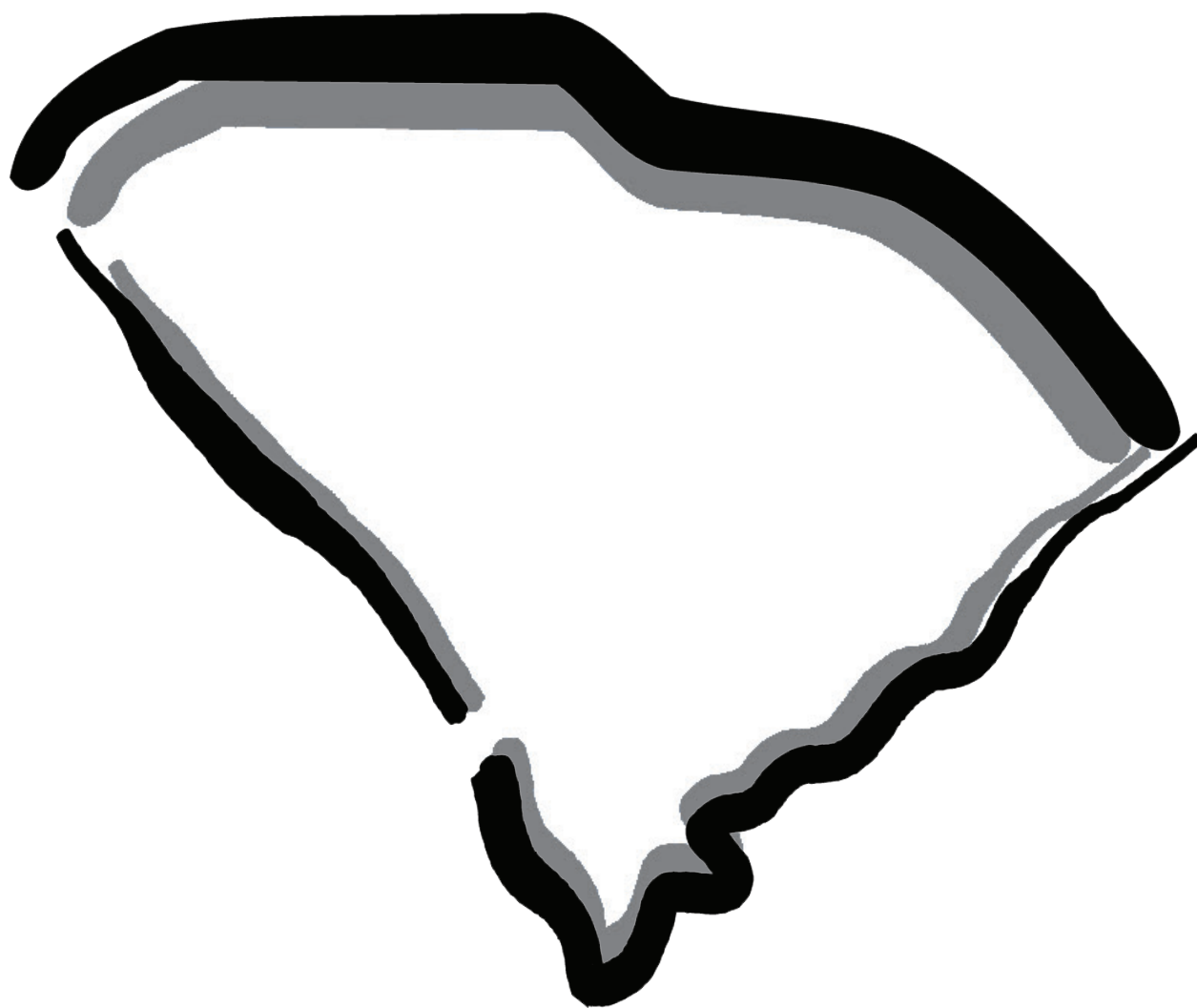


South Carolina End of Course Examination Program



Algebra 1

SAMPLE ITEMS

Introduction

The South Carolina Department of Education provides districts and schools with tools to assist in delivering focused instruction aligned with the South Carolina College- and Career-Ready Standards (SCCCRS). This document contains a set of twenty End-of-Course Examination Program (EOCEP) Algebra 1 test items that have been written to align with the South Carolina College- and Career-Ready Standards. These items were reviewed for content and bias prior to being field tested and approved for release to the public.

Purpose

This document is intended to be a resource for educators; it is not designed to be a practice test for students. The sample items are examples of college- and career-ready assessment items. These items were chosen to reflect the increased rigor of assessing the South Carolina College- and Career-Ready Standards which includes the Mathematical Process Standards. The EOCEP assesses content standards in a variety of ways. This document does not include all item types or standards.

Item Information Format

Standard Alignment	SCCCR
Standard Description	text from SCCCR
Answer Key	correct answer
Depth of Knowledge	cognitive demand
Estimated Difficulty	estimate based on student responses

Links

South Carolina College- and Career-Ready Standards

<https://ed.sc.gov/instruction/standards-learning/mathematics/standards/>

Norman Webb's Depth-of-Knowledge for the Four Content Areas

<http://www.webbalign.org/Webbs-DOK-Levels-Summary.pdf>

1. The density of an object is related to its mass and volume. The equation below shows the relationship between density (d), mass (m), and volume (V).

$$d = \frac{m}{V}$$

Which equation represents the volume of an object in relation to its density and mass?

A. $V = d - m$

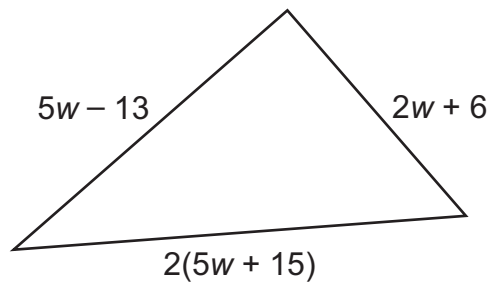
B. $V = dm$

C. $V = \frac{d}{m}$

D. $V = \frac{m}{d}$

EOCEP Sample Item 1	Standard Alignment	A1–ACE.4
	Standard Description	Solve literal equations and formulas for a specified variable including equations and formulas that arise in a variety of disciplines.
	Answer Key	D
	Depth of Knowledge	2
	Estimated Difficulty	High Difficulty

2. Emilio is given the triangle shown below.



Emilio represents the perimeter of the triangle with the equation

$(5w - 13) + (2w + 6) + 2(5w + 15) = P$, where P is the perimeter of the triangle.

Which equation is correctly solved for w ?

- A. $w = \frac{P-23}{17}$
- B. $w = \frac{P+49}{17}$
- C. $w = \frac{P-8}{17}$
- D. $w = \frac{P+34}{17}$

EOCEP Sample Item	2	Standard Alignment	A1–ACE.4
		Standard Description	Solve literal equations and formulas for a specified variable including equations and formulas that arise in a variety of disciplines.
		Answer Key	A
		Depth of Knowledge	2
		Estimated Difficulty	Medium Difficulty

3. Kaylee is building a rectangular enclosure with an area of 90 square yards. She wants the length of the enclosed area to be 6 yards longer than the width, x . To represent this, she writes the equation $x^2 + 6x = 90$. She then completes the square to help solve her equation for x . Which equation is equivalent to Kaylee's equation after she completes the square?
- A. $(x + 3)^2 = 93$
- B. $(x + 3)^2 = 99$
- C. $(x + 6)^2 = 96$
- D. $(x + 6)^2 = 126$

EOCEP Sample Item 3	Standard Alignment	A1–AREI.4a
	Standard Description	Solve mathematical and real-world problems involving quadratic equations in one variable. (Note: A1.AREI.4a and 4b are not Graduation Standards.) a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - h)^2 = k$ that has the same solutions. Derive the quadratic formula from this form.
	Answer Key	B
	Depth of Knowledge	2
	Estimated Difficulty	High Difficulty

4. Amil is given the equation shown.

$$x^2 + 14x + 37 = 0$$

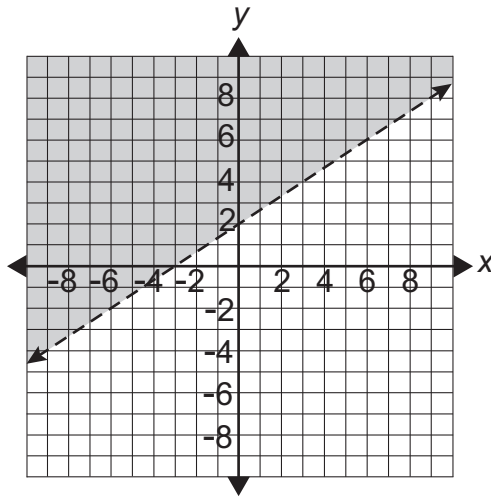
He completes the square and rewrites the given equation. Which equation is equivalent to the given equation?

- A. $(x + 7)^2 - 12 = 0$
- B. $(x - 7)^2 - 12 = 0$
- C. $(x + 7)^2 + 12 = 0$
- D. $(x - 7)^2 + 12 = 0$

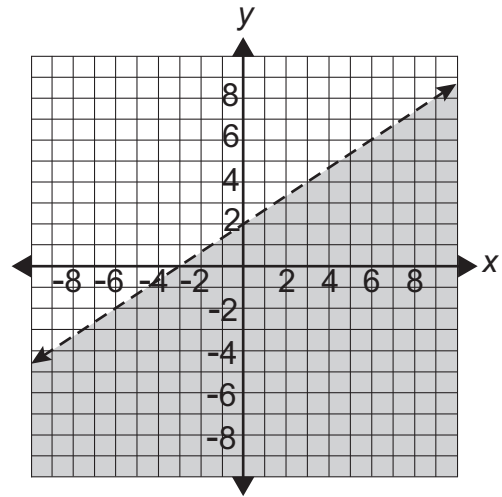
EOCEP Sample Item	4	Standard Alignment	A1–AREI.4a
		Standard Description	Solve mathematical and real-world problems involving quadratic equations in one variable. (Note: A1.AREI.4a and 4b are not Graduation Standards.) a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - h)^2 = k$ that has the same solutions. Derive the quadratic formula from this form.
		Answer Key	A
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

5. Which graph represents the solution of $y > -\frac{2}{3}x + 2$?

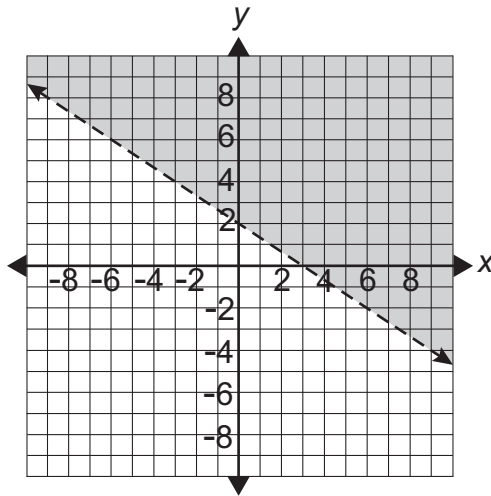
A.



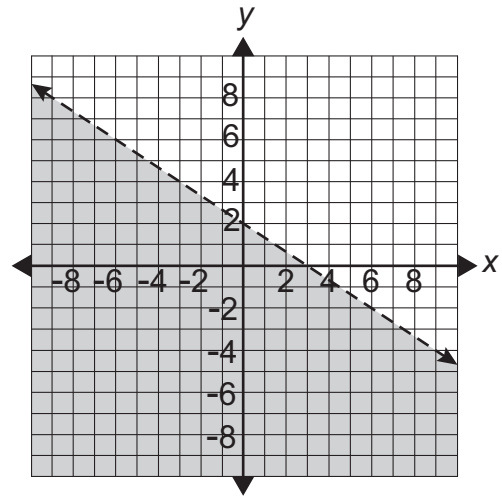
B.



C.



D.



EOCEP Sample Item

5

Standard Alignment A1–AREI.12

Standard Description Graph the solutions to a linear inequality in two variables.

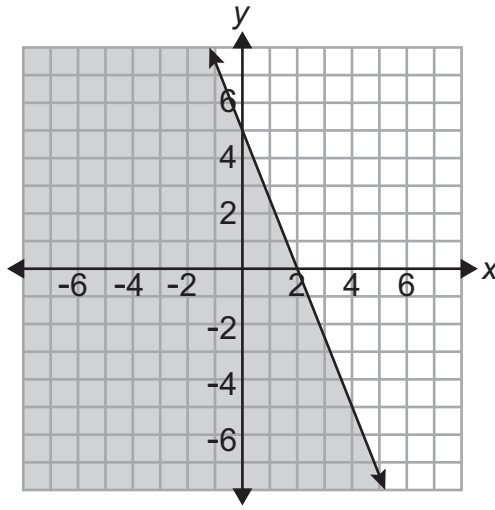
Answer Key C

Depth of Knowledge 2

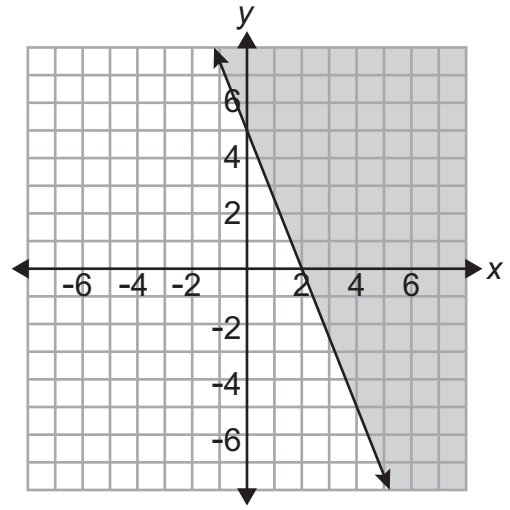
Estimated Difficulty High Difficulty

6. Which graph represents the solutions to $5x - 2y \geq 10$?

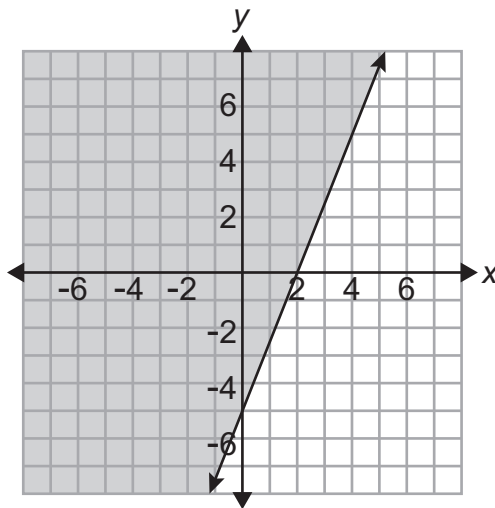
A.



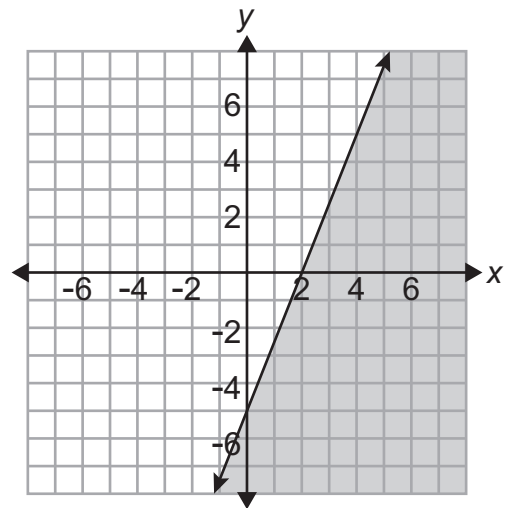
B.



C.



D.



EOCEP Sample Item

6

Standard Alignment A1–AREI.12

Standard Description Graph the solutions to a linear inequality in two variables.

Answer Key D

Depth of Knowledge 2

Estimated Difficulty High Difficulty

7. Mark hits a tennis ball into the air. He uses the equation shown to approximate the height, h , in feet, of the ball t seconds after he hits it.

$$h = -16t^2 + 88t + 4$$

What does the 4 represent in Mark's equation?

- A. The ball was in the air for a total of 4 seconds.
- B. The ball landed 4 feet away from where Mark hit it.
- C. The ball was 4 feet above the ground when Mark hit it.
- D. The ball reached its maximum height 4 seconds after Mark hit it.

EOCEP Sample Item	7	Standard Alignment	A1–ASE.1
		Standard Description	Interpret the meanings of coefficients, factors, terms, and expressions based on their real-world contexts. Interpret complicated expressions as being composed of simpler expressions. (Limit to linear; quadratic; exponential.)
		Answer Key	C
		Depth of Knowledge	2
		Estimated Difficulty	Medium Difficulty

8. A website tracks the number of users it has at the end of each of its first 30 days since going online. The equation $y = 15(1.03)^x$ shows the relationship between the number of days since the website went online, x , and the number of users it has, y . What does 1.03 represent in the equation?
- A. The number of users increases by 3 each day.
 - B. The number of users increases by 103 each day.
 - C. Each day after the first, the number of users is 3% greater than it was the day before.
 - D. Each day after the first, the number of users is 103% greater than it was the day before.

EOCEP Sample Item 8	Standard Alignment	A1–ASE.1
	Standard Description	Interpret the meanings of coefficients, factors, terms, and expressions based on their real-world contexts. Interpret complicated expressions as being composed of simpler expressions. (Limit to linear; quadratic; exponential.)
	Answer Key	C
	Depth of Knowledge	2
	Estimated Difficulty	High Difficulty

9. A quadratic expression is shown.

$$x^2 - 100$$

Which statement **best** explains why the quadratic expression can be rewritten as $(x + c)(x - c)$ for some integer value of c ?

- A. The expression is quadratic.
- B. The quadratic expression is a difference of squares.
- C. The quadratic expression does not have a linear term.
- D. The coefficient of the x^2 term in the quadratic expression is 1.

EOCEP Sample Item	9	Standard Alignment	A1–ASE.2
		Standard Description	Analyze the structure of binomials, trinomials, and other polynomials in order to rewrite equivalent expressions.
		Answer Key	B
		Depth of Knowledge	1
		Estimated Difficulty	High Difficulty

10. Which expression is equivalent to $x^4 + 6x^2 + 9$?

- A. $(x + 3)^2$
- B. $(x + 3)^4$
- C. $(x^2 + 3)^2$
- D. $(x^2 + 3)^4$

EOCEP Sample Item	10	Standard Alignment	A1–ASE.2
		Standard Description	Analyze the structure of binomials, trinomials, and other polynomials in order to rewrite equivalent expressions.
		Answer Key	C
		Depth of Knowledge	2
		Estimated Difficulty	Medium Difficulty

11. The function $f(x) = 4(0.5)^x$ gives the remaining amount, in grams, of a radioactive substance after the substance has been decaying for x minutes. What does the equation $f(4) = 0.25$ represent in this situation?
- A. After decaying for 15 seconds, there are 4 grams of the substance remaining.
 - B. After decaying for 25 seconds, there are 4 grams of the substance remaining.
 - C. After decaying for 4 minutes, there is 0.25 gram of the substance remaining.
 - D. After decaying for 4 minutes, there is 0.25 of the original amount of the substance remaining.

EOCEP Sample Item	11	Standard Alignment	A1–FIF.2
		Standard Description	Evaluate functions and interpret the meaning of expressions involving function notation from a mathematical perspective and in terms of the context when the function describes a real-world situation.
		Answer Key	C
		Depth of Knowledge	2
		Estimated Difficulty	Medium Difficulty

12. Reggie carves and sells wooden sculptures online. He uses the function $f(x) = 15x + 60$ to determine the selling price, $f(x)$, for a sculpture that took him x hours to make. Which statement explains the meaning of the value of $f(75)$?
- A. The selling price of a sculpture that took Reggie 1 hour to make is \$75.
 - B. The selling price of a sculpture that took Reggie 5 hours to make is \$75.
 - C. The selling price of a sculpture that took Reggie 5 hours to make is \$135.
 - D. The selling price of a sculpture that took Reggie 75 hours to make is \$1,185.

EOCEP Sample Item	12	Standard Alignment	A1–FIF.2
		Standard Description	Evaluate functions and interpret the meaning of expressions involving function notation from a mathematical perspective and in terms of the context when the function describes a real-world situation.
		Answer Key	D
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

13. A quadratic function is shown.

$$y = x^2 - 14x + 33$$

The function has two x-intercepts. What is the equation of the function's axis of symmetry?

- A. $x = -3$
- B. $x = 3$
- C. $x = 7$
- D. $x = 11$

EOCEP Sample Item	13	Standard Alignment	A1–FIF.8a
		Standard Description	Translate between different but equivalent forms of a function equation to reveal and explain different properties of the function. (Limit to linear; quadratic; exponential.) (Note: A1.FIF.8a is not a Graduation Standard.) a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
		Answer Key	C
		Depth of Knowledge	2
		Estimated Difficulty	<]] \ Difficulty

14. Which equivalent form of $g(x) = 2x^2 - 12x - 54$ is the **best** form to find the zeros of the function?
- A. $g(x) = 2(x - 3)^2 - 72$
 - B. $g(x) = 2(x^2 - 6x - 27)$
 - C. $g(x) = 2(x - 9)(x + 3)$
 - D. $g(x) = 2x^2 - 18x + 6x - 54$

EOCEP Sample Item	14	Standard Alignment	A1–FIF.8a
		Standard Description	Translate between different but equivalent forms of a function equation to reveal and explain different properties of the function. (Limit to linear; quadratic; exponential.) (Note: A1.FIF.8a is not a Graduation Standard.) a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
		Answer Key	C
		Depth of Knowledge	1
		Estimated Difficulty	High Difficulty

15. Which situation can be modeled by an exponential function?

- A. Photos cost \$0.08 each.
- B. The population of a town increases by 3% each year.
- C. The pay for an employee is \$12.25 an hour plus 5% sales commission.
- D. The number of gallons of water in a tank decreases by 52 gallons each day.

EOCEP Sample Item	15	Standard Alignment	A1–FLQE.1
		Standard Description	Distinguish between situations that can be modeled with linear functions or exponential functions by recognizing situations in which one quantity changes at a constant rate per unit interval as opposed to those in which a quantity changes by a constant percent rate per unit interval.
		Answer Key	B
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

16. Victoria and Roberto are climbing stairs in a tall building to raise money for charity. They are raising money together as a team. Victoria and Roberto receive donations differently.

- Victoria receives donations from people who give a fixed amount for each flight of stairs she climbs.
- Roberto receives donations from people who give a fixed amount regardless of how many flights of stairs he climbs.

Victoria and Roberto write an equation to represent the total amount of money their team raises, y , based on the number of flights of stairs Victoria climbs, x . Which statement **best** describes the equation Victoria and Roberto write?

- A. The equation is linear because Victoria and Roberto raise some money that does not depend on how many flights of stairs Victoria climbs.
- B. The equation is linear because the amount Victoria and Roberto raise increases at a constant rate for each additional flight of stairs Victoria climbs.
- C. The equation is exponential because only part of the money that Victoria and Roberto raise depends on how many flights of stairs Victoria climbs.
- D. The equation is exponential because the amount of money Victoria and Roberto raise for climbing each flight of stairs increases the more Victoria climbs.

EOCEP Sample Item	16	Standard Alignment	A1–FLQE.1
		Standard Description	Distinguish between situations that can be modeled with linear functions or exponential functions by recognizing situations in which one quantity changes at a constant rate per unit interval as opposed to those in which a quantity changes by a constant percent rate per unit interval.
		Answer Key	B
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

17. Central High School has 1,023 students. Approximately 75% of the school's students attended the last home football game. Which attendance number is the most appropriate estimate of the school's students who attended the last home football game?
- A. 760
 - B. 767
 - C. 767.3
 - D. 767.25

EOCEP Sample Item 17	Standard Alignment	A1–NQ.3
	Standard Description	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities in context.
	Answer Key	B
	Depth of Knowledge	1
	Estimated Difficulty	High Difficulty

18. An expression is shown.

$$\sqrt[4]{x^5}$$

Which expression is equivalent to the given expression?

A. $\sqrt[4]{x^5}$

B. $\sqrt[5]{x^4}$

C. $x^{\frac{4}{5}}$

D. $x^{\frac{5}{4}}$

EOCEP Sample Item	18	Standard Alignment	A1–NRNS.2
		Standard Description	Use the definition of the meaning of rational exponents to translate between rational exponent and radical forms.
		Answer Key	D
		Depth of Knowledge	1
		Estimated Difficulty	High Difficulty

19. Which expression is equivalent to $86x^{\frac{1}{2}}y^{\frac{2}{3}}$?

A. $86\sqrt{x} \sqrt[3]{y^2}$

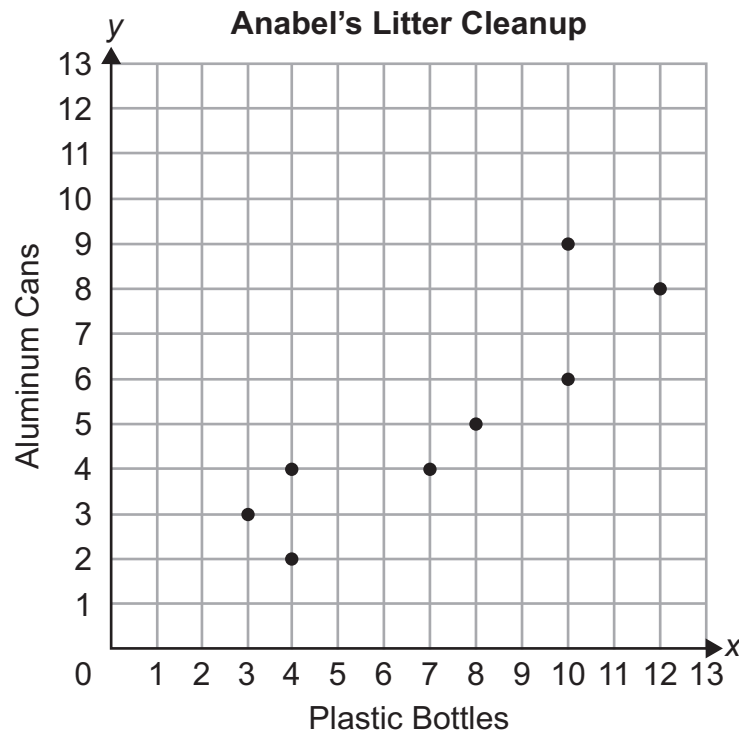
B. $86\sqrt{x} \sqrt{y^3}$

C. $\sqrt{86x} \sqrt[3]{y^2}$

D. $\sqrt{86x} \sqrt{y^3}$

EOCEP Sample Item	19	Standard Alignment	A1–NRNS.2
		Standard Description	Use the definition of the meaning of rational exponents to translate between rational exponent and radical forms.
		Answer Key	A
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

20. Anabel collects litter alongside a road near her house for 8 days. She keeps track of the number of plastic bottles, x , and aluminum cans, y , she finds alongside the road for each of the 8 days she collects litter. Her data are shown in the scatterplot.



The correlation coefficient of the data is 0.78. Which relationship between the number of plastic bottles and the number of aluminum cans **best** describes the meaning of the correlation coefficient?

- A. weak positive relationship
- B. weak negative relationship
- C. strong positive relationship
- D. strong negative relationship

EOCEP Sample Item

20

Standard Alignment A1–SPID.8

Standard Description Using technology, compute and interpret the correlation coefficient of a linear fit.

Answer Key C

Depth of Knowledge 2

Estimated Difficulty High Difficulty