STAAR MASTER®

Student Practice Book

Sample Booklet

Algebra I

Lori Mammen
Editorial Director

You know ECS from *TAAS MASTER*™ and *TAKS MASTER*®.
Rest assured. The content in the *STAAR MASTER*™ series is 100% new and developed according to the TEA test blueprints for STAAR™.

All *New!* Research-Based Series for Texas

For more than two decades, we have helped you achieve student success on Texas tests by providing the highest quality test-prep materials. With *STAAR MASTER*™, we continue our commitment to create research-based content that engages students and makes teaching easier.

- Based on eligible TEKS and STAAR test blueprints
- All new content with increased rigor
- Emphasis on readiness standards
- Assessment of process skills within context (mathematics, science, and social studies)
- More open-ended (griddable) items (mathematics and science)

Dear Texas Educator,

Since 1982, ECS Learning Systems has created quality K–12 teaching materials, training, and media. As a Texas-based publisher of the highest quality test-prep materials, we have always shared your commitment to lead your students to success on Texas tests—TEAMS, TAAS, TAKS, and now the STAAR™. With *STAAR MASTER*®, we continue our commitment to create research-based content that engages students and makes teaching easier.

As educators, we take developing new content seriously. As publishers, we have delivered quality and rigor in Texas testing materials for more than two decades.

Credible.

Developed based on TEA test blueprints.
Our product development process is based on the highest integrity standards. To create the new *STAAR MASTER* books, we used information provided by the Texas Education Agency (TEA) about the State of Texas Assessments of Academic Readiness (STAAR). Each *STAAR MASTER* book is 100% aligned to the Texas Essential Knowledge and Skills (TEKS) tested for the particular subject and grade level.

Authentic.

Reflects key characteristics of STAAR™.
Increased rigor: Items included in the *STAAR MASTER* books assess skills at a greater depth and level of cognitive complexity. Each item is identified by its level of cognitive complexity (low, moderate, high), with the majority of questions in each book falling within the moderate-high range.

Emphasis on readiness standards considered critical for success at a grade level: Items included in the *STAAR MASTER* books mirror the correct balance of readiness and supporting standards to provide meaningful, authentic practice for the STAAR.

More open-ended (griddable) items in math and science: *STAAR MASTER* math and science books include more griddable items so students can derive answers independently.

Assessment of process skills within context in math, science, and social studies: *STAAR MASTER* books reflect this important change. For example, most items in the math books assess both a knowledge skill and a process skill, with both skills identified for each item.

Fresh.

Includes brand-new material & strategies.

- Brand-new material in all books
- Range of topics to interest students
- Clear identification of tested skills
- Repeated practice in a variety of contexts
- Master list of standards and expectations
- Correlation charts for selected subjects
- Suggested teaching strategies
- Bibliography of research references
- Complete answer keys
- Clear, consistent layout

Sincerely,

Your ECS Team

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STAAR MASTER®

Student Practice Book
Algebra I

for the State of Texas Assessments
of Academic Readiness

Teacher Guide

Lori Mammen
Editorial Director

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The *STAAR MASTER* series includes new, challenging content to prepare students for the rigor of the STAAR. It's what you have come to expect from the most trusted source in Texas testing. Check our Web site often for the latest information at ecslearningsystems.com/staarmaster.

As you use *STAAR MASTER* in your classroom, we hope to hear from you! Send us your story and let us know:

- Why you need our product(s)
- How you use them in your classroom
- What outcomes and results you are experiencing

At ECS, we strive to provide educators like you with easy-to-use and effective materials that make teaching easier. We count it as a privilege to have you as a customer, and we hope that our products continuously exceed your expectations.

Please let us know how well the *STAAR MASTER* products worked in your classroom. Also, please spread the word—many of our new customers are referred by teachers like you.

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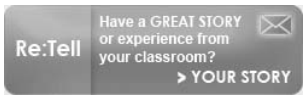
p.s. It's easy to share your story! Visit our Re:Think blog at ecslearningsystems.com/blog and click the Re:Tell button.



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What's Inside the Student Practice Book?

The *STAAR MASTER® Student Practice Book* provides practice and review material for the Algebra I portion of the State of Texas Assessments of Academic Readiness (STAAR™) End-of-Course (EOC) test.

- The practice items reflect the kinds of problems students might encounter on the actual STAAR EOC assessment.
- The practice items focus on the 2010 STAAR-eligible Algebra I Texas Essential Knowledge and Skills (Texas Education Agency, 2010c) standards.
- Each exercise is labeled for easy identification of the TEKS-based reporting category, standard, and expectation addressed in the practice items.
- Several exercises address the same standard/expectation, providing repeated practice for students in a variety of contexts.
- Selected problems are "griddable items" (*see* Figure 2), which reflects the format used randomly throughout the actual STAAR assessment.

Items in the *STAAR MASTER Student Practice Book* address the following algebra concepts:

- Functional relationships
- Properties and attributes of functions
- Linear functions
- Linear equations and inequalities
- Quadratic and other nonlinear functions

Exercise Skills Tags
Each exercise is labeled with a "skills tag" (*see* Figure 1, below) for easy identification of the TEKS-based standard and expectation addressed in the problems.

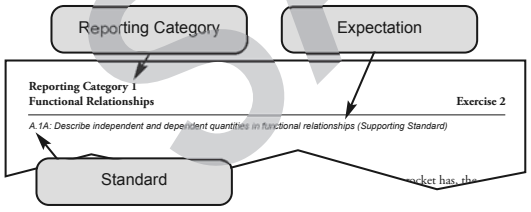

Figure 1: Exercise Skills Tag

Griddable Items
In addition to multiple-choice items, STAAR Mathematics EOC assessments will also use open-ended questions known as "griddable items" (Texas Education Agency, 2010e). This type of assessment question allows students to reach the answer without the influence of given answer choices. The STAAR Algebra I EOC assessment will likely include five griddable items. The answer grid will have eight columns, with a floating decimal point (*see* Figure 2, below). Correct answers can be positive or negative numbers that range from 0 to 9999999. To indicate their answer, students must appropriately enter the number in the boxes and then fill in the corresponding bubbles. Students will not grid the units (e.g., ft). It is acceptable to grid extra zeroes that do not affect the value of the correct answer.

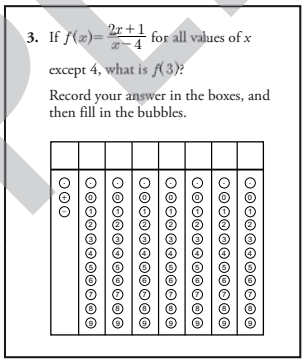

Figure 2: Griddable Item for Algebra

This Teacher Guide includes—

- an overview of the Student Practice Book and key characteristics of the STAAR program
- descriptions of complexity levels
- strategies for test preparation and mathematics instruction
- a master list of STAAR-eligible standards and expectations addressed in the Algebra I TEKS
- a complete answer key

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Readiness vs. Supporting Standards
The eligible, or tested, TEKS are divided into "readiness standards" and "supporting standards," with greater emphasis on the former. Readiness standards address broader, deeper ideas and are deemed more critical for students to know. Supporting standards address more narrowly defined ideas and will still be assessed, although not emphasized. The *STAAR MASTER® Student Practice Book* mirrors this balance of readiness and supporting standards to provide meaningful, authentic student practice for the STAAR™ assessment.

Increased Rigor
The STAAR program is described as "significantly more rigorous" (Texas Education Agency, 2010a) than the Texas Assessment of Knowledge and Skills (TAKS). But what does *rigor* mean in assessment? For the STAAR program, it means the cognitive complexity of items will increase to assess skills at a greater depth. Also, the test will include more griddable items, allowing students to arrive at answers independently through open-ended response. The *STAAR MASTER Student Practice Book* provides items written at varying levels of complexity to accommodate this increase in rigor. (Refer to the "Depth of Knowledge" and "Descriptions of Complexity Levels" sections on this page for more information about the levels of complexity in practice items.)

Alignment
According to the mandate of No Child Left Behind (2001), states are required to develop assessments that tightly align to their content standards. To ensure that this requirement is met, states and districts often conduct alignment studies. In such a study, an assessment is compared to the state's content standards. If an assessment is rigorous, the study will not yield large disparities between the cognitive demands of the expectations and those of the assessment.

Depth of Knowledge
Norman Webb's (2002a) "depth-of-knowledge" model is currently one of the most influential alignment models in the field of education. "Depth of knowledge" describes the degree of complexity of knowledge a curricular item requires. Webb identifies four levels of depth of knowledge: recall (Level 1), skill or concept (Level 2), strategic thinking (Level 3), and extended thinking (Level 4). Distinct cognitive demands occur during each activity, or thinking process, level.

Descriptions of Complexity Levels

The following descriptions provide an overview of complexity levels. Each explanation details the kinds of activities that occur within each level. However, they do not represent all of the possible thought processes for each level.

Low Complexity
Low-complexity items align with the TEKS at Level 1 of the Webb (2002a) model. Items of low complexity involve recall and reproduction. Activities and problems at this level require routine, single-step methods. An item may ask students to recognize or restate a fact, definition, or term and may require students to follow a basic procedure with clearly defined steps. At this cognitive level, students may need to apply a formula or perform a simple algorithm. A low-complexity item may ask students to identify, recognize, use, or measure information and concepts.

Moderate Complexity
Moderate-complexity items align with the TEKS at Level 2 of the Webb model. Items of moderate complexity involve both comprehension and the subsequent processing of information. Activities at this level demand more than one step in the reasoning process. Students are asked to determine how to best solve the problem. Items may involve using a model to solve a problem. At this cognitive level, students may need to visualize for tasks such as extending patterns and determining nonexamples. Items may involve interpreting information from a simple graph, table, or diagram. Items of this complexity may ask students to classify, organize, observe, collect and display data, or compare data. Some items also require students to apply low-complexity skills and concepts.

High Complexity
High-complexity items align with the TEKS at Level 3 and/or Level 4 of the Webb model*. Items of high complexity require students to use strategic, multi-step thinking; develop a deeper understanding of the information; and extend thinking. The problems at this level are non-routine and more abstract. Students are asked to demonstrate more flexible thinking, apply prior knowledge, make and test conjectures, and support their responses. High-complexity items may require students to make generalizations from patterns and interpret systems of equations. Items may involve interpreting information from a complex graph, table, or diagram. At this cognitive level, students will need to justify the reasonableness of a solution process when more than one solution exists. Students will use concepts to solve and explain problems. A high-complexity item may ask students to plan, reason,

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explain, compare, differentiate, draw conclusions, cite evidence, analyze, synthesize, apply, or prove. Some items also require students to apply low- and/or moderate-complexity skills and concepts.

*Note: Although state standards may include expectations that require extended thinking, many large-scale assessment activities are not classified as Level 4. Performance and open-ended assessment may require activities at Level 4.

How to Use This Book

Effective Test Preparation
What is the most effective way to prepare students for any mathematics competency test? Experienced educators know that the best test preparation includes three critical components—

- a strong curriculum that is aligned with the content and skills to be assessed
- effective, relevant, and varied instructional methods that allow students to learn content and skills in many different ways
- targeted practice that familiarizes students with the specific content and format of the test

Obviously, a strong curriculum and effective, relevant, and varied instructional methods provide the foundation for all appropriate test preparation. Contrary to what some might believe, merely "teaching the test" performs a great disservice to students. Students must acquire knowledge, practice skills, and have specific educational experiences that can never be included on tests limited by time and in scope. For this reason, resources like the *STAAR MASTER® Student Practice Book* should never become the heart of the curriculum or replace strong instructional methods.

Targeted Practice
The *STAAR MASTER Student Practice Book* does, however, address the final element of effective test preparation (targeted test practice). This book familiarizes students with—

- the specific content of Texas' competency tests
- the general format of competency tests

When students become familiar with both the content and the format of a test, they know what to expect on the actual test. This, in turn, improves their chances for success.

Using *STAAR MASTER®* Products
Used as part of the regular curriculum, the *STAAR MASTER Student Practice Book* allows teachers to—

- pretest skills students need for the actual test
- determine students' areas of strength and/or weakness
- provide meaningful test-taking practice for students
- ease students' test anxiety
- communicate test expectations and content to parents

Other Suggestions for Instruction

The *STAAR MASTER Student Practice Book* can serve as a springboard for other effective instructional activities that help with test preparation.

Group Work
Teachers and students can work through selected practice exercises together, noting the kinds of problems and range of problem-solving techniques. They should discuss common errors for each kind of question and strategies for avoiding these errors.

Formulating Answers
Teachers may encourage students to use scratch work to formulate their own answers on paper rather than simply using mental math or guessing based on the given answer choices. After solving a problem on their own, students can read the given answer choices and determine which one, if any, matches the answer they have recorded. If they cannot find their solution among the given answer choices, they can refer to their scratch work and determine their error.

Developing Test Problems
Teachers may create additional problems that cover skills in a different way than those provided in the exercises. Teachers and students can also select "test-type" problems from other assigned math exercises.

Developing Fundamental Understanding
Teachers can promote the recognition of mathematics in everyday life by developing problems relevant to students' daily experiences in the classroom and at home. Working through problems that relate directly to students' experiences fosters understanding of underlying processes and mathematical tools.

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Mathematics Vocabulary

To perform their best on any mathematics assessment, students must understand the vocabulary of mathematics. The following list includes many of the mathematics words that students will encounter on the STAAR™ EOC assessment.

Note: When a vocabulary term is addressed in multiple reporting categories, it is grouped with the reporting category in which it is either emphasized or introduced in the eligible TEKS.

Reporting Category 1: Functional Relationships
algebraic equation
algebraic expression
amount
approximate
convert
coordinate
coordinate grid
data
data set
decimal
denominator
dependent
description
diagram
equality
equation
equivalent
equivalent fraction
exponent
exponential notation
expression
fraction
fraction bar
fractional part
function
functional
graph
grid
improper fraction
independent
inequality
integer
interpret
mixed number
model
number sentence
numerator
plane
prediction
quadrant
quantity
ratio
rational number
relationship
represent
results
scientific notation
square root
table
unit rate
value

Reporting Category 2: Properties and Attributes of Functions
associative property
attribute
commutative property
continuous
correlation
discrete
distributive property
domain
equation notation
estimate
factor
function notation
generalization
linear
negative
non-proportional relationship
parent functions
pattern
polynomial expression
positive
property
proportional relationship
quadratic
range
rate of change
reasonable
scatterplot
simplify
solve
symbol
term
transform
unknown
variable

Reporting Category 3: Linear Functions
attribute
diagonal
dilation
direct variation
enlargement
given
intercept
intersecting lines
line
linear function
number line
ordered pairs
parameters
point
proportional change
rate of change
reduction
slope
transformation
x-axis
x-intercept
y-axis
y-intercept
zeros

Reporting Category 4: Linear Equations and Inequalities
algebraic method
formula
linear equation
perspective
relative
scale
scale model
solution
systems of linear equations

Reporting Category 5: Quadratic and Other Nonlinear Functions
actual
average
experimental
exponential decay
exponential growth
horizontal intercept
invalid
inverse variation
laws of exponents
nonlinear
nonlinear function
probability
quadratic equation
quadratic function
root
vertical intercept

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Answer Key

Exercise 21
1. B **2.** C **3.** D

Exercise 22
1. D **2.** C **3.** D

Exercise 23
1. C **2.** C

Exercise 24
1. B **2.** D **3.** D

Exercise 25
1. A **2.** C **3.** C

Exercise 26
1. B **2.** D **3.** D

Exercise 27
1. B **2.** D

Exercise 28
1. C **2.** D **3.** D

Exercise 29
1. D **2.** D **3.** B

Exercise 30
1. C **2.** A **3.** B **4.** A

Exercise 40
1. B **2.** D **3.** A

Exercise 41
1. B **2.** D **3.** C

Exercise 42
1. C **2.** D **3.** A

Exercise 43
1. D

Exercise 44
1. D **2.** B **3.** C **4.** C

Exercise 45
1. C **2.** B **3.** D **4.** A

Exercise 46
1. B **2.** D **3.** A

Reporting Category 4

Exercise 1

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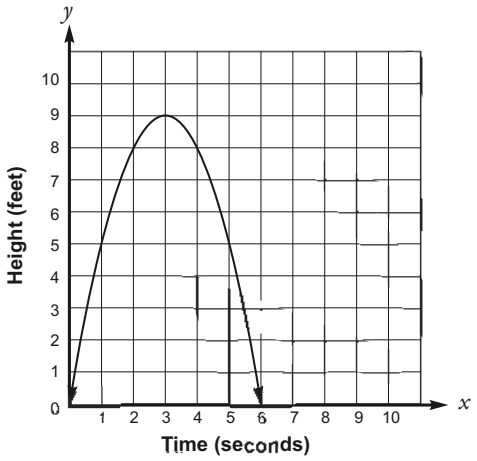
Functional Relationships **Exercise 1**

A.1A: Describe independent and dependent quantities in functional relationships (Supporting Standard)

1. If Jane inserts $0.75 into a vending machine, she will receive a soda. If she inserts $0.50 into the same machine, she will receive a bag of chips. Which best represents the independent variable in this situation?

A Chips
B Money
C Soda
D Vending machine

2. Look at the graph below.



Which best represents the dependent quantity?

A Height
B One foot
C Time
D Two seconds

3. Which description below best represents a relationship between an independent and a dependent quantity?

A A car's size is dependent upon how much it costs.
B The speed of a ball is dependent upon how high the ball travels.
C The grade a student receives is dependent upon how tall the student is.
D The size of a balloon is dependent upon the amount of air put into the balloon.

4. A farmer charges x dollars for each ear of corn he sells. If he sells n ears of corn, he will make nx dollars. Which expression below best represents the independent quantity in this situation?

A n
B x
C nx
D $x - n$

5. A copier can print 32 pages every minute. What is the independent variable in this situation?

A Paper
B Copier
C Minutes
D Number of pages

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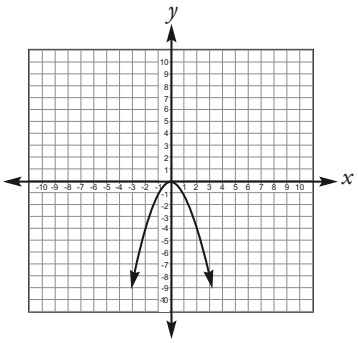
Reporting Category 2
Properties and Attributes of Functions **Exercise 3**

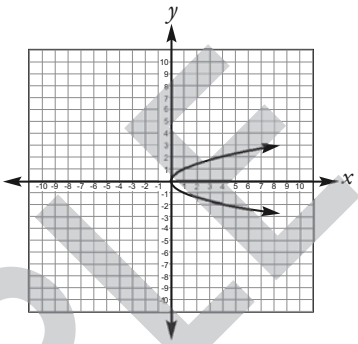
A.2A: Identify and sketch the general forms of linear (y = x) and quadratic ($y = x^2$) parent functions (Supporting Standard)

1. If the graph of $y = x^2$ is reflected across the *x*-axis, the resulting graph will look like which of the following?

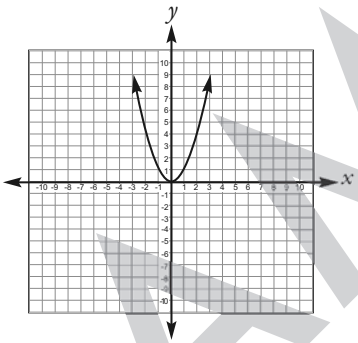
A



C



B



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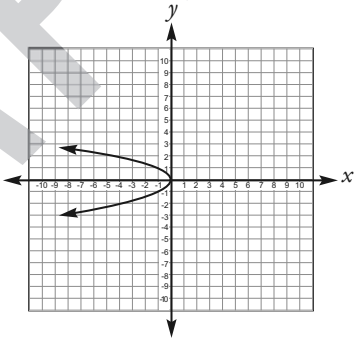

2. Which equation includes the range values $\{-4, 0, 2, 4\}$ for the domain $\{2, 0, 1, 4\}$?

A $y = 5x + 1$
B $y = 3x - 2$
C $y = -4x - 4$
D $y = -2x + 4$

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Reporting Category 3
Linear Functions **Exercise 13**

A.6A: Develop the concept of slope as rate of change, and determine slopes from graphs, tables, and algebraic representations (Supporting Standard)

1. The table below gives values of x and y that lie on the graph of a particular linear function.

x	–6	–3	3	12	18
y	–6	–2	6	18	26

What is the slope of the linear function in the table?

A 6

B $\frac{3}{4}$

C $\frac{4}{3}$

D 4

2. The points $(4n, 2n)$ and $(5n, 8n)$ lie on a line. If n is a nonzero number, what is the slope of the line?

A $\frac{1}{6}$

B $\frac{n}{6}$

C 6

D $6n$

3. Determine the slope of the graph of the linear equation $-3x - 6y = 5$.

Record your answer in the boxes, and then fill in the bubbles.

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Reporting Category 4
Linear Equations and Inequalities **Exercise 2**

A.7A: Analyze situations involving linear functions, and formulate linear equations or inequalities to solve problems (Supporting Standard)

1. A taxi cab charges \$2.25 for the first mile and \$0.35 for every $\frac{1}{4}$ mile traveled after that. Which of the following equations will **NOT** give the total cost, c, of traveling in a taxi for m miles?

A $c = 0.85 + 1.40m$
B $c = 2.25 + 1.40(m - 1)$
C $c = 2.25 + 0.35(4m - 4)$
D $c = 2.25 + \frac{0.35(m - 1)}{4}$

2. Jane is traveling to her grandmother's house, which is 14.4 miles away. After 5 minutes, she has traveled 4 miles. If she continues at the same pace, which of the following equations can Jane use to find d, the remaining distance in miles, to her grandmother's house t minutes after the first 5 minutes she has been traveling?

A $d = 10.4 - 0.8t$
B $d = 14.4 - 48t$
C $d = 4 + 0.8t$
D $d = 4 + 48t$

3. An airplane can travel at least 50 miles per hour faster than 8 times the speed of a car. If a car can travel m miles per hour, which of the following inequalities can be used to find v, the speed of the airplane?

A $v \geq 400m$
B $v \geq 8m + 50$
C $v \geq 8m - 50$
D $v \geq 50m + 8$

4. Rohan makes \$10.50 an hour filing papers at a doctor's office and \$15 an hour tutoring mathematics. If he works x hours at the doctor's office and y hours tutoring, which of the following inequalities will describe the number of hours Rohan needs to work in each job to make at least \$1,000?

A $25.50(x + y) \geq 1{,}000$
B $15x + 10.50y \geq 1{,}000$
C $10.50x + 15y = 1{,}000$
D $10.50x + 15y \geq 1{,}000$

5. A local gym has a rock-climbing wall. The gym charges a one-time training fee of \$18, plus \$7 per climb. Which of the following equations will give the total cost, C, of climbing the wall x times?

A $C = 25x$
B $C = 18 - 7x$
C $C = 18 + 7x$
D $C = 7 + 18x$

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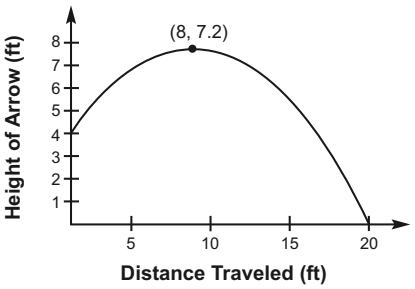
Reporting Category 5
Quadratic and Other Nonlinear Functions **Exercise 14**

A.9D: Analyze graphs of quadratic functions, and draw conclusions (Readiness Standard)

1. At an archery competition, David shot an arrow from 4 feet high and hit the target on the ground exactly 20 feet away, as shown below.



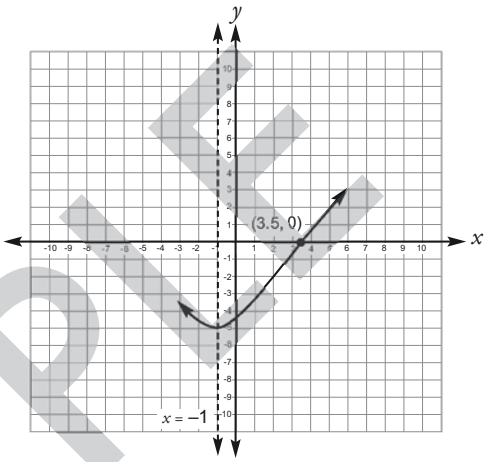
The equation $y = -0.05(x^2 + bx + c)$ models the path of the arrow. What is the value of b in this equation?

A $b = 8$
B $b = -8$
C $b = 16$
D $b = -16$

2. Which of the following equations has a graph with a minimum value?

A $y = -2x^2 + 4x + 5$
B $y = -(x - 2)(x + 4)$
C $y = (3 - 2x)(x + 5)$
D $y = (5 - 3x)(2 - x)$

3. Part of a quadratic function with one x-intercept at (3.5, 0) and an axis of symmetry of $x = -1$ is graphed below.



Find the x-coordinate of the other x-intercept.

Record your answer in the boxes, and then fill in the bubbles.

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