Q18	3	Subcluster		Solving Linear Equations	
	What is the solution to $34x + 95 = 3(14x + 9)$?	Content		Readiness	
	Record your answer and fill in the bubbles on your answer document.	Proces	Process		
	Record your answer and militaries bubbles on your answer accument.	Stimulus			
				Data	Analysis
		Item			Error Analysis
					☐ Guessing
					☐ Careless Error
					☐ Stopped Too Early
					☐ Mixed Up Concepts
					from Mistakes al Implications

applicat	solve linear equations in one variable, including those for which the ion of the distributive property is necessary and for which variables are I on both sides	An	ıalysi	s of Assessed Standards	
A	Ton Both Sides	Cluster		Linear Functions	
Q19		Subcluste	r	Solving Linear Equations	
		Content		Readiness	
WI	hat is the solution to $8x - 3(2x - 4) = 3(x - 6)$?	Process			
Α	6	Stimulus			
A	O .			Data Analysis	
В	2	Item		Error Analysis	
	_	Α		□ Guessing	
C	30	С		☐ Careless Error	
		D		☐ Stopped Too Early ☐ Mixed Up Concepts	
D	No solution				
			Learning from Mistakes Instructional Implications		

A.5(A) solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides			Analysis of Assessed Standards		
		Cluster Linear Functions		r Functions	
Q2	Q20		Subcluster Solving Linear Equations		
	Which value of x makes the equation $0.75(x + 20) = 2 + 0.5(x - 2)$ true?	Content	Readi	ness	
	5.64	Process			
	F 64	Stimulus			
	G -64				
			Data	a Analysis	
	Н 56	Item		Error Analysis	
	J -56	F		Guessing	
	J -30	G		☐ Careless Error	
		Н		☐ Stopped Too Early	
		J		☐ Mixed Up Concepts	
				rrom Mistakes nal Implications	

Systems of Equations and Inequalities

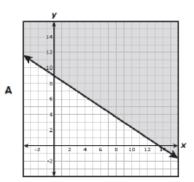
- **A.2 Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations.
- **A.3 Linear functions, equations, and inequalities.** The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations.
- **A.5 Linear functions, equations, and inequalities.** The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions.

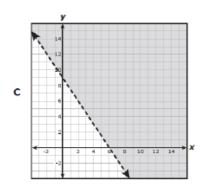
A.3(D) graph the solution set of linear inequalities in two variables on the coordinate plane

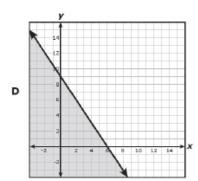
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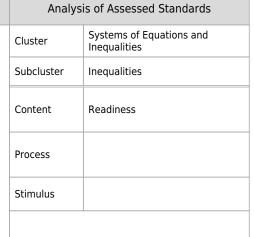
Q21

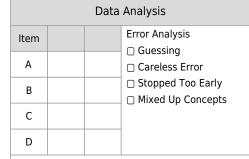
Which graph best represents the solution set of $-4x \le 6y - 54$?











A.3(D) graph the solution set of linear inequalities in two variables on the coordinate plane

Analysis of Assessed Standards

Inequalities

Inequalities

Cluster

Α

В

С

D

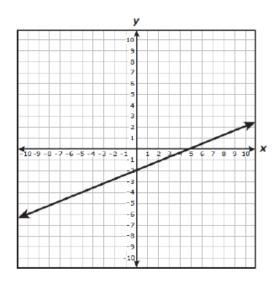
Subcluster

Systems of Equations and



Q22

The graph of 2x - 5y = 10 is shown on the grid.



Which ordered pair is in the solution set of $2x - 5y \ge 10$?

- A (0, 5)
- **B** (5, 0)
- (-2,5)
- D(-5, 2)

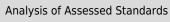
	,	
Content	Readiness	
Process		
Stimulus		
Data Analysis		
Item	Error Analysis □ Guessing	

□ Careless Error

☐ Stopped Too Early☐ Mixed Up Concepts

A.3(D) graph the solution set of linear inequalities in two variables on the Analysis of Assessed Standards coordinate plane Systems of Equations and Inequalities Cluster Q23 Subcluster Inequalities Which graph best represents the solution set of $y \le -4x$? Readiness Content Process Stimulus C Data Analysis Error Analysis Item \square Guessing Α □ Careless Error $\hfill\Box$ Stopped Too Early В $\ \square$ Mixed Up Concepts С D В D Learning from Mistakes Instructional Implications

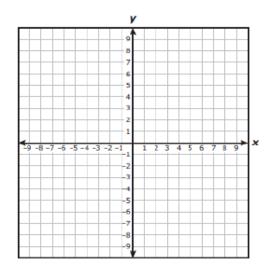
A.3(D) graph the solution set of linear inequalities in two variables on the coordinate plane





Q24

Which ordered pair is in the solution set of $y \ge \frac{1}{3}x + 4$?



- A (-6, 1)
- **B** (-1, 6)
- C (6,-1)
- D (1,-6)

Cluster	Systems of Equations and Inequalities
Subcluster	Inequalities
Content	Readiness
Process	
Stimulus	

Data Analysis				
Item			Error Analysis	
			☐ Guessing	
Α			□ Careless Error	
			☐ Stopped Too Early	
В	3		☐ Mixed Up Concepts	
С				
D				

A.5(B) solve linear inequalities in one variable, including those for which the	
application of the distributive property is necessary and for which variables are	
included on both sides	

Analysis of Assessed Standards

Q25

What is the solution set for $-4x + 10 \ge 5x + 55$?

- F $x \ge 5$
- **G** $x \ge 45$
- **H** $x \le -5$
- **J** $x \le -45$

Cluster	Systems of Equations and Inequalities
Subcluster	Inequalities
Content	Supporting
Process	
Stimulus	

	Data	Analysis
Item		Error Analysis
F		☐ Guessing
G		□ Careless Error
Н		☐ Stopped Too Early
J		☐ Mixed Up Concepts

Quadratic Functions

A.6 Quadratic functions and equations. The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations.

A.7 Quadratic functions and equations. The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations.

A.8 Quadratic functions and equations. The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data.

Connected Knowledge and Skills A.12

A.6(A) determine the domain and range of quadratic functions and represent the domain and range using inequalities

2018 - Q**26**

What is the range of $y = -x^2 - 2x + 3$?

- A $x \le 4$
- **B** $x \ge -4$

Analysis of Assessed Standards			
Cluster	Quadratic Functions		
Subcluster	Describing Quadratic Functions		
Content	Readiness		
Process			
Stimulus			

RC 4

Data Analysis			
Item		Error Analysis	
Α		☐ Guessing	
В		□ Careless Error	
С		☐ Stopped Too Early	
D		☐ Mixed Up Concepts	

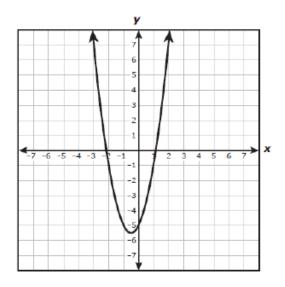
Learning from Mistakes
Instructional Implications

A.6(A) determine the domain and range of quadratic functions and represent the domain and range using inequalities



2018 - Q27

The graph of quadratic function f is shown on the grid.



Which of these best represents the domain of f?

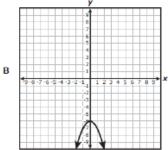
- **F** $-3 \le x \le 2$
- G All real numbers
- **H** $y \ge 5.5$
- J All real numbers less than -3 or greater than 2

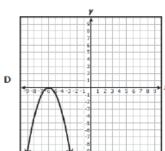
Analysis of Assessed Standards		
Cluster	Quadratic Functions	
Subcluster	Describing Quadratic Functions	
Content	Readiness	
Process		
Stimulus		

Data Analysis				
Item			Error Analysis	
			☐ Guessing	
F			□ Careless Error	
			☐ Stopped Too Early	
G*			☐ Mixed Up Concepts	
Н				
J				

	determine the domain and range of quadratic functions and represent nain and range using inequalities	Analysis of Assessed Standards		
0			Quadratic Functions	
Q28			r Describing Quadratic Functions	
What is the domain of $f(x) = 9 - x^2$?		Content	Readiness	
		Process		
F	$f(x) \geq 9$	Stimulus		
		Data Analysis		
G	All real numbers			
		F	Error Analysis	
		G	☐ Guessing ☐ Careless Error	
н	$-3 \le x \le 3$	Н		
		П .	☐ Stopped Too Early ☐ Mixed Up Concepts	
		J	□ Mixed op concepts	
		Learning from Mistakes Instructional Implications		
J	<i>x</i> ≤ 9			
	_		•	

A.6(A) determine the domain and range of quadratic functions and represent the domain and range using inequalities Analysis of Assessed Standards Cluster **Quadratic Functions** Q29 Subcluster **Describing Quadratic Functions** Which graph best represents a function with a range of all real numbers greater than or equal Content Readiness Process Stimulus C





Data Analysis Item						
A Guessing Careless Error Stopped Too Early Mixed Up Concepts	Data Analysis					
A Careless Error Stopped Too Early Mixed Up Concepts	Item			☐ Guessing ☐ Careless Error ☐ Stopped Too Early		
☐ Mixed Up Concepts	А					
	В					
	С			→ □ Mixed of Concepts		
D	D					