Step Up to the TEKS
by GF Educators, Inc.

# Algebra I

# 2017 Released Items Analysis

***Teacher:*** _____



Edition I

GF Educators Inc.
STEP IT UP

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# Step Up to the TEKS

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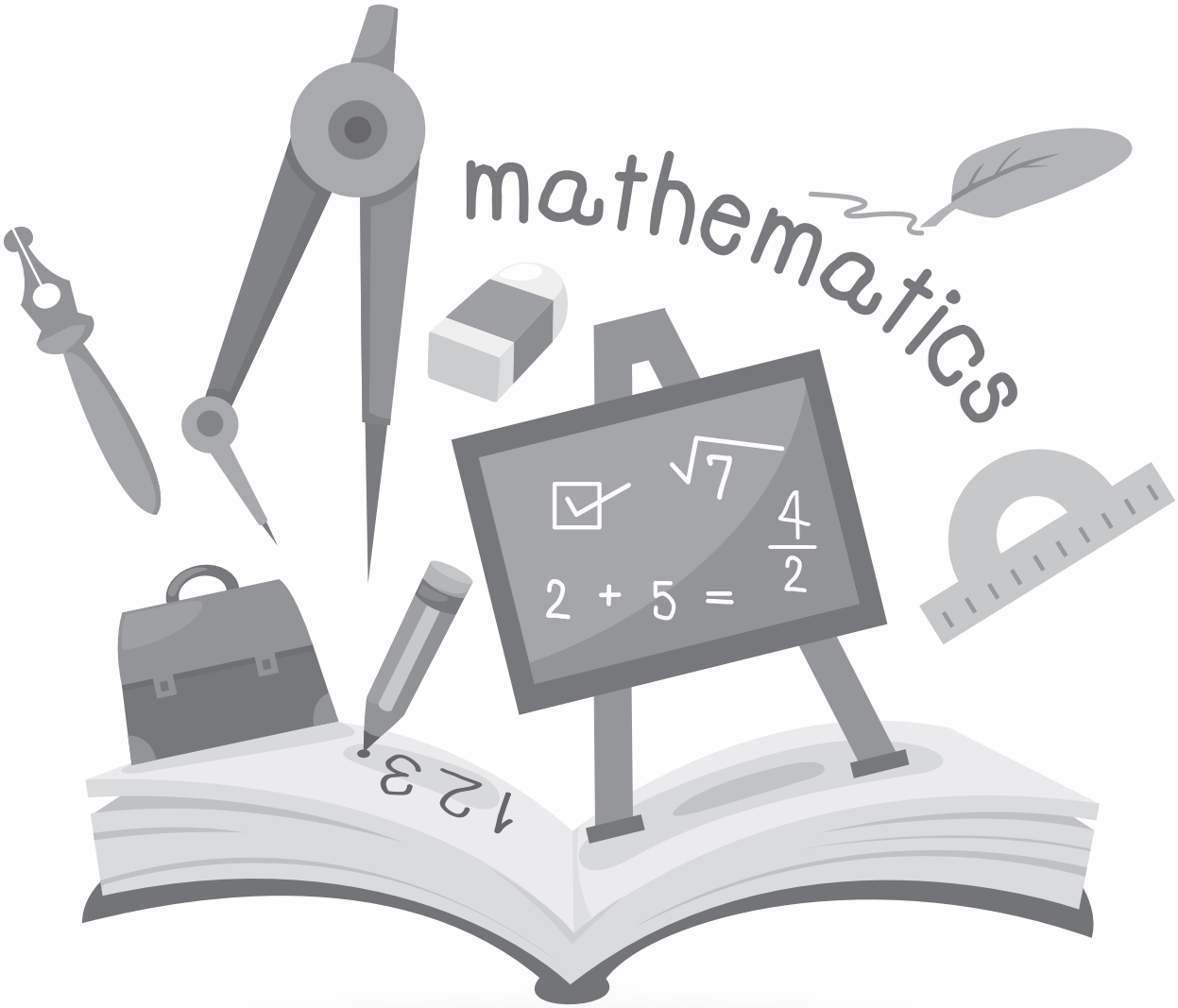
# Instructional Analysis
# 2017 Released Test



**TEKS A.10A Supporting Standard**
add and subtract polynomials of degree one and degree two

**ITEM**

**13** A shoe company is going to close one of its two stores and combine all the inventory from both stores. These polynomials represent the inventory in each store:

Store A: $\frac{1}{2}g^2 + \frac{7}{2}$

Store B: $3g^2 - \frac{4}{5}g + \frac{1}{4}$

Which expression represents the combined inventory of the two stores?

**A** $\frac{7}{2}g^2 - \frac{4}{5}g + \frac{15}{4}$

**B** $\frac{7}{2}q^2 - \frac{4}{5}g + \frac{4}{3}$

**C** $\frac{7}{2}g^2 - \frac{4}{5}g + \frac{15}{4}$

**D** $\frac{7}{2}g^2 - \frac{4}{5}g + \frac{4}{3}$

| Item Analysis | |
|---|---|
| **Verb** | Add |
| **Using or Including** | NA |
| **Concept** | Polynomials Degree Two |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.10E Readiness Standard**
factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two

**ITEM**

**17** Which expression is equivalent to $6x^2 + 13x + 5$?

**A** $(2x + 5)(3x\ 1)$
**B** $(2x - 5)(3x + 1)$
**C** $(2x + 1)(3x + 5)$
**D** $(2x - 1)(3x - 5)$

| Item Analysis | |
|---|---|
| **Verb** | Factor |
| **Using or Including** | Trinomials Degree Two |
| **Concept** | Real Factors |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.10E Readiness Standard**
factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two

**ITEM**
**28** Which expression is equivalent to $m^2 - 13m - 30$?

**F** $(m - 15)(m + 2)$
**G** $(m - 10)(m - 3)$
**H** $(m + 15)(m - 2)$
**J** $(m + 10)(m + 3)$

**Item Analysis**

| | |
|---|---|
| **Verb** | Factor |
| **Using or Including** | Trinomials Degree Two |
| **Concept** | Real Factors |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.10E Readiness Standard**
factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two

**ITEM**
**41** Which expression is a factor of $18x^2 - 15x + 2$?

**A** $3x - 2$
**B** $9x - 1$
**C** $x - 2$
**D** $2x - 1$

**Item Analysis**

| | |
|---|---|
| **Verb** | Factor |
| **Using or Including** | Trinomials Degree Two |
| **Concept** | Real Factors |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.11A Supporting Standard**
simplify numerical radical expressions involving square roots

**ITEM**

**1** Which expression is equivalent to $\sqrt{147}$ ?

**A** $3\sqrt{7}$
**B** $7\sqrt{3}$
**C** $21\sqrt{7}$
**D** $49\sqrt{3}$

| Item Analysis | |
|---|---|
| **Verb** | Simplify |
| **Using or Including** | Square Roots |
| **Concept** | Numerical Radical Expressions |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.11B Readiness Standard**
simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents

**ITEM**

**6** The area of a rectangle is $54x^9y^8$ square yards. If the length of the rectangle is $6x^3y^4$ which expression represents the width of the rectangle in yards?

**F** $9x^3y^2$
**G** $48x^6y^4$
**H** $9x^6y^4$
**J** $60x^{12}y^{12}$

| Item Analysis | |
|---|---|
| **Verb** | Simplify |
| **Using or Including** | Integral Exponents |
| **Concept** | Algebraic Expressions |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.11B Readiness Standard**
simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents

**ITEM**

**20** The expression $(x^3)(x^{-17})$ is equivalent to $x^n$. What is the value of $n$?

Record your answer and fill in the bubbles on your answer document.

| Item Analysis | |
|---|---|
| **Verb** | Simplify |
| **Using or Including** | Integral Exponents |
| **Concept** | Algebraic Expressions |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.11B Readiness Standard**
simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents

**ITEM**

**51** Which expression is equivalent to $(7x^3)^2(x^8)^{1/2}$

**A** $14x^{10}$
**B** $49x^{10}$
**C** $14x^7$
**D** $49x^7$

| Item Analysis | |
|---|---|
| **Verb** | Simplify |
| **Using or Including** | Rational Exponents |
| **Concept** | Algebraic Expressions |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.12A Supporting Standard**
decide whether relations represented verbally, tabularly, graphically, and symbolically define a function

**ITEM**

**38** Which table does NOT show $y$ as a function of $x$?

**F**

| $x$ | $\frac{1}{10}$ | $\frac{1}{8}$ | $\frac{1}{5}$ | $\frac{1}{4}$ | $\frac{1}{2}$ |
|---|---|---|---|---|---|
| $y$ | 9 | 11 | 9 | 14 | 7 |

**G**

| $x$ | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|
| $y$ | 100 | 80 | 110 | 100 | 90 |

**H**

| $x$ | −0.2 | 0.6 | −1.3 | 1.0 | −0.2 |
|---|---|---|---|---|---|
| $y$ | 5.8 | −3.7 | 4.4 | −0.9 | 8.1 |

**J**

| $x$ | −24 | 21 | 24 | −27 | 29 |
|---|---|---|---|---|---|
| $y$ | 2.7 | 2.8 | 2.7 | 2.5 | 2.5 |

**Item Analysis**

| | |
|---|---|
| **Verb** | Decide |
| **Using or Including** | Table |
| **Concept** | Function |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.12B Supporting Standard**
evaluate functions, expressed in function notation, given one or more elements in their domains

**ITEM**

**47** If $p(x) = 5(x^2 + 1) + 16$, what is the value of $p(11)$?

**A** 690
**B** 736
**C** 622
**D** 626

**Item Analysis**

| | |
|---|---|
| **Verb** | Evaluate |
| **Using or Including** | Domain |
| **Concept** | Function Notation |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.12C Supporting Standard**
identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes

**ITEM**

**22** A sequence can be generated by using $a_n = 4a_{(n-1)}$, where $a_1 = 6$ and $n$ is a whole number greater than 1. What are the first four terms in the sequence?

**F** 6, 24, 96, 384
**G** 6, 10, 14, 18
**H** 6, 20, 100, 500
**J** 6, 20, 76, 300

| Item Analysis | |
|---|---|
| **Verb** | Identify |
| **Using or Including** | Recursive Process |
| **Concept** | Algebraic Sequence |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

| Item Analysis | |
|---|---|
| **Verb** | |
| **Using or Including** | |
| **Concept** | |
| **Process TEKS** | |

**Notes**

**TEKS A.3A Supporting Standard**
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 $y - y_1 = m(x - x_1)$

**ITEM**

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

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

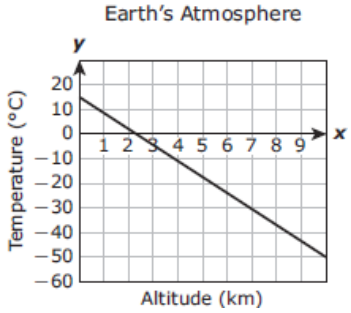
| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | $Ax + By = C$ |
| **Concept** | Slope |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.3B Readiness Standard**
calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems

**ITEM**

**26** The graph models the linear relationship between the temperature of Earth's atmosphere and the altitude above sea level.




Which of these best represents the rate of change of the temperature with respect to altitude?

**F** -6.5°C/km
**G** -3.5°C/km
**H** -0.29°C/km
**J** -0.15°C/km

| Item Analysis | |
|---|---|
| **Verb** | Calculate |
| **Using or Including** | Graphically |
| **Concept** | Rate of Change |
| **Process TEKS** | **A.1A, A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.3B Readiness Standard**
calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems

**ITEM**

**52** The function $y = 3.75 + 1.5(x - 1)$ can be used to determine the cost in dollars for a taxi ride of $x$ miles. What is the rate of change of the cost in dollars with respect to the number of miles?

**F** $1.50 per mile
**G** $3.75 per mile
**H** $4.25 per mile
**J** $5.25 per mile

| Item Analysis | |
|---|---|
| **Verb** | Calculate |
| **Using or Including** | Algebraically |
| **Concept** | Rate of Change |
| **Process TEKS** | **A.1A, A.1B, A.1E, A.1F** |

**Notes**

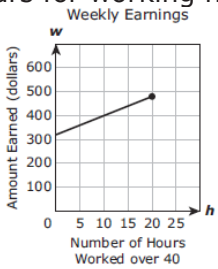
**TEKS A.3C Readiness Standard**
graph linear functions on the coordinate plane and identify key features, including $x$-intercept, $y$-intercept, zeros, and slope, in mathematical and real-world problems

**ITEM**

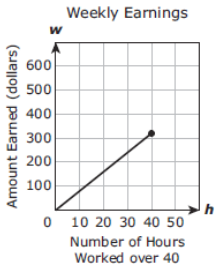
**12** A lifeguard earns $320 per week for working 40 hours plus $12 per hour worked over 40 hours. A lifeguard can work a maximum of 60 hours per week.

Which graph best represents the lifeguard's weekly earnings in dollars for working h hours over 40?

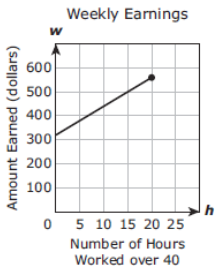
**F**



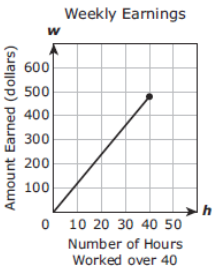

**H**




**G**




**J**



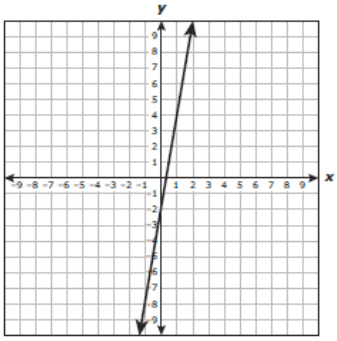

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Real-World Problems |
| **Concept** | Linear Function Key Features |
| **Process TEKS** | **A.1A, A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.3C Readiness Standard**
graph linear functions on the coordinate plane and identify key features, including *x*-intercept, *y*-intercept, zeros, and slope, in mathematical and real-world problems

**ITEM**

**32** The graph of a function is shown on the grid.




Which ordered pair best represents the location of the *y*-intercept?

**F** $(\frac{1}{3}, 0)$
**G** (0, -2)
**H** $(0, \frac{1}{3})$
**J** (-2, 0)

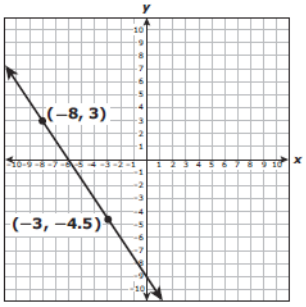
| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | *y*-intercept |
| **Concept** | Linear Functions<br>Key Features |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.3C Readiness Standard**
graph linear functions on the coordinate plane and identify key features, including *x*-intercept, *y*-intercept, zeros, and slope, in mathematical and real-world problems

**ITEM**

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




What is the zero of *g*?
Record your answer and fill in the bubbles on your answer document.

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Zero |
| **Concept** | Linear Functions<br>Key Features |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

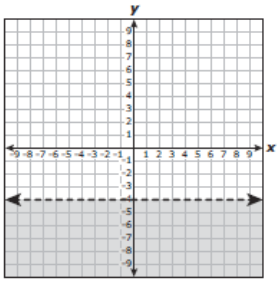
**Notes**

**TEKS A.3D Readiness Standard**
graph the solution set of linear inequalities in two variables on the coordinate plane

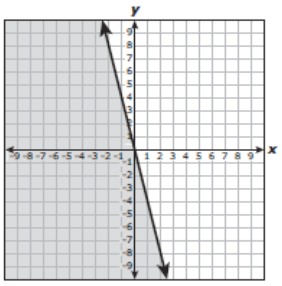
**ITEM**

**3** Which graph best represents the solution set of $y \leq -4x$?

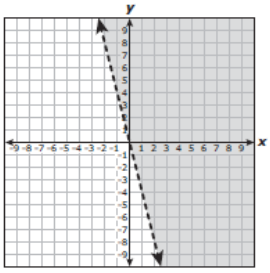
**A**



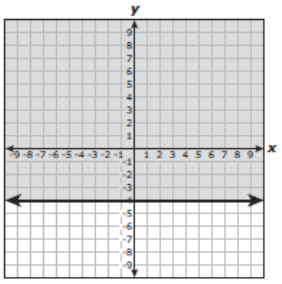
**C**



**B**



**D**



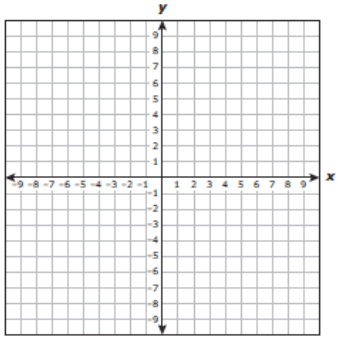
| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Coordinate Plane |
| **Concept** | Solution Set<br>Linear Inequalities |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.3D Readiness Standard**
graph the solution set of linear inequalities in two variables on the coordinate plane

**ITEM**

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



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

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Coordinate Plane |
| **Concept** | Solution Set<br>Linear Inequalities |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.3E Supporting Standard**
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 $d$

**ITEM**

**45** 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?

**A** The graph of $f$ is shifted 3 units up to create the graph of $g$.
**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 $g$.
**D** The graph of $f$ is less steep than the graph of $g$.

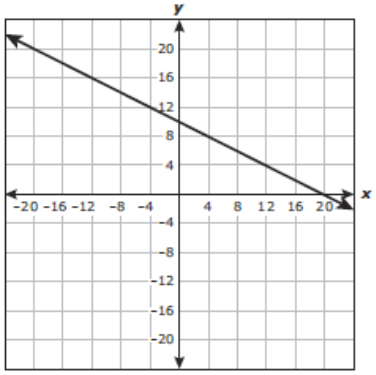
| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | NA |
| **Concept** | $f(x) + d$ |
| **Process TEKS** | **A.1A, A.1B, A.1G** |

**Notes**

**TEKS A.3F Supporting Standard**
graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist

**ITEM**

**29** The line graphed on the grid represents the first of two equations in a system of linear equations.




If the graph of the second equation in the system passes through the points (-12, 20) and (4, 12), which statement is true?

**A** The only solution to the system is (10, 5).
**B** The only solution to the system is (0, 14).
**C** The system has no solution.
**D** The system has an infinite number of solutions.

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Coordinate Plane |
| **Concept** | Two Linear Equations in Two Variables |
| **Process TEKS** | **A.1B, A.1E, A.1G** |

**Notes**

**TEKS A.4A Supporting Standard**
calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity a s a measure of the strength of the linear association

**ITEM**

**19** The table shows the heights and the lengths of several rectangles.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Height (in.) | 41 | 70 | 21 | 34 | 10 | 92 | 54 | 24 | 10 | 35 | 42 | 66 |
| Length (in.) | 21 | 25 | 32 | 12 | 16 | 45 | 40 | 23 | 45 | 35 | 21 | 14 |

What does the correlation coefficient for the data indicate about the strength of the linear association between the height and the length of these rectangles?

**A** Weak negative correlation
**B** Strong negative correlation
**C** Weak positive correlation
**D** Strong positive correlation

**Item Analysis**

| | |
|---|---|
| **Verb** | Calculate |
| **Using or Including** | NA |
| **Concept** | Correlation Coefficient |
| **Process TEKS** | **A.1A, A.1B, A.1E, A.1G** |

**Notes**

**TEKS A.4B Supporting Standard**
compare and contrast association and causation in real-world problems

**ITEM**

**9** Which situation best represents causation?

**A** When the number of bus stops increases, the number of car sales decreases.
**B** When fewer firefighters report to a house fire, the damage caused by the fire decreases.
**C** When ice cream sales increase, incidents of sunburn increase.
**D** When it rains several inches, the water level of a lake increases.

**Item Analysis**

| | |
|---|---|
| **Verb** | Compare and Constant |
| **Using or Including** | Real-World Problems |
| **Concept** | Causation |
| **Process TEKS** | **A.1A, A.1B, A.1G** |

**Notes**

**TEKS A.2A Readiness Standard**
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

**ITEM**

**5** A set of weights includes a 4 lb barbell and 6 pairs of weight plates. Each pair of plates weighs 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 $f(x) = 20x + 4$.

What is the range of the function for this situation?

**A** {0, 1, 2, 3, 4, 5, 6}
**B** {4, 24, 44, 64, 84, 104, 124}
**C** {0, 2, 4, 6}
**D** {4, 44, 84, 124}

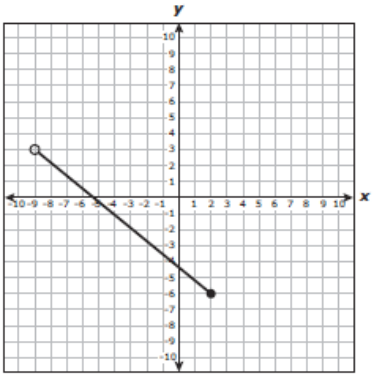
| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | Discrete |
| **Concept** | Range |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.2A Readiness Standard**
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

**ITEM**

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




Which inequality best represents the domain of the part shown?

**F** $9 < x \leq 2$
**G** $9 \leq x < 2$
**H** $6 < g(x) \leq 3$
**J** $6 \leq g(x) < 3$

| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | Inequalities |
| **Concept** | Domain |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.2B Supporting Standard**
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

**ITEM**

**23** 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** $y = -\frac{2}{21}x + \frac{979}{21}$

**C** $y = -\frac{21}{2}x + 5$

**D** $y = -\frac{2}{21}x + 5$

**Item Analysis**

| | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Two Points |
| **Concept** | Linear Equations in Two Variables |
| **Process TEKS** | **A.1B, A.1D, A.1F** |

**Notes**

**TEKS A.2C Readiness Standard**
write linear equations in two variables given a table of values, a graph, and a verbal description

**ITEM**

**33** Researchers in Antarctica discovered a warm sea current under a glacier that is causing the 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 per day.

Which function can be used to find the thickness of the ice shelf in meters x days since the discovery?

**A** $t(x) = 450 - 0.06x$
**B** $t(x) = -0.06(x + 450)$
**C** $t(x) = 450 + 0.06x$
**D** $t(x) = 0.06(x + 450)$

**Item Analysis**

| | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Verbal Description |
| **Concept** | Linear Equations in Two Variables |
| **Process TEKS** | **A.1A, A.1B, A.1D, A.1F** |

**Notes**

**TEKS A.2C Readiness Standard**
write linear equations in two variables given a table of values, a graph, and a verbal description

**ITEM**

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

| $x$ | $y$ |
|---|---|
| −20 | −268 |
| −14 | −196 |
| −8 | −124 |
| −1 | −40 |

Which equation represents the same relationship?

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

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Table of Values |
| **Concept** | Linear Equations in Two Variables |
| **Process TEKS** | **A.1B, A.1D, A.1F** |

**Notes**

**TEKS A.2D Supporting Standard**
write and solve equations involving direct variation

**ITEM**

**27** The value of $y$ is directly proportional to the value of $x$. If $y = 35$ when $x = 140$, what is the value of $y$ when $x = 70$?

Record your answer and fill in the bubbles on your answer document.

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | NA |
| **Concept** | Direct Variation |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.2G Supporting Standard**
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

**ITEM**

**36** What is the equation of the line that passes through the point (-2, 7) and has a slope of zero?

**F** $x = 7$
**G** $y = 2$
**H** $x = 2$
**J** $y = 7$

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Slope Zero |
| **Concept** | Parallel to x-axis |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.2H Supporting Standard**
write linear inequalities in two variables given a table of values, a graph, and a verbal description

**ITEM**

**25** A student is ordering a flower arrangement. She can choose any combination of roses and carnations for her flower arrangement, and she does not want to spend more than $30. If roses cost $3 each and carnations cost $2 each, which inequality represents all possible combinations of *x* roses and *y* carnations?

**A** $3x + 2y < 30$
**B** $3x + 2y \leq 30$
**C** $2x + 3y > 30$
**D** $2x + 3y \leq 30$

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Verbal Description |
| **Concept** | Linear Inequalities in Two Variables |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.2I Readiness Standard**
write systems of two linear equations given a table of values, a graph, and a verbal description

**2** A drummer and a guitarist each wrote songs for their band. The guitarist wrote 8 fewer than twice the number of songs that the drummer wrote. They wrote a total of 46 songs.

Which system of equations models this situation if the drummer wrote $d$ songs and the guitarist wrote $g$ songs?

**F** $g = 2d - 8$
$g + d = 46$

**G** $g = 8 - 2d$
$g = 46 - d$

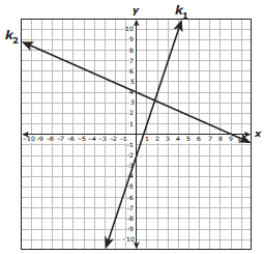
**H** $d = 2g - 8$
$d = 46 - g$

**J** $d = 8 - 2g$
$d + g = 46$

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Verbal Description |
| **Concept** | System of Two Linear Equations |
| **Process TEKS** | **A.1A, A.1B, A.1F** |
| **Notes** | |

**TEKS A.2I Readiness Standard**
write systems of two linear equations given a table of values, a graph, and a verbal description

**ITEM**
**48** The graphs of lines $k_1$ and $k_2$ are shown on the grid.




Which system of equations is best represented by this graph?

**F** $3x - y = 2$
$4x + 9y = 36$

**G** $3x - y = 6$
$4x + 9y = 4$

**H** $x - 3y = 18$
$9x + 4y = 9$

**J** $x + y = 10$
$9x + 4y = 13$

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Graph |
| **Concept** | System of Two Linear Equations |
| **Process TEKS** | **A.1B, A.1E, A.1F** |
| **Notes** | |

**TEKS A.5A Readiness Standard**
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

**ITEM**
**11** What is the solution to $8x - 3(2x - 4) = 3(x - 6)$?

**A** 6
**B** 2
**C** 30
**D** No solution

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | Distributive Property |
| **Concept** | Linear Equations |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.5A Readiness Standard**
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

**ITEM**
**40** Which value of $x$ makes the equation $0.75(x + 20) = 2 + 0.5(x - 2)$ true?

**F** 64
**G** -64
**H** 56
**J** -56

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | Distributive Property |
| **Concept** | Linear Equations |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.5C Readiness Standard**
solve systems of two linear equations with two variables for mathematical and real-world problems

**ITEM**

**18** A bus travels two different routes: the Green Route and the Blue Route. The routes are different lengths.

- On Monday the bus traveled the Green Route 6 times and the Blue Route 5 times, traveling a total of 52 miles.
- On Tuesday the bus traveled the Green Route 12 times and the Blue Route 13 times, traveling a total of 119 miles.

What is the length of the Green Route in miles?

**F** 4.4 mi
**G** 4.5 mi
**H** 6.4 mi
**J** 6.8 mi

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | Real-World Problems |
| **Concept** | System of Two Linear Equations |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.5C Readiness Standard**
solve systems of two linear equations with two variables for mathematical and real-world problems

**ITEM**

**54** What is the value of $x$ in the solution to this system of equations?

$$y + 2x = -1$$
$$y = \frac{1}{2}x + 4$$

**F** $\frac{6}{5}$
**G** -2
**H** $-\frac{10}{3}$
**J** 3

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | Mathematical Problems |
| **Concept** | System of Two Linear Equations |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.6A Readiness Standard**
determine the domain and range of quadratic functions and represent the domain and range using inequalities

**ITEM**
**30** What is the domain of $f(x) = 9 - x^2$?

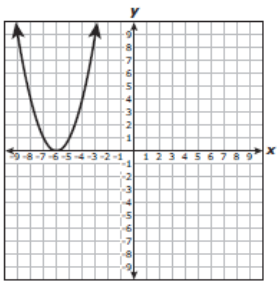
**F** $f(x) \geq 9$
**G** All real numbers
**H** $-3 \leq x \leq 3$
**J** $x \leq 9$

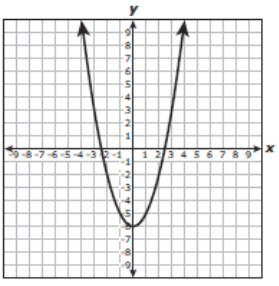
| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | Inequalities |
| **Concept** | Domain |
| **Process TEKS** | **A.1B, A.1F** |

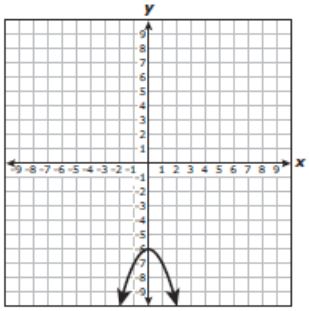
**Notes**

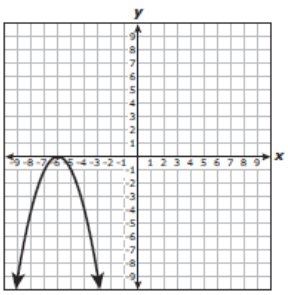
**TEKS A.6A Readiness Standard**
determine the domain and range of quadratic functions and represent the domain and range using inequalities

**ITEM**
**53** Which graph best represents a function with a range of all real numbers greater than or equal to 6?

**A**


**C**


**B**


**D**


| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | NA |
| **Concept** | Range |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.6B Supporting Standard**
write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax^2 + bx + c$)

**ITEM**

**43** Which quadratic function in vertex form can be represented by the graph that has a vertex at (3, -7) and passes through the point (1, -10)?

**A** $y = \frac{3}{4}(x + 3)^2 + 7$
**B** $y = -\frac{3}{4}(x + 3)^2 - 7$
**C** $y = \frac{3}{4}(x - 3)^2 + 7$
**D** $y = -\frac{3}{4}(x - 3)^2 - 7$

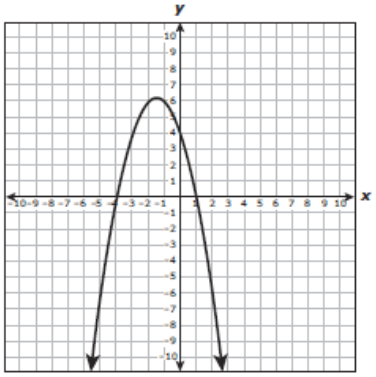
| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Vertex and Point |
| **Concept** | Quadratic Function Vertex Form |
| **Process TEKS** | **A.1B, A.1D, A.1F** |

**Notes**

**TEKS A.6C Supporting Standard**
write quadratic functions when given real solutions and graphs of their related equations

**ITEM**

**10** The graph of a quadratic function is shown on the grid.




Which function is best represented by this graph?

**F** $f(x) = x^2 + 3x - 4$
**G** $f(x) = -x^2 - 3x + 4$
**H** $f(x) = x^2 - 3x - 4$
**J** $f(x) = -x^2 + 3x + 4$

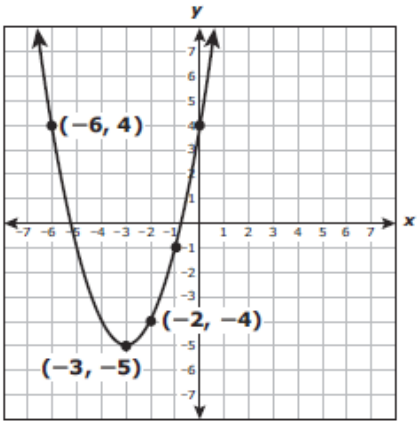
| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Real Solutions and Graph |
| **Concept** | Quadratic Function |
| **Process TEKS** | **A.1B, A.1D, A.1F** |

**Notes**

**TEKS A.7A Readiness Standard**
graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including *x*-intercept, *y*-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry

**ITEM**

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




What is the *y*-intercept of the graph of *f*?

Record your answer and fill in the bubbles on your answer document.

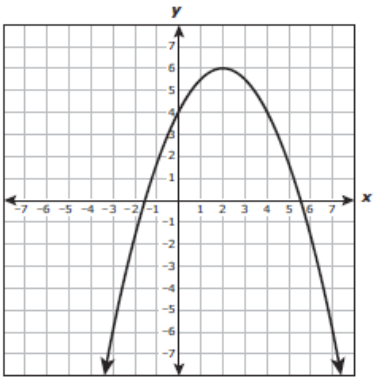
| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | *y*-intercept |
| **Concept** | Quadratic Function Key Features |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.7A Readiness Standard**
graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including *x*-intercept, *y*-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry

**ITEM**

**46** The graph of a quadratic function is shown on the grid.




Which equation best represents the axis of symmetry?

**F** $y = 6$
**G** $x = 2$
**H** $y = 4$
**J** $x = 0$

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Axis of Symmetry |
| **Concept** | Quadratic Function Key Features |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.7C Readiness Standard**
determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of $a$, $b$, $c$, and $d$

**ITEM**

**4** The graph of $f(x) = x$ was transformed to create the graph of $g(x) = (x - 7.5)^2$. Which of these describes this transformation?

**F** A horizontal shift to the right 7.5 units
**G** A horizontal shift to the left 7.5 units
**H** A vertical shift down 56.25 units
**J** A vertical shift up 56.25 units

| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | $f(x - c)$ |
| **Concept** | Effects of Graph |
| **Process TEKS** | **A.1A, A.1B, A.1G** |

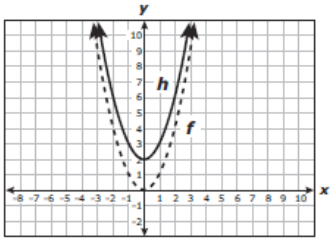
**Notes**

**TEKS A.7C Readiness Standard**
determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of $a$, $b$, $c$, and $d$

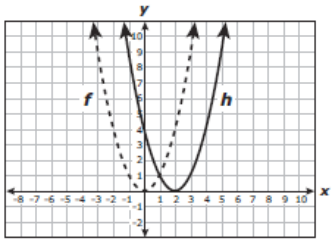
**ITEM**

**24** The graph of $f(x) = x^2$ is transformed to create the graph of $h(x) = 2f(x)$ . Which graph best represents f and $h$?

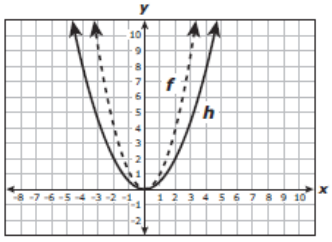
**F**



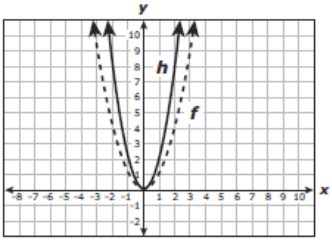

**H**




**G**




**J**




| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | $af(x)$ |
| **Concept** | Effects of Graph |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.8A Readiness Standard**
solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula

**ITEM**

**7** The total number of seats in an auditorium is modeled by $f(x) = 2x^2 - 6x$, where $x$ represents the number of rows of seats. How many rows are there in the auditorium if it has a total of 416 seats?

**A** 32
**B** 13
**C** 20
**D** 16

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | Factoring |
| **Concept** | Quadratic Equations |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.8A Readiness Standard**
solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula

**ITEM**

**34** What is the positive solution to the equation $0 = \frac{1}{3}x^2 - 3$?

Record your answer and fill in the bubbles on your answer document.

| Item Analysis | |
|---|---|
| **Verb** | Solve |
| **Using or Including** | Square Roots |
| **Concept** | Quadratic Equations |
| **Process TEKS** | **A.1B, A.1F** |

**Notes**

**TEKS A.8B Supporting Standard**
write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems

**ITEM**

**39** A projectile is launched into the air from the ground. The table shows the height of the projectile, $h(t)$, at different times.

Projectile Height

| Time (seconds) | Height (meters) |
|---|---|
| 5 | 1,353 |
| 10 | 2,460 |
| 15 | 3,323 |
| 20 | 3,940 |
| 25 | 4,313 |
| 30 | 4,440 |
| 35 | 4,323 |

Based on the table, which function can best be used to model this situation?

**A** $h(t) = 99t^2 + 858$
**B** $h(t) = 4.9t^2 + 295t + 0.6$
**C** $h(t) = 4.9t^2 + 295t + 2$
**D** $h(t) = 99t^2 + 1,470.3$

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Fit Data |
| **Concept** | Quadratic Equations |
| **Process TEKS** | **A.1A, A.1B, A.1E, A.1F** |

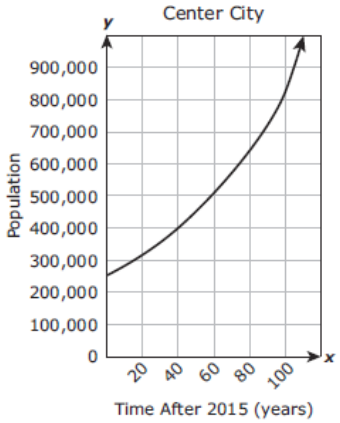
**Notes**

| Item Analysis | |
|---|---|
| **Verb** | |
| **Using or Including** | |
| **Concept** | |
| **Process TEKS** | |

**Notes**

**TEKS A.9A Supporting Standard**
determine the domain and range of exponential functions of the form $f(x) = ab^x$ and represent the domain and range using inequalities

**21** The population of Center City is modeled by exponential function $f$, where $x$ is the number of years after the year 2015. The graph of $f$ is shown on the grid.




Which inequality best represents the range of $f$ in this situation?

**A** $x \geq 0$
**B** $y \geq 250{,}000$
**C** $0 \leq x \leq 110$
**D** $250{,}000 \leq y \leq 1{,}000{,}000$

| Item Analysis | |
|---|---|
| **Verb** | Determine |
| **Using or Including** | Inequalities |
| **Concept** | Range |
| **Process TEKS** | **A.1A, A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.9B Supporting Standard**
interpret the meaning of the values of a and b in exponential functions of the form $f(x) = ab^x$ in real-world problems

**31** A student used $f(x) = 5.00(1.012)^x$ to show how the balance in a savings account will increase over time. What does the 5.00 represent?

**A** The interest the savings account earned for the first year
**B** The annual interest rate of the savings account
**C** The number of years the savings account has earned interest
**D** The starting balance of the savings account

| Item Analysis | |
|---|---|
| **Verb** | Interpret |
| **Using or Including** | Real-World Problems |
| **Concept** | Exponential Functions Meaning of $a$ |
| **Process TEKS** | **A.1A, A.1B, A.1G** |

**Notes**

**TEKS A.9C Readiness Standard**
write exponential functions in the form $f(x) = ab^x$ (where $b$ is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay

**15** A particular type of cell doubles in number every hour. Which function can be used to find the number of cells present at the end of $h$ hours if there are initially 4 of these cells?

**F** $n = 4(\frac{1}{2})^h$
**G** $n = 4(2)^h$
**H** $n = 4 + (2)^h$
**J** $n = 4 + (\frac{1}{2})^h$

| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Growth |
| **Concept** | Exponential Functions |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.9C Readiness Standard**
write exponential functions in the form $f(x) = ab^x$ (where $b$ is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay

**ITEM**
**35** The amount of fertilizer in a landscaping company's warehouse decreases at a rate of 3% per week. The amount of fertilizer in the warehouse was originally 78,000 cubic yards.

Which function models the amount of fertilizer in cubic yards left after w weeks?

**A** $f(w) = 0.97(78{,}000)^w$
**B** $f(w) = 1.03(78{,}000)^w$
**C** $f(w) = 78{,}000(0.97)^w$
**D** $f(w) = 78{,}000(1.03)^w$

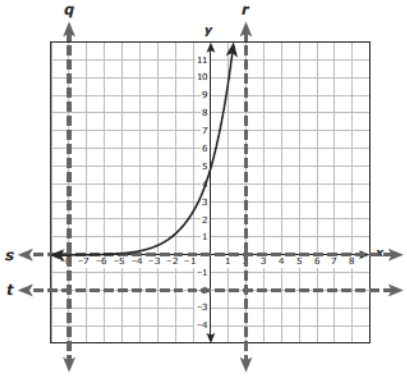
| Item Analysis | |
|---|---|
| **Verb** | Write |
| **Using or Including** | Decay |
| **Concept** | Exponential Functions |
| **Process TEKS** | **A.1A, A.1B, A.1F** |

**Notes**

**TEKS A.9D Readiness Standard**
graph exponential functions that model growth and decay and identify key features, including *y*-intercept and asymptote, in mathematical and real-world problems

**ITEM**

**8** The graph of an exponential function is shown on the grid.




Which dashed line is an asymptote for the graph?

**F** Line *q*
**G** Line *r*
**H** Line *s*
**J** Line *t*

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Asymptote |
| **Concept** | Exponential Functions Key Features |
| **Process TEKS** | **A.1B, A.1E, A.1F** |

**Notes**

**TEKS A.9D Readiness Standard**
graph exponential functions that model growth and decay and identify key features, including *y*-intercept and asymptote, in mathematical and real-world problems

**ITEM**

**49** Which statement about the graph of $y = \frac{1}{3}(\frac{2}{3})^x$ is true?

**A** The graph has a vertical asymptote.
**B** The graph crosses the *y*-axis at $(0, \frac{2}{9})$.
**C** The graph has an asymptote at $y = \frac{1}{3}$.
**D** The graph decreases from left to right.

| Item Analysis | |
|---|---|
| **Verb** | Graph |
| **Using or Including** | Key Features |
| **Concept** | Exponential Functions |
| **Process TEKS** | **A.1B, A.1G** |

**Notes**

# Category 1
# Number and Algebraic Methods
# 11 Total Questions

| TEKS | Item | My Answer | Correct Answer | Process TEKS |
|---|---|---|---|---|
| **A.10A** add and subtract polynomials of degree one and degree two | **13** | | **A** | |
| **A.10B** multiply polynomials of degree one and degree two | **NT** | | | |
| **A.10C** determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend | **NT** | | | |
| **A.10D** rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property | **NT** | | | |
| **A.10E** factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two | **17** | | **C** | |
| | **28** | | **F** | |
| | **41** | | **A** | |
| **A.10F** decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial | **NT** | | | |
| **A.11A** simplify numerical radical expressions involving square roots | **1** | | **B** | |
| **A.11B** simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents | **6** | | **H** | |
| | **20** | | **-14** | |
| | **51** | | **B** | |
| **A.12A** decide whether relations represented verbally, tabularly, graphically, and symbolically define a function | **38** | | **H** | |
| **A.12B** evaluate functions, expressed in function notation, given one or more elements in their domains | **47** | | **D** | |
| **A.12C** identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes | **22** | | **F** | |
| **A.12D** write a formula for the nth term of arithmetic and geometric sequences, given the value of several of their terms | **NT** | | | |
| **A.12E** solve mathematics and scientific formulas, and other literal equations, for a specified variable | **NT** | | | |

Shaded - Readiness TEKS, NT - Not Tested
Readiness TEKS - 5/11 questions

# Category 2
## Describing and Graphing Linear Functions, Equations, and Inequalities
## 12 Total Questions

| TEKS | Item | My Answer | Correct Answer | Process TEKS |
|---|---|---|---|---|
| **A.3A** 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 $y - y_1 = m(x - x_1)$ | **16** | | **J** | |
| **A.3B** calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems | **26** | | **F** | |
| | **52** | | **F** | |
| **A.3C** graph linear functions on the coordinate plane and identify key features, including $x$-intercept, $y$-intercept, zeros, and slope, in mathematical and real-world problems | **12** | | **G** | |
| | **32** | | **G** | |
| | **42** | | **-6** | |
| **A.3D** graph the solution set of linear inequalities in two variables on the coordinate plane | **3** | | **C** | |
| | **37** | | **B** | |
| **A.3E** 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 $d$ | **45** | | **A** | |
| **A.3F** graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist | **29** | | **C** | |
| **A.3G** estimate graphically the solutions to systems of two linear equations with two variables in real-world problems | **NT** | | | |
| **A.3H** graph the solution set of systems of two linear inequalities in two variables on the coordinate plane. | **NT** | | | |
| **A.4A** calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity a s a measure of the strength of the linear association | **19** | | **C** | |
| **A.4B** compare and contrast association and causation in real-world problems | **9** | | **D** | |
| **A.4C** write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems | **NT** | | | |

Shaded - Readiness TEKS, NT - Not Tested
Readiness TEKS - 7/12 questions

# Category 3
## Writing and Solving Linear Functions, Equations, and Inequalities
## 14 Total Questions

| TEKS | Item | My Answer | Correct Answer | Process TEKS |
|---|---|---|---|---|
| **A.2A** 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 | **5** | | **B** | |
| | **44** | | **F** | |
| **A.2B** 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 | **23** | | **C** | |
| **A.2C** write linear equations in two variables given a table of values, a graph, and a verbal description | **33** | | **A** | |
| | **50** | | **H** | |
| **A.2D** write and solve equations involving direct variation | **27** | | **17.5** | |
| **A.2E** write the equation of a line that contains a given point and is parallel to a given line | **NT** | | | |
| **A.2F** write the equation of a line that contains a given point and is perpendicular to a given line | **NT** | | | |
| **A.2G** 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 | **36** | | **J** | |
| **A.2H** write linear inequalities in two variables given a table of values, a graph, and a verbal description | **25** | | **B** | |
| **A.2I** write systems of two linear equations given a table of values, a graph, and a verbal description | **2** | | **F** | |
| | **48** | | **F** | |
| **A.5A** 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 | **11** | | **C** | |
| | **40** | | **J** | |
| **A.5B** 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 | **NT** | | | |
| **A.5C** solve systems of two linear equations with two variables for mathematical and real-world problems | **18** | | **G** | |
| | **54** | | **G** | |

Shaded - Readiness TEKS, NT - Not Tested
Readiness TEKS - 10/14 questions

# Category 4
# Quadratic Functions and Equations
# 11 Total Questions

| TEKS | Item | My Answer | Correct Answer | Process TEKS |
|---|---|---|---|---|
| **A.6A** determine the domain and range of quadratic functions and represent the domain and range using inequalities | **30** | | **G** | |
| | **53** | | **C** | |
| **A.6B** write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax^2 + bx + c$) | **43** | | **D** | |
| **A.6C** write quadratic functions when given real solutions and graphs of their related equations | **10** | | **G** | |
| **A.7A** graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including *x*-intercept, *y*-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry | **14** | | **4** | |
| | **46** | | **G** | |
| **A.7B** describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions | **NT** | | | |
| **A.7C** determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of $a$, $b$, $c$, and $d$ | **4** | | **F** | |
| | **24** | | **J** | |
| **A.8A** solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula | **7** | | **D** | |
| | **34** | | **3** | |
| **A.8B** write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems | **39** | | **B** | |

Shaded - Readiness TEKS, NT - Not Tested
Readiness TEKS - 8/11 questions

# Category 5
# Exponential Functions and Equations
# 6 Total Questions

| TEKS | Item | My Answer | Correct Answer | Process TEKS |
|---|---|---|---|---|
| **A.9A** determine the domain and range of exponential functions of the form $f(x) = ab^x$ and represent the domain and range using inequalities | **21** | | **B** | |
| **A.9B** interpret the meaning of the values of a and b in exponential functions of the form $f(x) = ab^x$ in real-world problems | **31** | | **D** | |
| **A.9C** write exponential functions in the form $f(x) = ab^X$(where $b$ is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay | **15** | | **B** | |
| | **35** | | **C** | |
| **A.9D** graph exponential functions that model growth and decay and identify key features, including $y$-intercept and asymptote, in mathematical and real-world problems | **8** | | **H** | |
| | **49** | | **D** | |
| **A.9E** write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems. | **NT** | | | |

Shaded - Readiness TEKS, NT - Not Tested
Readiness TEKS - 4/6 questions