STAAR CONNECTION™

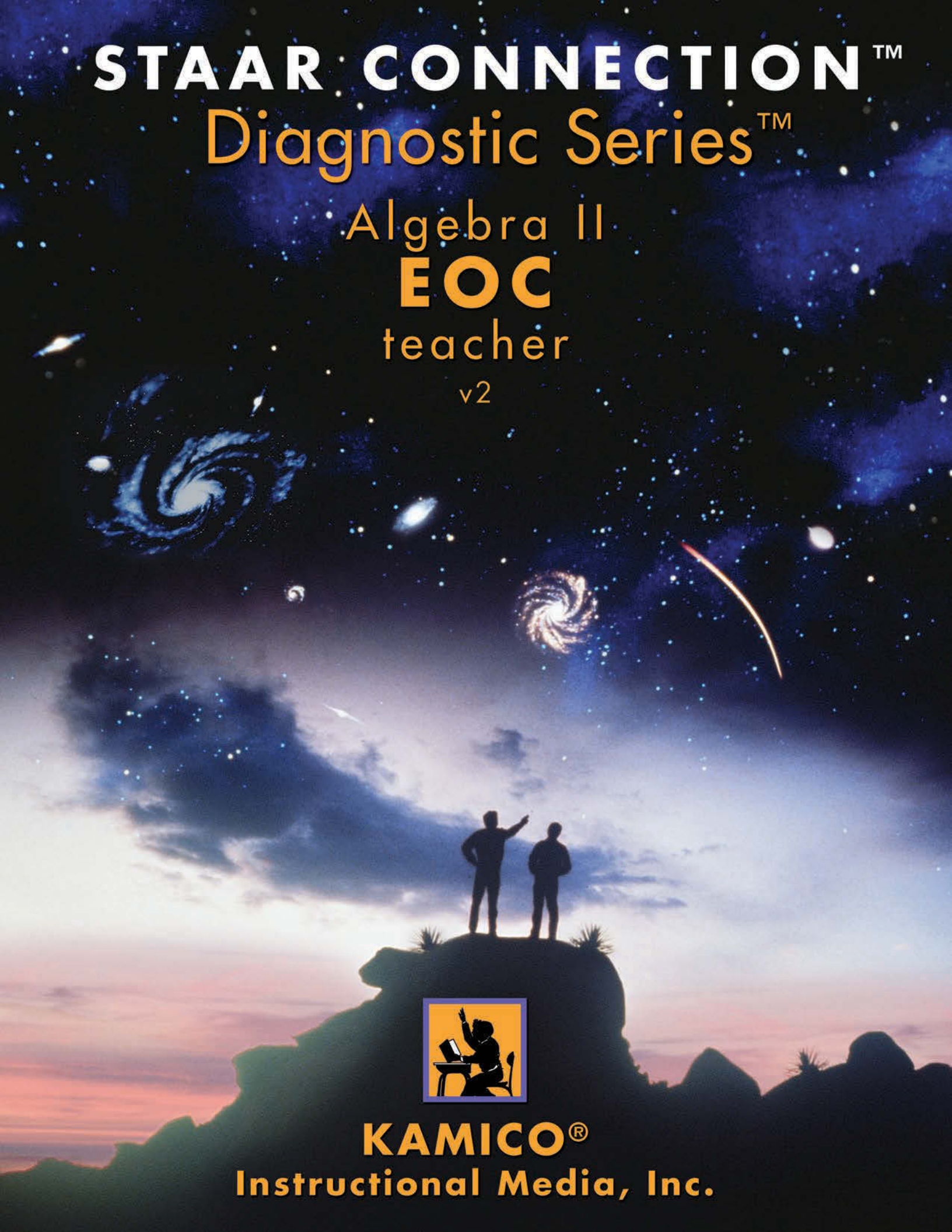
Diagnostic Series™

Algebra II

EOC

teacher

v2



KAMICO®
Instructional Media, Inc.

STAAR CONNECTION™

Algebra II
EOC
teacher

Diagnostic Series™

XVI/ix/MMXXVI
Version 2.1



KAMICO®
Instructional Media, Inc.

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KAMICO® Instructional Media, Inc.
CONNECTION® to the TEKS
Introduction

KAMICO® Instructional Media's program is validated by scientifically based research. **STAAR CONNECTION™ Diagnostic Series™** and **CONNECTION® to the TEKS Developmental Series™** can be used in tandem to ensure mastery of Texas reporting categories and TEKS. The *Diagnostic Series™* consists of a bank of assessments. Each assessment covers a mixture of reporting categories and TEKS. This research-based format provides continual reinforcement for and ensures retention of mastered concepts. To take full advantage of this series, administer an assessment to students. After they have completed the assessment, use it as an instructional tool. Go over each item with the class, discussing all correct and incorrect answers. Then, use the assessment as a diagnostic tool to determine a standard for which students need remediation. Find that standard in the *Developmental Series™*.

Each book in the **CONNECTION® to the TEKS Developmental Series™** consists of instructional activities and assessments over isolated TEKS to allow for the remediation and development of specific TEKS. For every TEKS, there is at least one individual or group activity. The activities provide a fun, challenging, yet nonthreatening, way to develop mastery of the TEKS. In addition to these activities, each *Developmental Series™* book contains assessments on isolated TEKS to be used to identify mastery or the need for further skill development or reinforcement. Continue to alternate between the **STAAR CONNECTION™ Diagnostic Series™** and the **CONNECTION® to the TEKS Developmental Series™**.

KAMICO's **Game Gallery®** consists of over 300 board games in English and in Spanish. These games create a game-based learning environment to facilitate additional reinforcement of TEKS.

KAMICO® Instructional Media, Inc., supports efforts to ensure adequate yearly progress and eliminate surprises in high-stakes test results.

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KAMICO® Instructional Media, Inc.
STAAR CONNECTION™
Diagnostic Series™
EOC Algebra II
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Mathematical Process Standards

These student expectations will not be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.

(2A.1) **Mathematical process standards**. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Reporting Category 1:
Number and Algebraic Methods

The student will demonstrate an understanding of how to use algebraic methods to manipulate numbers, expressions, and equations.

(2A.7) **Number and algebraic methods.** The student applies mathematical processes to simplify and perform operations on expressions and to solve equations. The student is expected to

(A) add, subtract, and multiply complex numbers; ***Supporting Standard***

(B) add, subtract, and multiply polynomials; ***Supporting Standard***

(C) determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two; ***Supporting Standard***

(D) determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods; ***Supporting Standard***

(E) determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping; ***Readiness Standard***

(F) determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two; ***Readiness Standard***

(G) rewrite radical expressions that contain variables to equivalent forms; ***Supporting Standard***

(H) solve equations involving rational exponents; and ***Readiness Standard***

(I) write the domain and range of a function in interval notation, inequalities, and set notation. ***Supporting Standard***

Reporting Category 2:
Describing and Graphing Functions and Their Inverses

The student will demonstrate an understanding of how to describe and graph various functions and their inverses.

(2A.2) **Attributes of functions and their inverses.** The student applies mathematical processes to understand that functions have distinct key attributes and understand the relationship between a function and its inverse. The student is expected to

(A) graph the functions $f(x) = \sqrt{x}$, $f(x) = 1/x$, $f(x) = x^3$, $f(x) = \sqrt[3]{x}$, $f(x) = b^x$, $f(x) = |x|$, and $f(x) = \log_b(x)$ where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval; ***Readiness Standard***

(B) graph and write the inverse of a function using notation such as $f^{-1}(x)$; ***Supporting Standard***

(C) describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range; and ***Readiness Standard***

(D) use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other. ***Supporting Standard***

(2A.8) **Data.** The student applies mathematical processes to analyze data, select appropriate models, write corresponding functions, and make predictions. The student is expected to

(A) analyze data to select the appropriate model from among linear, quadratic, and exponential models; ***Supporting Standard***

(B) use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data; and ***Supporting Standard***

(C) predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models. ***Readiness Standard***

Reporting Category 3:
Writing and Solving Systems of Equations and Inequalities

The student will demonstrate an understanding of how to write and solve systems of equations and inequalities.

(2A.3) **Systems of equations and inequalities.** The student applies mathematical processes to formulate systems of equations and inequalities, use a variety of methods to solve, and analyze reasonableness of solutions. The student is expected to

(A) formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic; ***Readiness Standard***

(B) solve systems of three linear equations in three variables by using Gaussian elimination, technology with matrices, and substitution; ***Readiness Standard***

(C) solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation; ***Supporting Standard***

(D) determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables; ***Supporting Standard***

(E) formulate systems of at least two linear inequalities in two variables; ***Supporting Standard***

(F) solve systems of two or more linear inequalities in two variables; and ***Supporting Standard***

(G) determine possible solutions in the solution set of systems of two or more linear inequalities in two variables. ***Supporting Standard***

Reporting Category 4:
Quadratic and Square Root Functions, Equations, and Inequalities

The student will demonstrate an understanding of how to describe, write, and solve quadratic and square root functions, equations, and inequalities.

(2A.4) **Quadratic and square root functions, equations, and inequalities.** The student applies mathematical processes to understand that quadratic and square root functions, equations, and quadratic inequalities can be used to model situations, solve problems, and make predictions. The student is expected to

(A) write the quadratic function given three specified points in the plane; ***Supporting Standard***

(B) write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening; ***Readiness Standard***

(C) determine the effect on the graph of $f(x) = \sqrt{x}$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(bx)$, and $f(x - c)$ for specific positive and negative values of a, b, c, and d; ***Readiness Standard***

(D) transform a quadratic function $f(x) = ax^2 + bx + c$ to the form $f(x) = a(x - h)^2 + k$ to identify the different attributes of $f(x)$; ***Supporting Standard***

(E) formulate quadratic and square root equations using technology given a table of data; ***Supporting Standard***

(F) solve quadratic and square root equations; ***Readiness Standard***

(G) identify extraneous solutions of square root equations; and ***Supporting Standard***

(H) solve quadratic inequalities. ***Supporting Standard***

Reporting Category 5:
Exponential and Logarithmic Functions and Equations

The student will demonstrate an understanding of how to describe, write, and solve exponential and logarithmic functions and equations.

(2A.5) **Exponential and logarithmic functions and equations.** The student applies mathematical processes to understand that exponential and logarithmic functions can be used to model situations and solve problems. The student is expected to

(A) determine the effects on the key attributes on the graphs of $f(x) = b^x$ and $f(x) = \log_b(x)$ where b is 2, 10, and e when $f(x)$ is replaced by $af(x)$, $f(x) + d$, and $f(x - c)$ for specific positive and negative real values of a, c, and d; ***Readiness Standard***

(B) formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation; ***Supporting Standard***

(C) rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations; ***Supporting Standard***

(D) solve exponential equations of the form $y = ab^x$ where a is a nonzero real number and b is greater than zero and not equal to one and single logarithmic equations having real solutions; and ***Readiness Standard***

(E) determine the reasonableness of a solution to a logarithmic equation. ***Supporting Standard***

Reporting Category 6:
Other Functions, Equations, and Inequalities

The student will demonstrate an understanding of how to describe, write, and solve cubic, cube root, absolute value, and rational functions, equations, and inequalities.

(2A.6) **Cubic, cube root, absolute value and rational functions, equations, and inequalities.** The student applies mathematical processes to understand that cubic, cube root, absolute value and rational functions, equations, and inequalities can be used to model situations, solve problems, and make predictions. The student is expected to

(A) analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d; ***Supporting Standard***

(B) solve cube root equations that have real roots; ***Supporting Standard***

(C) analyze the effect on the graphs of $f(x) = |x|$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d; ***Supporting Standard***

(D) formulate absolute value linear equations; ***Supporting Standard***

(E) solve absolute value linear equations; ***Readiness Standard***

(F) solve absolute value linear inequalities; ***Supporting Standard***

(G) analyze the effect on the graphs of $f(x) = 1/x$ when $f(x)$ is replaced by $af(x)$, $f(bx)$, $f(x - c)$, and $f(x) + d$ for specific positive and negative real values of a, b, c, and d; ***Supporting Standard***

(H) formulate rational equations that model real-world situations; ***Supporting Standard***

(I) solve rational equations that have real solutions; ***Readiness Standard***

(J) determine the reasonableness of a solution to a rational equation; ***Supporting Standard***

(K) determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation; and ***Supporting Standard***

(L) formulate and solve equations involving inverse variation. ***Readiness Standard***

Name _____ Date _____

1 What is the expression $(2i)^2 + 4i - \frac{10i^2}{i}$ in simplified form?

A $4i - 8i^2$

B $-4 - 6i$

C $4i - 4 + \frac{10}{i}$

D $4i - \frac{8i^2}{i}$

2 What is the solution to the equation $4x^{\frac{3}{4}} = 28x^{-\frac{1}{2}}$?

F $x = \sqrt[5]{2,401}$

G $x = \{0, 2,401\}$

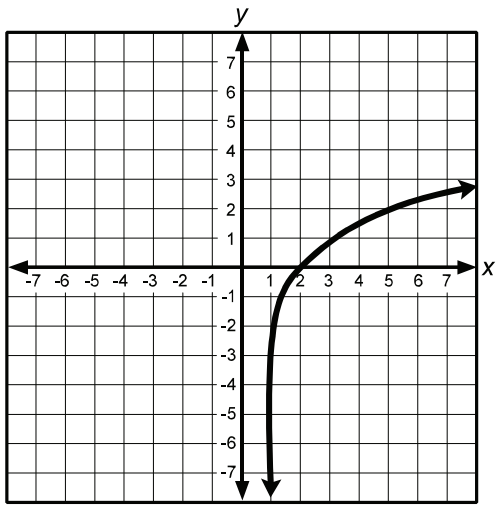
H $x = \sqrt[3]{\left(\frac{1}{5,764,801}\right)}$

J $x = \left\{-\sqrt[5]{2,401}, 0, \sqrt[5]{2,401}\right\}$

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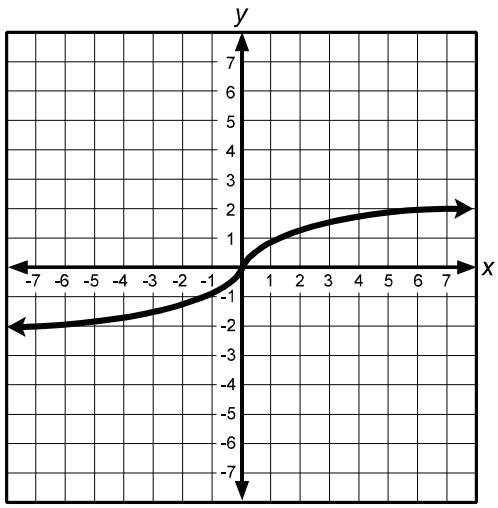
3 Which of the graphs represents the function $f(x) = \sqrt[3]{x}$? How many intercepts are there on this graph?

A



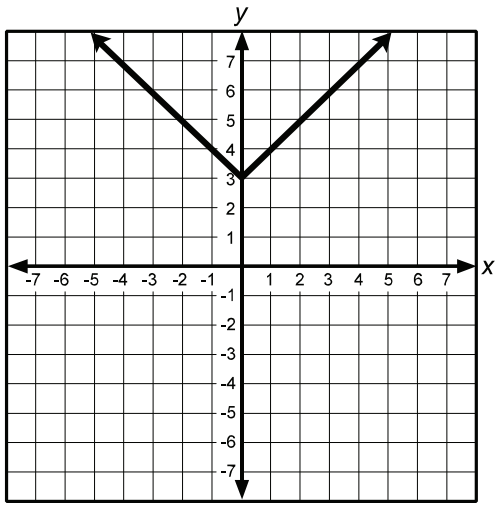
zero

C



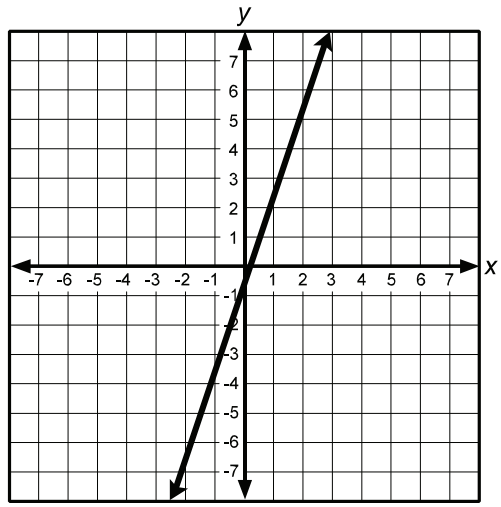
one

B



one

D



one

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4 Past and projected enrollment figures for Texas State University in San Marcos are given in the table.

Year	Enrollment
2005	27,129
2010	32,572
2014	36,790
2015	36,905
2016	37,339
2020	38,830
2025	40,604

Starting at $x = 1$ for 2005, which equation best fits the data?

F $y = 661.0674x + 28{,}446.6865$

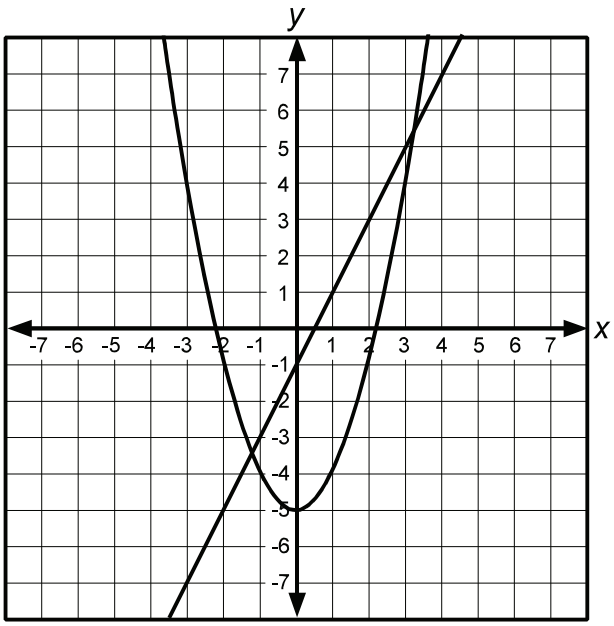
G $y = -30.6736x^2 + 1{,}335.8877x + 25{,}859.4267$

H $y = 28{,}606.8205(1.0197)^x$

J $y = 26{,}759.5964x^{0.1333}$

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5 Study the graph.



Formulate the system of equations represented by the graph.

A $y = x - 1$; $y = x^2 + 5$

B $y = 2x - 1$; $y = x^2 - 5$

C $y = 2x + 1$; $y = 5 - x^2$

D $y = 2x - 1$; $y = (x + 5)^2$

6 Study the data in the table.

x	$f(x)$
3	8
0	−10
−4	−6

Formulate the quadratic function that best fits the data.

F $f(x) = -10x^2 + 3x + 1$

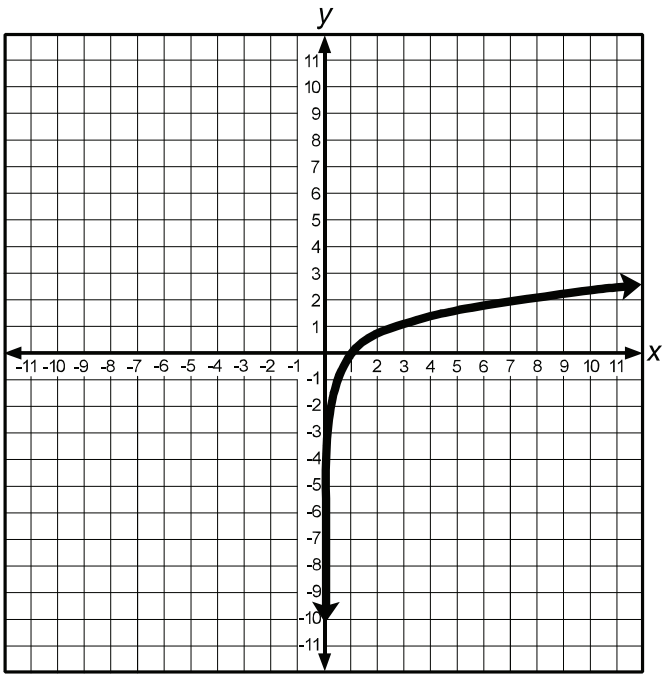
G $f(x) = x^2 - 3x + 10$

H $f(x) = x^2 + x - 10$

J $f(x) = x^2 + 3x - 10$

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7 The graph of $y = \ln x$ is shown.



What happens to the graph when x is replaced with $x - 5$?

A The graph is shifted 5 units to the left.

B The graph is shifted 5 units downward.

C The graph is shifted 5 units upward.

D The graph is shifted 5 units to the right.

8 Susan opens an account with $25,000 at 1.05% interest, compounded annually. One day, she checks the value of her investment and finds it has reached $28,350. About how long has Susan's account been open?

F 1 year

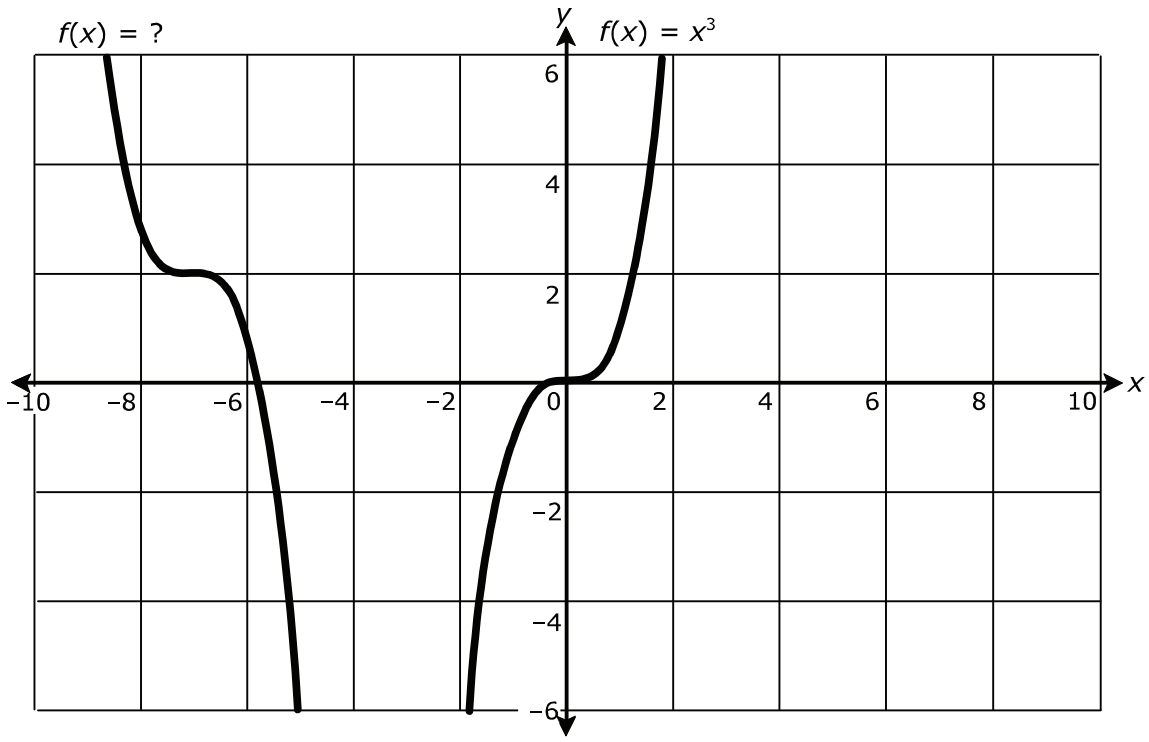
G 1.26 years

H 5.18 years

J 12 years

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9



Kianna was given the proceeding coordinate plane with the two curves graphed as shown. One of the curves is the representation of $f(x) = x^3$. The other function represented on the graph is an unknown function. Kianna is instructed to find the unknown function that represents the curve on the graph. Her teacher gives the following hints:

- The curve represents a transformation of the cubic parent function.
- The curve was not stretched or shrunk.
- The curve was reflected about the *y*-axis.
- The curve was translated horizontally and vertically.

If Kianna is correct, which function will she derive?

A $f(x) = -(x - 7)^3 + 2$

B $f(x) = (-x - 7)^3 + 2$

C $f(x) = (-x + 2)^3 - 7$

D $f(x) = -(x + 2)^3 - 7$

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10 A car is driven on a county road for 21.7 miles at a certain speed. The driver then merges onto a toll road and drives for 65 miles going 24 miles per hour faster than the speed driven on the county road. The trip takes a total of 1.2 hours. During the portion of the trip spent on the county road, how fast was the car driven?

F 70 mph

G 36.29 mph

H 48 mph

J 56 mph

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Student Name:

STAAR CONNECTION™
EOC Algebra II
Diagnostic Series Math

The following charts provide the correct answer to each assessment question, along with the corresponding reporting category, identification of readiness or supporting standard, content student expectation, and process student expectation.

Circle the number of any question that has been answered incorrectly. Circle the TEKS that need additional reinforcement.

Assessment 1

Item Number	Correct Answer	Reporting Category	Readiness or Supporting	Content Student Expectation (TEKS)	Process Student Expectation (TEKS)
1	B	1	Supporting	2A.7A	2A.1F
2	F	1	Readiness	2A.7H	2A.1F
3	C	2	Readiness	2A.2A	2A.1E
4	G	2	Supporting	2A.8B	2A.1C
5	B	3	Readiness	2A.3A	2A.1D
6	J	4	Supporting	2A.4A	2A.1D
7	D	5	Readiness	2A.5A	2A.1E
8	J	5	Readiness	2A.5D	2A.1A
9	B	6	Supporting	2A.6A	2A.1G
10	J	6	Readiness	2A.6I	2A.1B

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