Tennessee Comprehensive Assessment Program

TCAP

Math
Grade 8 Item Release

Spring 2019

TN Department of Education

Table of Contents

Metadata Interpretation Guide - Math

Item Information

Item Code: TN658318	Grade Level: 8
Standard Code: 8.NS.A.1	Position No: 1
Standard Text: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually or terminates, and convert a decimal expansion which repeats eventually or terminates into a rational number.	
Reporting Category: 1: Number Relationships	
Calculator: Z	
Correct Answer: B	DOK Level: 1 Item Type: O

Metadata Definitions

Item Code: Unique letter/number code used to identify the item.	**Grade Level:** Grade level or Course.
Standard Code: Primary educational standard assessed.	**Position No:** Position of the item in the PDF.
Standard Text: Text of the educational standard assessed.	
Reporting Category: Text of the Reporting Category the standard assesses.	
Calculator: Indicates if usage of a calculator is allowed. Y = calculator is allowed, N = calculator is not allowed, Z = calculator may be allowed.	

| **Correct Answer:** Correct answer. This may be blank for constructed response items where students write or type their responses. | **DOK Level:** (if listed): Depth of Knowledge (cognitive complexity) is measured on a three-point scale. 1= Recall or simple reproduction of information; 2= Skills and concepts: comprehension and processing of text; 3= Strategic thinking, prediction, elaboration. | **Item Type:** Indicates administered usage. O = Operational. |

Item Information

Item Code:	TN658318	Grade Level:	8
Standard Code:	8.NS.A.1	Position No:	1
Standard Text:	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually or terminates, and convert a decimal expansion which repeats eventually or terminates into a rational number.		
Reporting Category:	1: Number Relationships		
Calculator:	Z		
Correct Answer:	B	DOK Level: 1	Item Type: O

Which statement **best** explains if the number 5.32147 is a rational or irrational number?

A. It is a rational number. The number is not within a square root symbol.

B. It is a rational number. The number can be converted into a fraction.

C. It is an irrational number. The number cannot be converted into a fraction.

D. It is an irrational number. The decimal portion does not repeat or end.

Item Information

Item Code:	TN142825	Grade Level:	8
Standard Code:	8.NS.A.2	Position No:	2

Standard Text: Use rational approximations of irrational numbers to compare the size of irrational numbers locating them approximately on a number line diagram. Estimate the value of irrational expressions such as π^2.

Reporting Category: 1: Number Relationships

Calculator: Z

Correct Answer: D   DOK Level: 2   Item Type: O

Which interval describes the location of π^2 on a number line?

A. $6 \leq \pi^2 < 7$

B. $7 \leq \pi^2 < 8$

C. $8 \leq \pi^2 < 9$

D. $9 \leq \pi^2 < 10$

Item Information

Item Code:	TN876857	Grade Level:	8
Standard Code:	8.EE.A.1	Position No:	3
Standard Text:	Know and apply the properties of integer exponents to generate equivalent numerical expressions.		
Reporting Category:	1: Number Relationships		
Calculator:	Z		
Correct Answer:	C	DOK Level: 2	Item Type: O

Which expression is equivalent to $3^{-4} \cdot 3^6$?

A. $\dfrac{1}{9^{24}}$

B. $\dfrac{1}{3^{24}}$

C. 3^2

D. 9^2

Item Information

Item Code:	TN858163	Grade Level:	8
Standard Code:	8.EE.B.5	Position No:	4

Standard Text: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
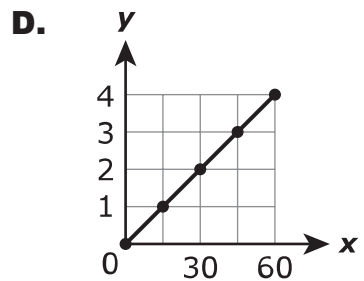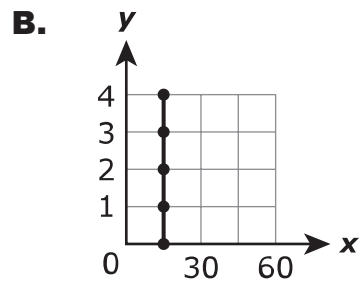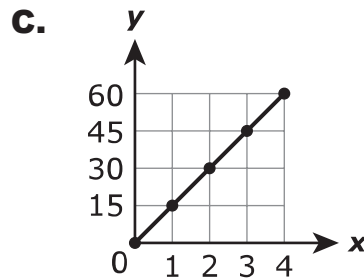
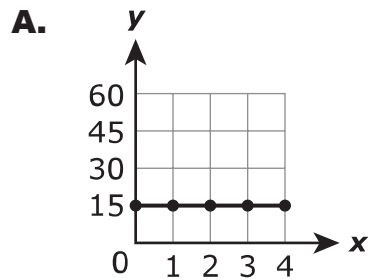Reporting Category: 2: Expressions and Equations

Calculator: Z

Correct Answer:	C	DOK Level:	2	Item Type:	O

Ana Maria reads 15 pages of a book each day. If x stands for the number of days that Ana Maria reads and y stands for the total number of pages that Ana Maria reads, what is the graph of this relationship?

A.

C.

B.

D.

Item Information

Item Code:	TN808908	Grade Level:	8
Standard Code:	8.EE.C.7.a	Position No:	5

Standard Text: Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).

Reporting Category: 2: Expressions and Equations

Calculator: Z

Correct Answer:	A,E	DOK Level:	2	Item Type:	O

Which equations have infinitely many solutions?

Select **all** that apply.

A. $2x = 3x - x$

B. $3x = 3(2 + x)$

C. $4x = x + 4$

D. $-2x = -x - 2$

E. $x - 1 = 2x - (x + 1)$

Item Information

Item Code:	TN698913	Grade Level:	8
Standard Code:	8.EE.C.8.a	Position No:	6

Standard Text: Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
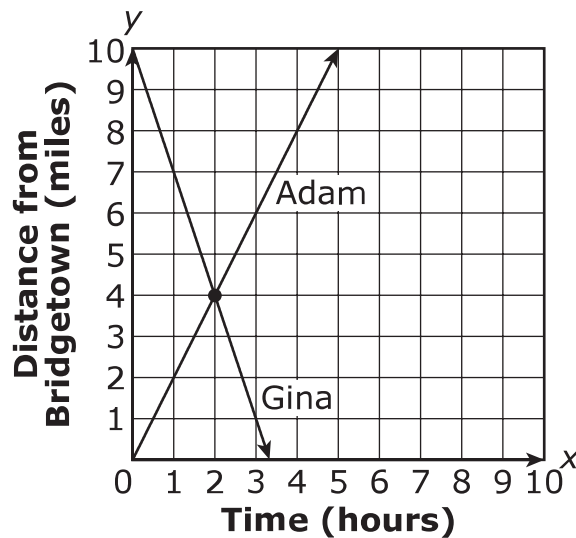
Reporting Category: 2: Expressions and Equations

Calculator: Z

Correct Answer:	C	DOK Level:	2	Item Type:	O

Adam hikes from Bridgetown to Lakeville. Gina starts at the same time, and hikes from Lakeville to Bridgetown on the same road. Their hikes are represented on the graph below.

What is the meaning of the solution to this system of equations?

A. Gina walks 1 mile per hour faster than Adam.

B. It takes Adam 5 hours to hike from Bridgetown to Lakeville.

C. At 2 hours, both Adam and Gina are 4 miles from Bridgetown.

D. At 0 hours, Adam is 0 miles from Bridgetown and Gina is 10 miles.

Item Information

Item Code: TN662678	Grade Level: 8
Standard Code: 8.F.A.3	Position No: 7

Standard Text: Know and interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

Reporting Category: 3: Functions

Calculator: Z

Correct Answer: A,D,E	DOK Level: 1	Item Type: O

Which equations represent a linear function?

Select **all** that apply.

A. $y = \dfrac{x}{3} - \dfrac{1}{5}$

B. $y = x^3$

C. $y = 2x^2 - 4$

D. $y = 1.7x + 9$

E. $y = \dfrac{(x - 7)}{10}$

Item Information

Item Code: TN209248	Grade Level: 8
Standard Code: 8.F.B.4	Position No: 8

Standard Text: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values.

Reporting Category: 3: Functions

Calculator: Z

Correct Answer: D   DOK Level: 2   Item Type: O

Jacob planted a seed that grew into a tree. The height of the tree, as a function of years since Jacob planted the seed, is shown in the graph below.
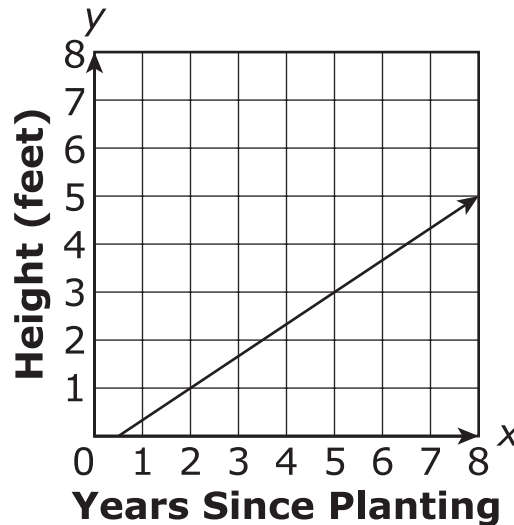
What is the meaning of the point (0.5, 0) on the graph?

A. The tree grew at a rate of 0.5 foot per year.

B. The tree was 0.5 foot tall when it was planted.

C. Jacob planted the seed 0.5 foot below the ground.

D. The tree started growing above ground 0.5 year after Jacob planted the seed.

Item Information

Item Code:	TN658304	Grade Level:	8
Standard Code:	8.F.B.5	Position No:	9

Standard Text: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
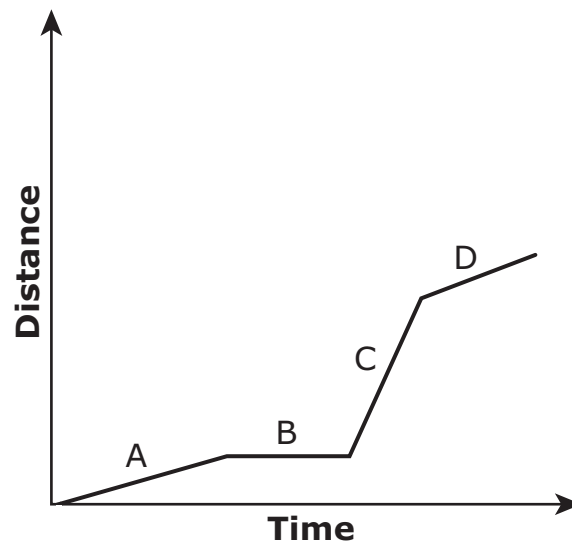
Reporting Category: 3: Functions

Calculator: Z

Correct Answer:	C	DOK Level: 2		Item Type: O

The graph shows the distance Ella travels from her house to the library. On her trip, Ella walks from her house to the bus stop, where she waits to get on the bus and rides to the library. Then, Ella walks to the library after getting off the bus.

Which statement **best** explains segment C of Ella's trip?

A. Ella stops and waits for the bus.

B. Ella walks to the bus stop at a slow, constant speed.

C. Ella rides the bus to the library, moving at a faster, constant speed.

D. Ella quickly walks to the library at a constant speed after getting off the bus.

Item Information

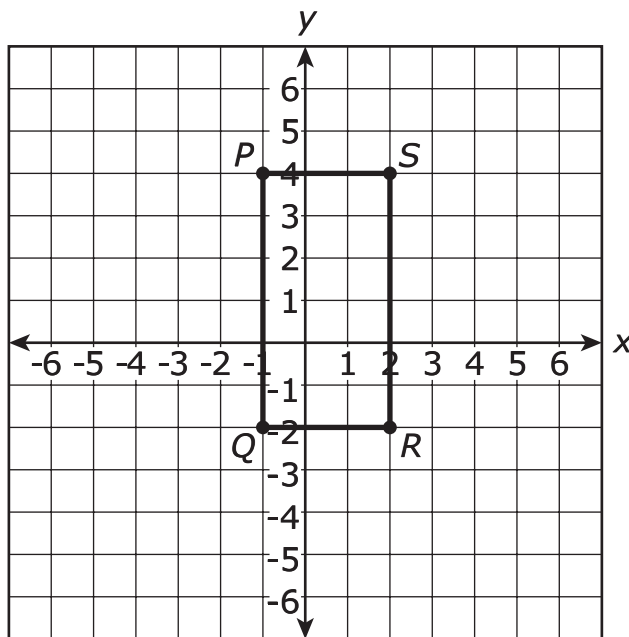|		
Item Code: TN641801		Grade Level: 8
Standard Code: 8.G.A.2		Position No: 10
Standard Text: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.		
Reporting Category: 4: Geometry and Data		
Calculator: Z		
Correct Answer: B	DOK Level: 2	Item Type: O

Quadrilateral *PQRS* is shown on the coordinate plane.

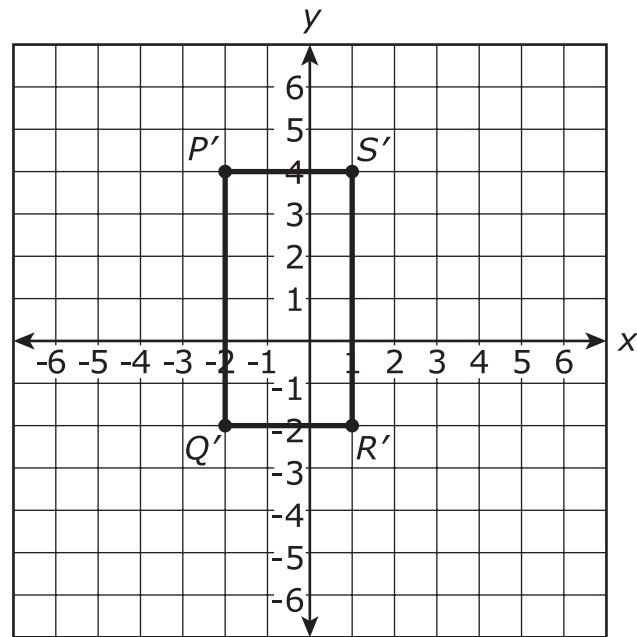What is the image of *PQRS* after a reflection over the *y*-axis?

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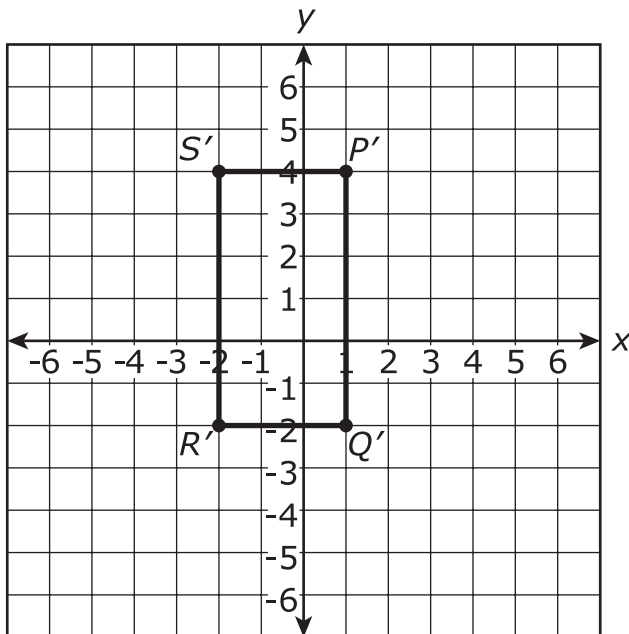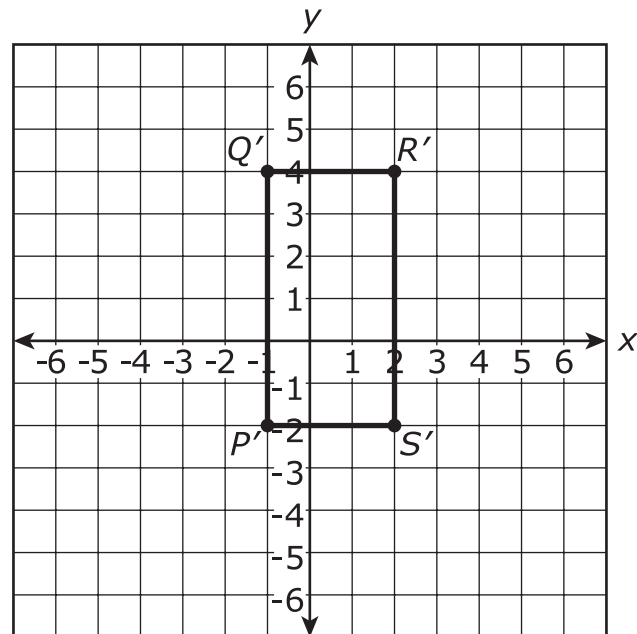
(Item 10, *continued from the previous page)*

A.

C.

B.

D.
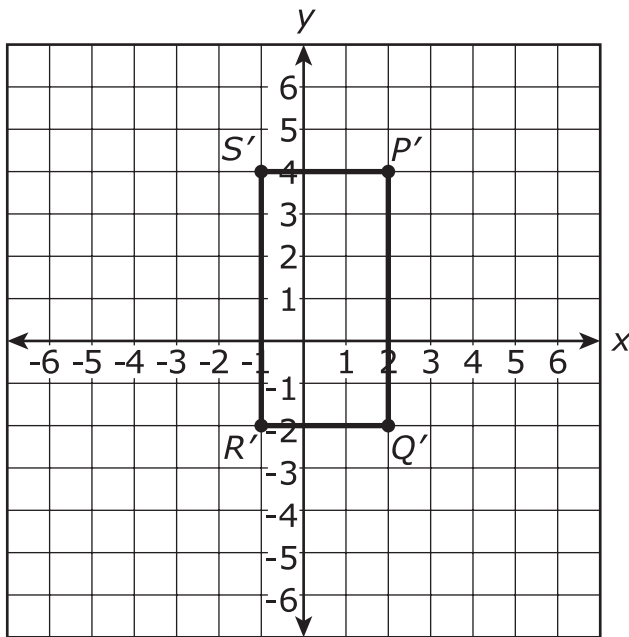
Item Information

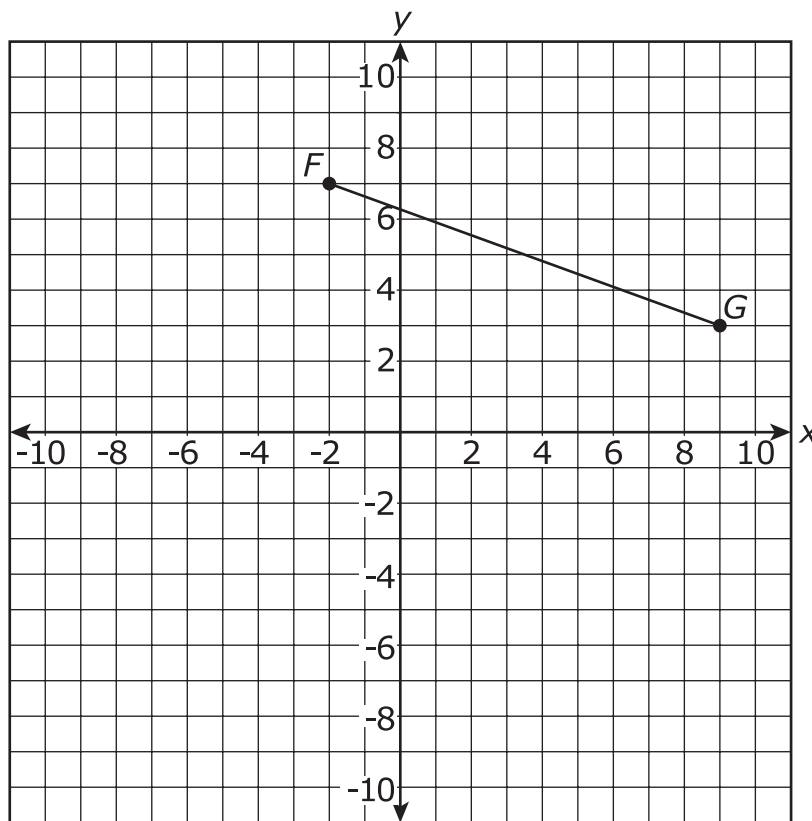|			
Item Code:	TN211579	Grade Level:	8
Standard Code:	8.G.B.6	Position No:	11
Standard Text:	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.		
Reporting Category:	4: Geometry and Data		
Calculator:	Z		
Correct Answer:	C	DOK Level: 2	Item Type: O

Line segment *FG* is shown on the coordinate grid.

Which value is closest to the length, in units, of line segment *FG*?

A. 3.9

B. 8.1

C. 11.7

D. 15.0

Item Information

Item Code: TN958460	Grade Level: 8
Standard Code: 8.G.C.7	Position No: 12
Standard Text: Know and understand the formulas for the volumes of cones, cylinders, and spheres, and use them to solve real-world and mathematical problems.	
Reporting Category: 4: Geometry and Data	
Calculator: Z	
Correct Answer: A	DOK Level: 1	Item Type: O

A container of soup in the shape of a cylinder has a radius of 1.5 inches and a height of 4 inches. Which expression represents the maximum cubic inches of soup the container can hold?

A. $\pi(1.5^2)(4)$

B. $\pi(4^2)(1.5)$

C. $\frac{1}{3}\pi(1.5^2)(4)$

D. $\frac{1}{3}\pi(4^2)(1.5)$

Item Information

Item Code: TN613554	Grade Level: 8
Standard Code: 8.G.C.7	Position No: 13
Standard Text: Know and understand the formulas for the volumes of cones, cylinders, and spheres, and use them to solve real-world and mathematical problems.	
Reporting Category: 4: Geometry and Data	
Calculator: Z	
Correct Answer: B DOK Level: 2 Item Type: O	

A cylinder with a volume of 45 cubic inches has a radius of 3 inches.

Which expression represents the height of the cylinder in inches?

A. $\dfrac{45}{3\pi}$

B. $\dfrac{45}{3^2\pi}$

C. $\dfrac{3\pi}{45}$

D. $\dfrac{3^2\pi}{45}$

Item Information

Item Code:	TN058492	Grade Level:	8
Standard Code:	8.SP.A.1	Position No:	14

Standard Text: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
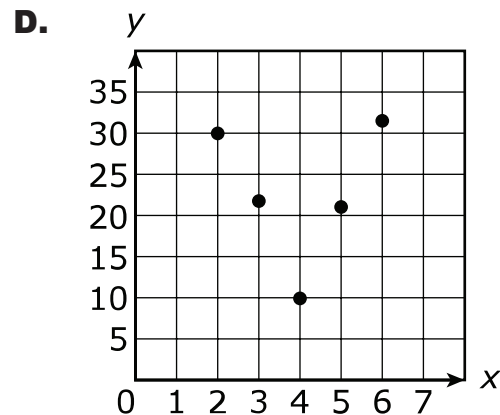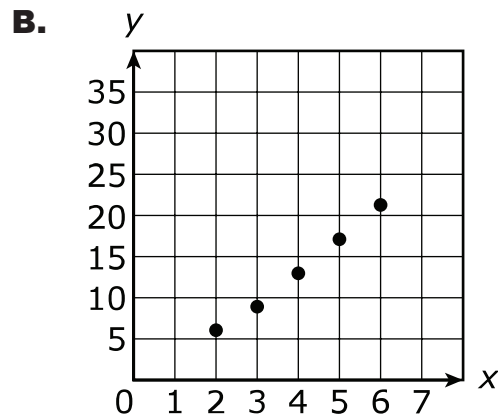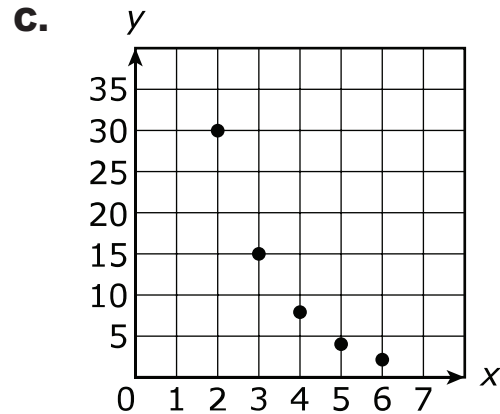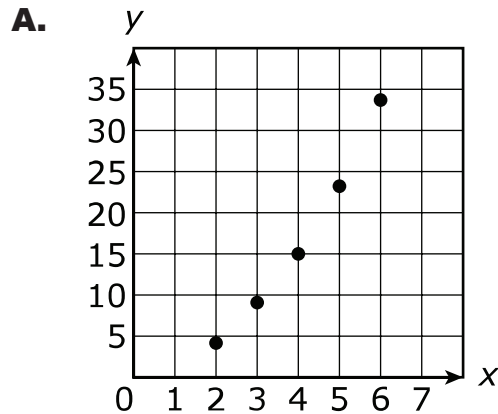
Reporting Category: 4: Geometry and Data

Calculator: Z

Correct Answer:	B	DOK Level:	1	Item Type:	O

In which scatter plot is the pattern of association **most** linear?

A.

C.

B.

D.

Item Information

Item Code: TN142844	Grade Level: 8
Standard Code: 8.SP.A.3	Position No: 15
Standard Text: Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.	
Reporting Category: 4: Geometry and Data	
Calculator: Z	
Correct Answer: B DOK Level: 2	Item Type: O

The relationship between age and salary is modeled using the equation, $y = 5{,}500 + 850x$, where y is salary and x is age. Which statement is the correct interpretation of the slope?

A. For every additional year of age, the salary is expected to increase by $5,500.

B. For every additional year of age, the salary is expected to increase by $850.

C. Age increases by 850 as the salary increases by $1.

D. Age increases by 5,500 as the salary increases by $1.

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