

DRAFT

engage^{ny}

Our Students. Their Moment.

**New York State Testing Program
Grade 3 Common Core
Mathematics Test**

Released Questions with Annotations

August 2013



THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK /
ALBANY, NY 12234

New York State Testing Program Grade 3 Common Core Mathematics Test

Released Questions with Annotations

With the adoption of the New York P-12 Common Core Learning Standards (CCLS) in ELA/Literacy and Mathematics, the Board of Regents signaled a shift in both instruction and assessment. In Spring 2013, New York State administered the first set of tests designed to assess student performance in accordance with the instructional shifts and the rigor demanded by the Common Core State Standards (CCSS). To aid in the transition to new tests, New York State released a number of resources during the 2012-2013 year, including test blueprints and specifications, and criteria for writing test questions. These resources can be found at <http://www.engageny.org/common-core-assessments>.

New York State administered the first ELA/Literacy and Mathematics Common Core tests in April 2013 and is now making a portion of the questions from those tests available for review and use. These released questions will help students, families, educators, and the public better understand how tests have changed to assess the instructional shifts demanded by the Common Core and to assess the rigor required to ensure that all students are on track to college and career readiness.

Annotated Questions Are Teaching Tools

The released questions are intended to help students, families, educators, and the public understand how the Common Core is different. The annotated questions will demonstrate the way the Common Core should drive instruction and how tests have changed to better assess student performance in accordance with the instructional shifts demanded by the Common Core. They are also intended to help educators identify how the rigor of the State tests can inform classroom instruction and local assessment. The annotations will indicate common student misunderstandings related to content standards; educators should use these to help inform unit and lesson planning. In some cases, the annotations may offer insight into particular instructional elements (conceptual thinking, visual models) that align to the Common Core that may be used in curricular design. It should not be assumed, however, that a particular standard will be measured with an identical item in future assessments.

The annotated questions will include both multiple-choice and constructed-response questions. With each multiple-choice question released, a rationale will be available to demonstrate why the question measures the intended standards; why the correct answer is correct; and why each wrong answer is plausible but incorrect. The rationales describe why the wrong answer choices are plausible but incorrect and are based in common errors in computation. While these rationales will speak to a possible and likely reason for selection of the incorrect option by the student, these rationales do not contain definitive statements as to why the student chose the incorrect option or what we can infer about knowledge and skills of the student based on their selection of an incorrect response. These multiple-choice questions are designed to assess student proficiency, not to diagnose specific misconceptions/errors with each and every incorrect option.

Additionally, for each constructed-response question, there will be an explanation for why the question measures the intended standards and sample student responses representing each possible score point.

Questions from the upper grades may feature more detailed annotations, as the items tend to be more complex.

Understanding Math Annotated Questions

Multiple Choice

Multiple-choice questions are designed to assess CCLS for Mathematics. Mathematics multiple-choice questions will mainly be used to assess standard algorithms and conceptual standards. Multiple-choice questions incorporate both Standards and Standards for Mathematical Practices, some in real-world applications. Many multiple-choice questions require students to complete multiple steps. Likewise, many of these questions are linked to more than one standard, drawing on the simultaneous application of multiple skills and concepts. Within answer choices, distractors will all be based on plausible missteps.

Short and extended constructed-response questions may refer to the scoring rubric, which can be found at www.engageny.org/resource/test-guides-for-english-language-arts-and-mathematics.

Short Response

Short-response questions are similar to past 2-point questions, requiring students to complete a task and show their work. Like multiple-choice questions, short-response questions will often require multiple steps, the application of multiple mathematics skills, and real-world applications. Many of the short-response questions will cover conceptual and application Standards.

Extended Response

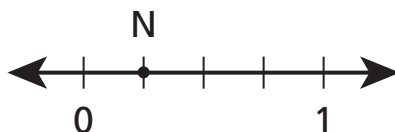
Extended-response questions are similar to past 3-point questions, asking students to show their work in completing two or more tasks or a more extensive problem. Extended-response questions allow students to show their understanding of mathematical procedures, conceptual understanding, and application. Extended-response questions may also assess student reasoning and the ability to critique the arguments of others.

Released Questions Do Not Comprise a Mini Test

This document is NOT intended to show how operational tests look or to provide information about how teachers should administer the test; rather, the purpose of the released questions is to provide an overview of how the new test reflects the demands of the Common Core.

The released questions do not represent the full spectrum of standards assessed on the State test, nor do they represent the full spectrum of how the Common Core should be taught and assessed in the classroom. Specific criteria for writing test questions as well as additional instruction and test information is available on www.engageny.org/common-core-assessments.

Which measure best represents the distance from 0 to point N on the number line below?



A $\frac{1}{6}$ unit

B $\frac{1}{5}$ unit

C $\frac{1}{4}$ unit

D $\frac{1}{3}$ unit

Key: C

Measured CCLS: 3.NF.2a

Commentary: The item measures 3.NF.2a because it asks the student to represent fractions on a number line diagram by defining the interval from zero to 1 as the whole and recognizing that each part defines an equal fractional part of the whole.

Extended Rationale

Answer Choice A: $\frac{1}{6}$ unit - This response demonstrates a limited understanding of defining the interval between zero to 1 as the whole on a number line diagram. The student appears to have selected a response based on the partitions including the sections before zero and after 1, counting six parts.

Answer Option B: $\frac{1}{5}$ unit - This response demonstrates a limited understanding of the partitioning a whole into equal fractional parts of a number line diagram. The student most likely selected a response based on the number of markers that define the number partition, and not the actual number of partitions that define the whole between zero and 1.

Answer Option C: $\frac{1}{4}$ unit - This response correctly identifies the fractional representation of the distance from zero to N. There are precisely 4 equal parts represented on the number line diagram. Point N at the first unit interval defines $\frac{1}{4}$ unit of the whole defined from zero to 1.

Answer Option D: $\frac{1}{3}$ unit - This response demonstrates a limited understanding of the portioning of a whole into equal fractional parts on a number line diagram. The student likely selected a response based on the tick marks between 0 and 1 rather than the number of equal partitions between zero and 1.

Answer options A, B, and D are plausible but incorrect. They show partial understanding of the mathematical concept of representing a fraction on a number line diagram. However, these responses demonstrate a lack of a thorough understanding of the application.

What number sentence is another way to represent the missing number in the equation $36 \div 4 = \square$?

A $\square \times 4 = 36$

B $36 \times 4 = \square$

C $36 + 4 = \square$

D $\square \div 4 = 36$

Key: A

Measured CCLS: 3.OA.6

Commentary: The item measures 3.OA.6 because it asks the student to demonstrate an understanding of division as an unknown-factor problem; that is, to find $36 \div 4$ students determine the number that makes 36 when multiplied by 4.

Extended Rationale

Answer Choice A: $\square \times 4 = 36$ This response correctly identifies a number sentence that models multiplying an “unknown-factor” by 4 to make 36. This response shows that the answer to $36 \div 4$ is the value that can be multiplied by 4 to get 36.

Answer Option B: $36 \times 4 = \square$ This response shows limited understanding that a number sentence involving multiplication can be used to solve a division problem. However, the selection incorrectly presents the unknown as the product, rather than a factor.

Answer Option C: $36 + 4 = \square$ This response indicates little or no understanding of division as an unknown-factor problem. The same numbers that appear in the equation are used; however, the selection may indicate a misunderstanding that adding these numbers can be used to solve the division problem.

Answer Option D: $\square \div 4 = 36$ This response may be an attempt to apply the commutative property. While the commutative property does allow for certain multiplication and addition expressions to be equal to one another, it is incorrectly applied here.

Answer options B, C and D are plausible but incorrect. They show little or no understanding of the standard that is being assessed.

What is another way of expressing 8×12 ?

- A** $(8 \times 10) + (8 \times 2)$
- B** $(8 \times 1) + (8 \times 2)$
- C** $(8 \times 10) + 2$
- D** $8 + (10 \times 2)$

Key: A

Measured CCLS: 3.OA.5

Commentary: The item measures 3.OA.5 because it asks the student to apply the distributive property.

Extended Rationale

Answer Choice A: $(8 \times 10) + (8 \times 2)$ This is the correct application of the distributive property. The student rewrites the two-digit number 12 as the sum of 10 and 2, multiplies each by 8, and adds the products.

Answer Option B: $(8 \times 1) + (8 \times 2)$ This response shows limited understanding of the distributive property; the example incorrectly rewrites the two-digit number 12 as the sum of 1 and 2, but does multiply each by 8, then adds the products. This will not result in an answer equivalent to 8×12 .

Answer Option C: $(8 \times 10) + 2$ This response is an incorrect application of the distributive property. The student selects a response that correctly rewrites 12 into a sum of 10 and 2; however, multiplication by 8 is only applied to the 10 and not the 2 as well. This application will not result in an answer equivalent to 8×12 .

Answer Option D: $8 + (10 \times 2)$ This response is an incorrect application of the distributive property. The student selects a response that incorrectly rewrites 12 into the product of 10 and 2 and then adds that product to 8. This will not result in an answer equivalent to 8×12 .

Answer options B, C, and D are plausible but incorrect. An attempt to apply the distributive property was made, without the correct result.

Which fraction goes in the blank to make a true number sentence?

$$\frac{4}{8} > \underline{\quad ? \quad}$$

A $\frac{4}{6}$

B $\frac{2}{8}$

C $\frac{7}{8}$

D $\frac{4}{4}$

Key: B

Measured CCLS: 3.NF.3d

Commentary: The item measures 3.NF.3d because it asks the student to compare two fractions with the same numerator or the same denominator using an inequality symbol.

Extended Rationale

Answer Choice A: $\frac{4}{6}$ - This response demonstrates that the student may not understand how to compare fractions with the same numerator. The student may have selected this response based on the denominator, incorrectly reasoning that a fraction with 8 parts will be greater than a fraction with 6 parts.

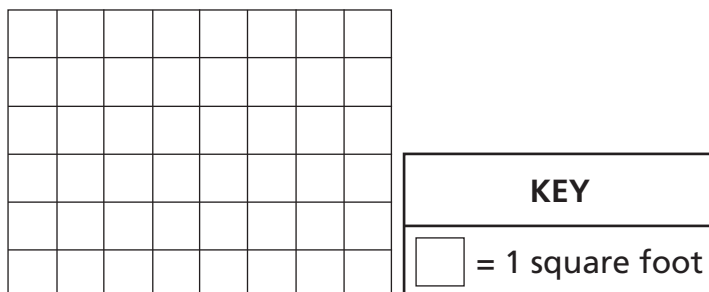
Answer Option B: $\frac{2}{8}$ - This response correctly identifies a valid comparison. The student understands that the denominator shows the number of parts of the whole and when the denominators are the same the numerators can be used directly to compare the fractions. Since 4 is greater than 2, $\frac{4}{8} > \frac{2}{8}$.

Answer Option C: $\frac{7}{8}$ - This response demonstrates the student may not understand how to compare fractions with the correct inequality symbol. The student may have selected this response due to incorrectly interpreting the inequality symbol as less than rather than greater than.

Answer Option D: $\frac{4}{4}$ - This response demonstrates the student may not understand that 4 parts of 4 is equal to one. Students may also have selected this response based on a comparison of the two denominators, incorrectly reasoning that a fraction with 8 parts will be greater than a fraction with 4 parts.

Answer options A, C, and D are plausible but incorrect. They show a misunderstanding of the mathematical concept of comparing fractions with the same numerator or same denominator.

Sue is going to cover her kitchen floor with tiles that are each 1 square foot. The floor is in the shape of a rectangle that is 6 feet wide and 8 feet long. How many tiles are needed to cover the floor?



- A** 14
- B** 24
- C** 28
- D** 48

Key: D

Measured CCLS: 3.MD.5b; 3.MD.7a

Commentary: The item measures 3.MD5b because it asks the student to demonstrate an understanding that unit squares can be used to measure the area of a plane figure. This item also assesses 3.MD.7a because it asks the student to find the area of a rectangle with whole-number side lengths by tiling it or by understanding that the area can be found by multiplying the side lengths.

Extended Rationale

Answer Choice A: 14; This response indicates the student may not understand the concept of area measurement. The student most likely added the length and width to arrive at 14.

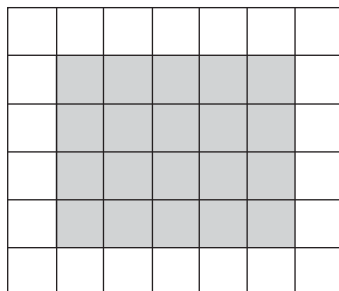
Answer Option B: 24; This response indicates the student may have confused the concepts of area and perimeter, while also incorrectly calculating the perimeter. The student likely attempted to calculate the perimeter by counting the unit squares along the edges of the figure.


Answer Option C: 28; This response indicates the student may have confused the concepts of area and perimeter. The perimeter of the figure is 28 units.

Answer Option D: 48; This response correctly identifies the area of the floor and the number of tiles needed to cover the floor. The student could have counted the tiles to find the area or multiplied side lengths, $8 \times 6 = 48$.

Answer options A, B, and C are plausible but incorrect. They do not indicate a thorough understanding of concepts of area measurement.

What is the area, in square units, of the shaded part of the figure?



KEY	
	= 1 square unit

- A** 18
- B** 20
- C** 22
- D** 42

Key: B

Measured CCLS: 3.MD.6

Commentary: This item measures 3.MD.6 because it calls on students to measure area by counting unit squares.

Extended Rationale

Answer Choice A: 18; This response indicates that the student may have confused the concepts of area and perimeter. The perimeter of the figure is 18 units.

Answer Option B: 20; This response correctly identifies the area of the shaded part of the figure. There are 20 unit squares that are shaded.

Answer Option C: 22; This response is likely the result of counting the unshaded unit squares. A student that selects this response may understand that area can be determined by counting unit squares, but did not count the unit squares in the shaded part of the figure.

Answer Option D: 42; The response is likely the result of counting all the unit squares provided. A student that selects this response may understand that area can be determined by counting the number of unit squares, but counted more than just the unit squares in the shaded part of the figure.

Answer options A, C, and D are plausible responses but incorrect. They show partial understanding of the mathematical concept of measuring area by counting unit squares. However, responses demonstrate a lack of a thorough understanding of the application.

The number of objects described in which situation can be represented by $24 \div 4$?

- A** There are 24 boxes with 4 pencils in each box.
- B** There are 24 people on a bus, and 4 people get off the bus.
- C** There are 24 marbles that need to be sorted into 4 equal groups.
- D** There are 24 books on a shelf, and 4 more books are put on the shelf.

Key: C

Measured CCLS: 3.OA.2

Commentary: The item measures 3.OA.2 because it asks the student to interpret whole-number quotients; such as the number of objects in each group when the objects are partitioned equally into groups.

Extended Rationale

Answer Choice A: "There are 24 boxes with 4 pencils in each box." This response uses the numbers provided in the stem, but is a situation where multiplication is the operation used to relate 24 and 4.

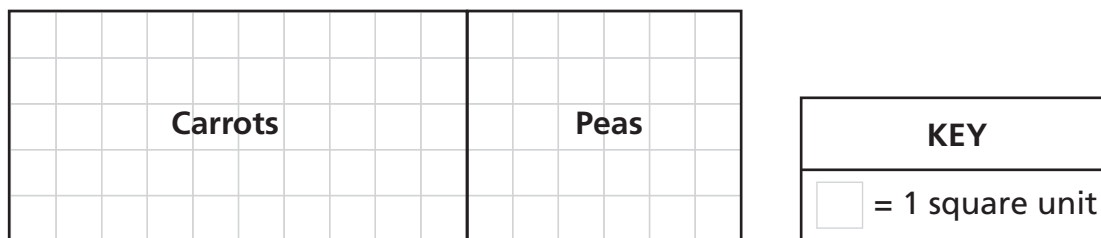
Answer Option B: "There are 24 people on a bus, and 4 people get off the bus." This response uses the numbers provided in the stem, but is a situation where subtraction is the operation used to relate 24 and 4.

Answer Option C: "There are 24 marbles that need to be sorted into 4 equal groups." This is the correct interpretation of the quotient, $24 \div 4$, as it involves partitioning or dividing 24 objects into 4 equal groups.

Answer Option D: "There are 24 books on a shelf, and 4 more books are put on the shelf." This response uses the numbers provided in the stem, but is a situation where addition is the operation used to relate 24 and 4.

Answer options A, B, and D are plausible responses but incorrect. They use the whole numbers provided in the stem.

The garden below was divided into two regions—one for carrots and one for peas.



Which expression represents the area, in square units, of the whole garden?

- A** $(5 + 10) + (5 + 6)$
- B** $(5 \times 10) \times (5 \times 6)$
- C** $(5 \times 10) + (5 \times 6)$
- D** $(5 + 10) \times (5 + 6)$

Key: C

Measured CCLS: 3.MD.7c

Commentary: This item measures 3.MD.7c because it asks the student to relate the area found by tiling to the calculation of area using the distributive property.

Extended Rationale

Answer Choice A: $(5 + 10) + (5 + 6)$ This response indicates an understanding that the region for the carrots and the region for the peas must be added together, but the student may not understand the procedure for finding the area of each region.

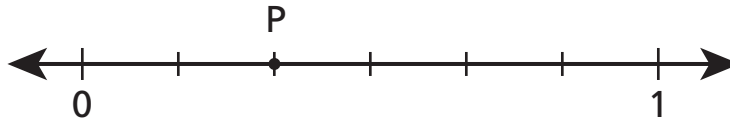
Answer Option B: $(5 \times 10) \times (5 \times 6)$ This response indicates an understanding of finding the area of each region, but the student may not understand that after finding the area of each region the areas must be added together.

Answer Option C: $(5 \times 10) + (5 \times 6)$ This is the correct expression which can be used to find the area of the whole garden. The area of both regions together can be found by multiplying 5×16 . This product can be found also by rewriting 16 as the sum of 10 and 6 and distributing the 5 to both of those terms as shown in answer choice C. As a result the student finds the area of the region for the carrots (5×10) and then the region for the peas (5×6), and adds the two together.

Answer Option D: $(5 + 10) \times (5 + 6)$ This response may indicate a misunderstanding of the procedure for finding area by tiling; the student may also not understand that after finding the area of each region the areas must be added together.

Answer options A, B, and D are plausible but incorrect. An attempt to relate area to multiplication and addition using the distributive property was made, but without the desired result.

Which number represents the location of point P on the number line below?



A $\frac{2}{7}$

B $\frac{2}{6}$

C $\frac{3}{7}$

D $\frac{2}{4}$

Key: B

Measured CCLS: 3.NF.2b

Commentary: This item measures 3.NF.2b because it asks the student to identify a location on a number line diagram using a fraction. In order to identify the correct location students recognize that the number of equal intervals between 0 and 1 represent the denominator of the fraction while the numerator represents the number of equal intervals between 0 and P.

Extended Rationale

Answer Choice A: $\frac{2}{7}$ This response incorrectly identifies the denominator, likely by counting the number of equal intervals between 0 and 1 using the number of tick marks on the number line diagram rather than the actual number of equal intervals between 0 and 1.

Answer Option B: $\frac{2}{6}$ This response correctly identifies the fractional representation. There are precisely 6 intervals represented on the number line diagram. Point P is at the second interval defining $\frac{2}{6}$ of the entire number line.

Answer Option C: $\frac{3}{7}$ This response incorrectly identifies the denominator, most likely by counting the number of equal intervals between 0 and 1 using the number of tick marks on the number line diagram rather than the actual number of equal intervals between 0 and 1. This item also incorrectly identifies the numerator by most likely counting the number of tick marks between 0 and P by including the tick mark at 0 rather than counting the number of tick marks from 0 to P.

Answer Option D: $\frac{2}{4}$ The student selected a response with the correct numerator. However, the student may then have counted the intervals remaining on the number line to determine the denominator.

Answer options A, C, and D are plausible but incorrect. They show partial understanding of the mathematical concept of representing a fraction on a number line diagram. However, these responses demonstrate a lack of a thorough understanding of the concept.

The Rogers family drove a total of 482 miles, starting on Friday and ending on Sunday. They drove 138 miles on Friday and 225 miles on Saturday. How many miles did they drive on Sunday?

- A** 119
- B** 121
- C** 363
- D** 745

Key: A

Measured CCLS: 3.OA.8

Commentary: The item measures 3.OA.8 because it asks the student to solve a two-step word problem using two of the four operations, specifically addition and subtraction.

Extended Rationale

Answer Choice A: 119; This response indicates a clear understanding of the process involved to correctly solve the problem. The student most likely added the number of miles driven on Friday and Saturday and then subtracted the sum from the total miles driven to arrive at the correct answer.

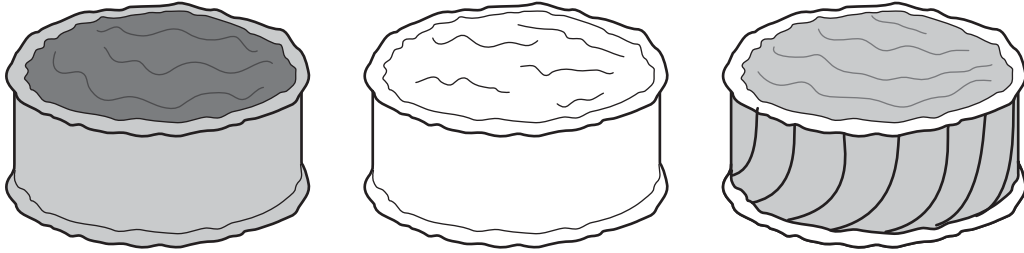
Answer Option B: 121; This response may indicate an understanding of the process involved to solve the problem, but lacks precision. The student may have added the number of miles driven on Friday and Saturday and but then incorrectly subtracted the sum from the total miles driven.

Answer Option C: 363; This response indicates the student may not understand the two-step process required to correctly solve the problem. The student likely added the number of miles driven on Friday and Saturday but failed to complete the process of subtracting the sum from the total miles driven.

Answer Option D: 745; This response indicates the student may not understand the process to correctly solve the problem and may also lack precision. Selection of this response suggests that the student may have added all of the numbers given in the problem and also encountered a regrouping error when adding in the hundreds column.

Answer options B, C, and D are plausible but incorrect. They show either limited understanding of the mathematical process or lack of precision required to solve the problem. In the case of answer option D, both occur.

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

Answer \$ _____

Measured CCLS: 3.OA.8

Commentary: This item measures 3.OA.8 because it asks the student to solve a two-step word problem using multiplication.

Extended Rationale: The correct answer of \$90 could be arrived at by first multiplying the number of cakes by the number of slices for each cake: $3 \times 6 = 18$. This shows that there are 18 slices of cake, in all, if each cake is cut into 6 slices. Then the student must multiply the number of slices by the cost of each slice: $18 \times 5 = 90$. The total amount earned for the sale of all the pieces in all three cakes is \$90.

SAMPLE STUDENT RESPONSES AND SCORES APPEAR ON THE FOLLOWING PAGES:

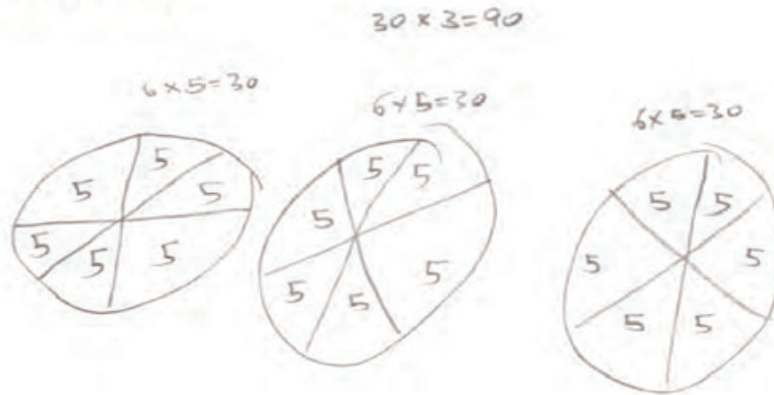
A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.



Answer \$90

Score Point 2 (out of 2 points)

This response answers the question correctly and uses both visual representation and correct calculations to demonstrate a thorough understanding of the mathematical concepts. The work shown correctly determines that $6 \text{ slices} \times \$5 = \$30$ per cake and that $\$30 \times 3 \text{ cakes} = \90 .

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

$$\begin{array}{r} \$5 \\ \times 6 \\ \hline \$30 \end{array} \quad \begin{array}{r} \$30 \\ \times 3 \\ \hline \$90 \end{array}$$

Answer \$ 90

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response identifies that each cake earned \$30 ($\$5 \times 6 = \30) and the total revenue of 3 cakes sold was \$90 ($\$30 \times 3 = \90).

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

$$6 \times 3 = 18$$

$$18 \times 5 = 90$$

Answer \$ 90

Score Point 2 (out of 2 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response shows that if each cake has 6 slices, then 3 cakes produce 18 slices for sale ($6 \times 3 = 18$). At \$5 a slice, the total revenue was \$90 ($18 \times 5 = 90$).

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

$$6 \times \$5.00 = \$30.00$$

↑ ↑ ↑
Slices Money Total Money
 in all

Answer \$30.00

Score Point 1 (out of 2 points)

This response demonstrates partial understanding of the mathematical concepts embodied in this task by correctly determining that each cake would generate \$30 in revenue ($6 \times \$5.00 = \30.00). However, the total amount earned for the sale of all the cakes has not been calculated.

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

30 dollars

$$\begin{array}{r}
 5 \\
 +5 \\
 5 \\
 5 \\
 5 \\
 5 \\
 5 \\
 \hline
 30
 \end{array}$$

5, 10, 15, 20, 25, 30

Answer 30

Score Point 1 (out of 2 points)

This response demonstrates partial understanding of the mathematical concepts embodied in this task by correctly determining that each cake would generate \$30 in revenue ($5 + 5 + 5 + 5 + 5 + 5 = 30$). However, the total amount earned for the sale of all the cakes has not been calculated.

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

$$6 \times 5 = 30$$

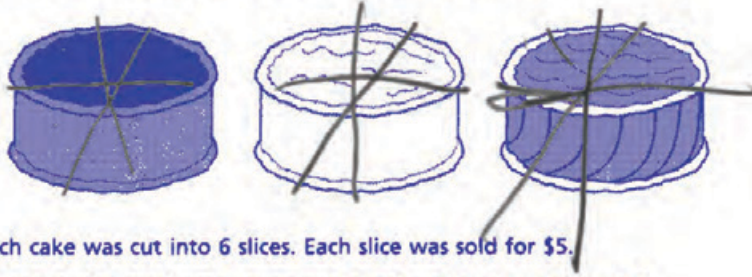
$$30 \times 3 = 60$$

Answer 5

Score Point 1 (out of 2 points)

This response demonstrates partial understanding of the mathematical concepts embodied in this task by correctly determining that each cake would generate \$30 in revenue ($6 \times 5 = 30$). However, the work to determine the total amount earned by the sale of 3 cakes includes a calculation error ($30 \times 3 = 60$) that results in an incorrect answer.

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

$$\begin{array}{r} 6 \\ 6 \\ + 6 \\ \hline \$18.00 \end{array}$$

Answer \$ 18.00

Score Point 0 (out of 2 points)

This response is incorrect. This response incorrectly adds slices to equal dollars.

A bake sale had the 3 cakes, as shown below, for sale.



Each cake was cut into 6 slices. Each slice was sold for \$5.

What was the total amount earned for the sale of all the cakes?

Show your work.

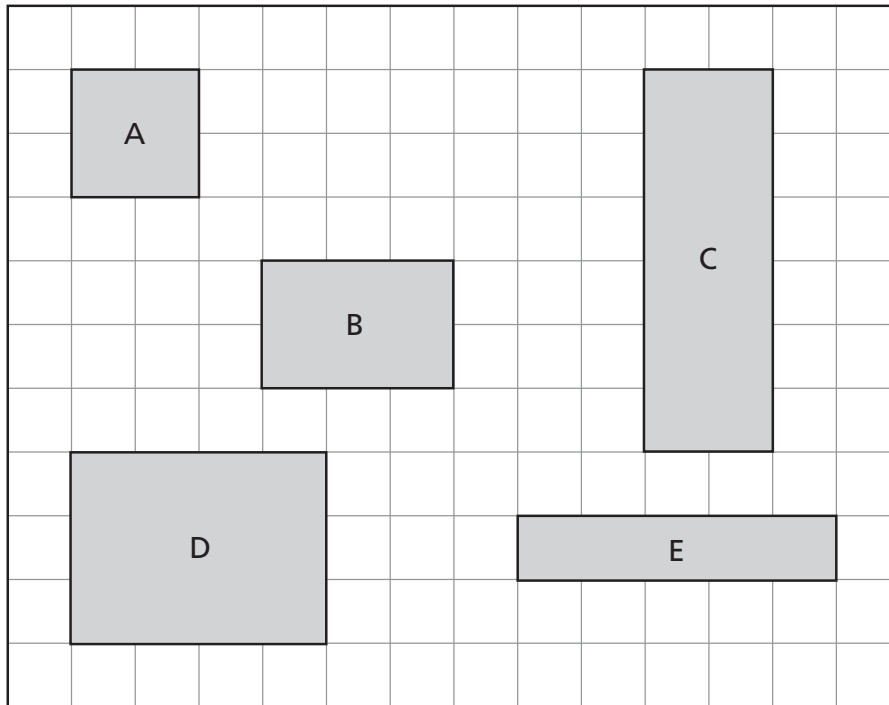
$$\begin{array}{r} 6 \\ + 3 \\ 5 \\ \hline \$14.00 \end{array}$$


Answer \$ 14.00

Score Point 0 (out of 2 points)

This response is incorrect. The process of adding all slices, cakes and dollars is an incorrect procedure.

The diagram shows the size of 5 different rectangles.



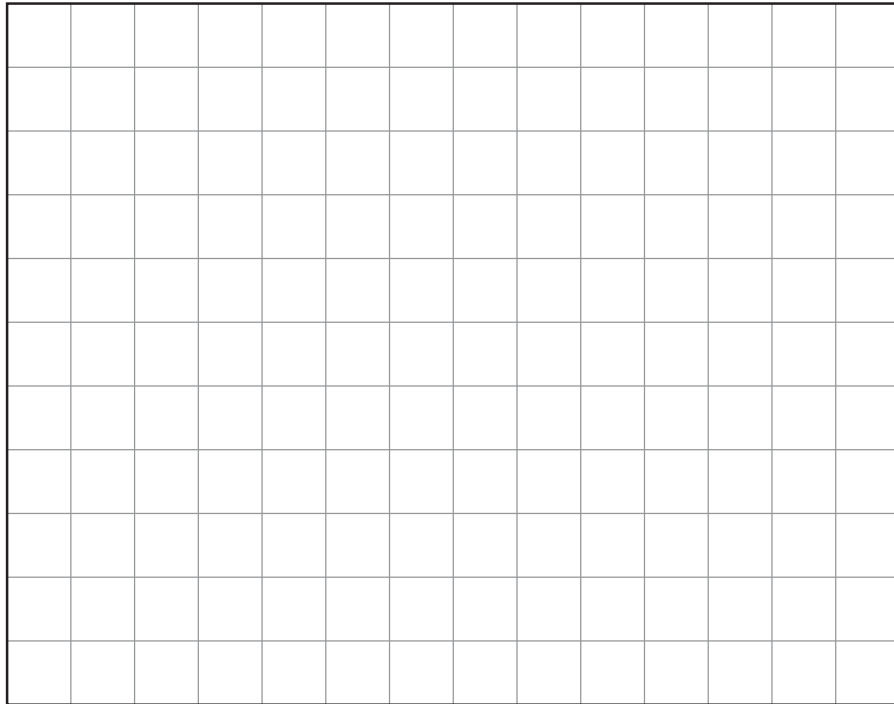
KEY	
	= 1 square unit


Which 2 figures have the same area?

Show your work or explain how you got your answer.

Answer _____ and _____

On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page X.



KEY	
	= 1 square unit

Measured CCLS: 3.MD.7a; 3MD.7d

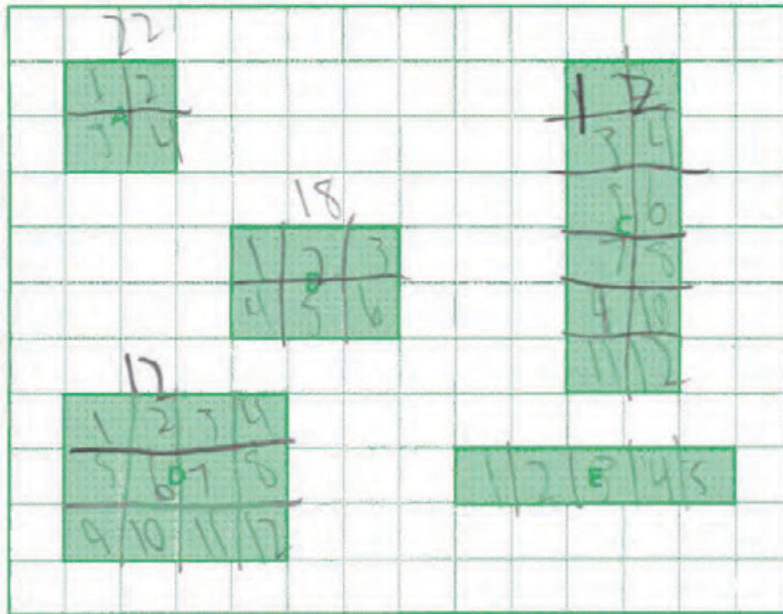
Commentary: This item measures 3.MD.7a because it asks the student to find the area of a rectangle with whole number side lengths by tiling it with unit squares. It also measures 3.MD.7d because asking students to create a new figure from the given rectangles with a specified area demonstrates an understanding that area is additive; adding the areas of smaller, component parts will yield the area of an entire region.


Extended Rationale: The correct answer to the first part of the item is determined by finding the area of each shaded rectangle. The process can be achieved either by forming square units based on tiling and counting the units, or by multiplying side lengths. With this process, the student would determine that rectangle C and rectangle D both have the area of 12 square units. The student could explain that rectangle C has side lengths of 2 units and 6 units; multiplying the side lengths would equal an area of 12 square units. Rectangle D has side lengths of 3 units and 4 units; multiplying these side lengths would also equal 12 square units.

With the second part of the item, the student could find three rectangles that have compatible lengths and widths which can be combined to form one large figure. Some students may recognize that rectangles A, B and C all have one side length that is 2 units wide. The length of the three rectangles combined is 11 units. The student could either multiply side lengths or count unit squares to determine that rectangles A, B, and C combined in any arrangement would form a figure that has an area of 22 square units. Students may also calculate the area of all five rectangles and employ a different set of three rectangles that leads to a total area of 22 square units, such as A, B, and D.

SAMPLE STUDENT RESPONSES AND SCORES APPEAR ON THE FOLLOWING PAGES:

The diagram shows the size of 5 different rectangles.



KEY	
	= 1 square unit

Which 2 figures have the same area?

Show your work or explain how you got your answer.



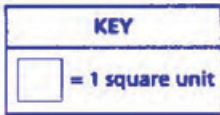
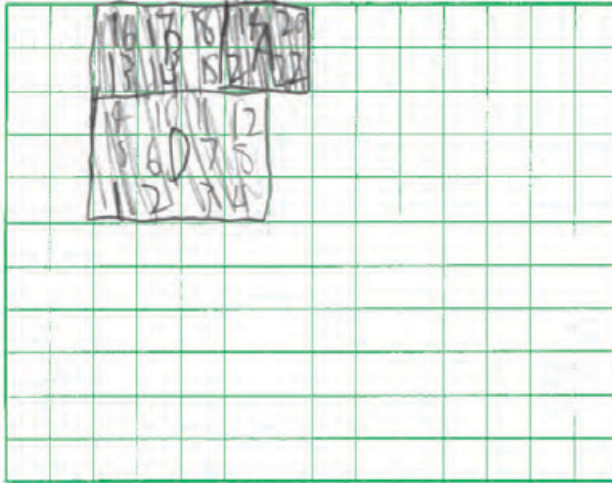
$$6 \times 2 = 12$$



$$3 \times 4 = 12$$

Answer D and C

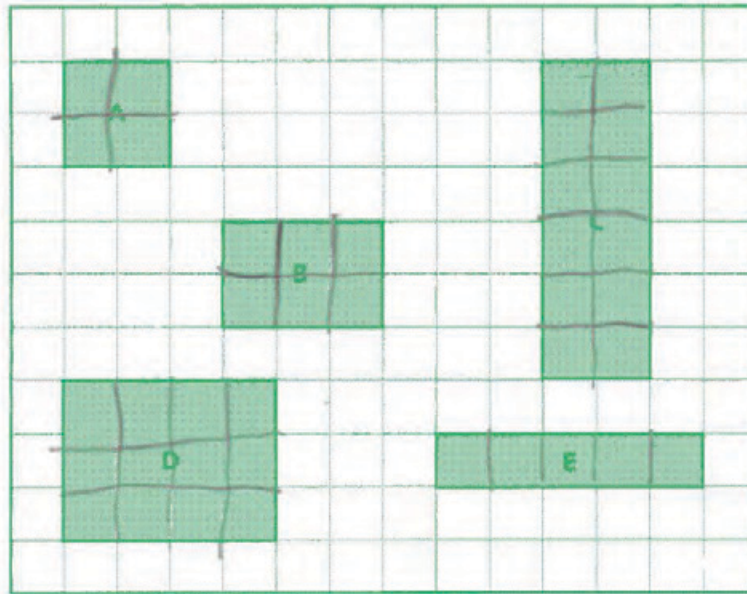
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 3 (out of 3 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response illustrates both the counting of square units of all figures and the multiplication of the dimensions of D and C that leads to the correct answers D and C. This response also correctly solves the third part by joining three rectangles (A, B, D) together to form a figure that has an area of 22 square units.

The diagram shows the size of 5 different rectangles.



KEY	
	= 1 square unit

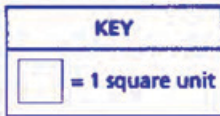
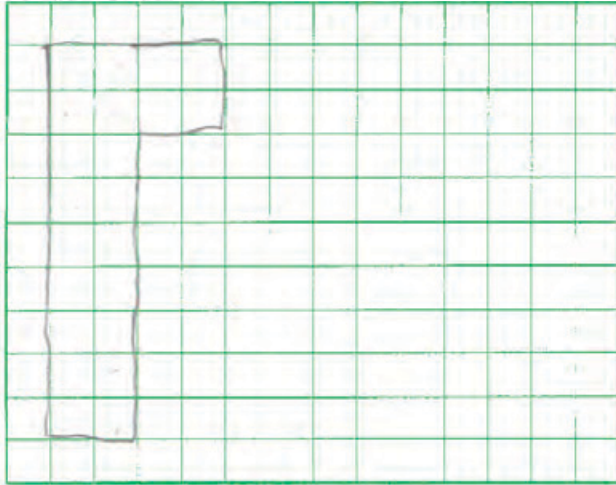
Which 2 figures have the same area?

Show your work or explain how you got your answer.

I Just drew the lines thru
the shape and it looked like a lot
so did it so I counted them and for both
I got 12.

Answer D and C

On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.

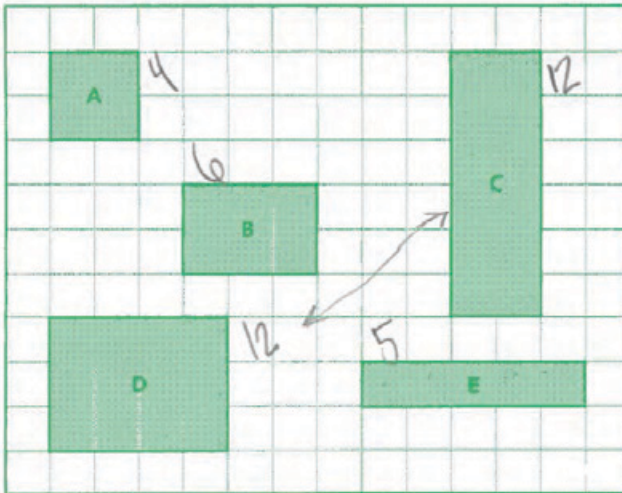



Score Point 3 (out of 3 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response adequately explains the process (drawing lines through the figures, counting, and comparing) to arrive at the correct answers D and C. The third part of the response is correctly solved by joining three rectangles (A, B, C) together to form a figure that has an area of 22 square units. Note: rectangles do not need to be labeled, and may be transposed to arrive at a figure that has an area of 22 square units.

Additional

The diagram shows the size of 5 different rectangles.



KEY	
	= 1 square unit

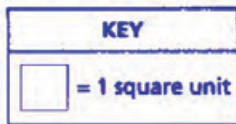
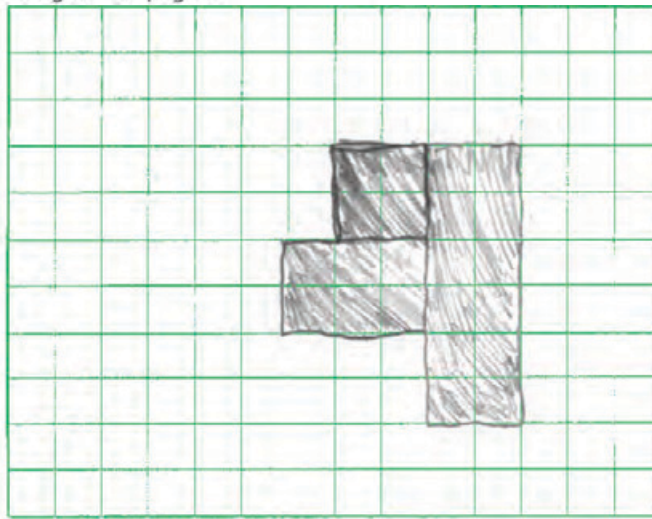
Which 2 figures have the same area?

Show your work or explain how you got your answer.

I counted each figure and I wrote the number next to them then I got my answer.

Answer D and C

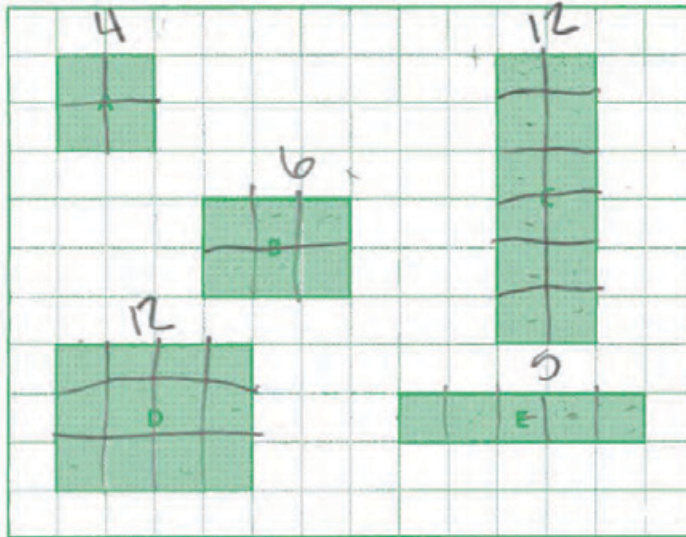
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 3 (out of 3 points)

This response answers the question correctly and demonstrates a thorough understanding of the mathematical concepts. This response adequately explains the work (counting and numbering each figure) that leads to the correct answer, D and C. In addition, the third part of the response is correctly solved by joining three rectangles (A, B, C) together to form a figure that has an area of 22 square units.

The diagram shows the size of 5 different rectangles.



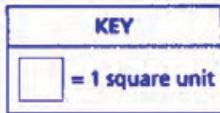
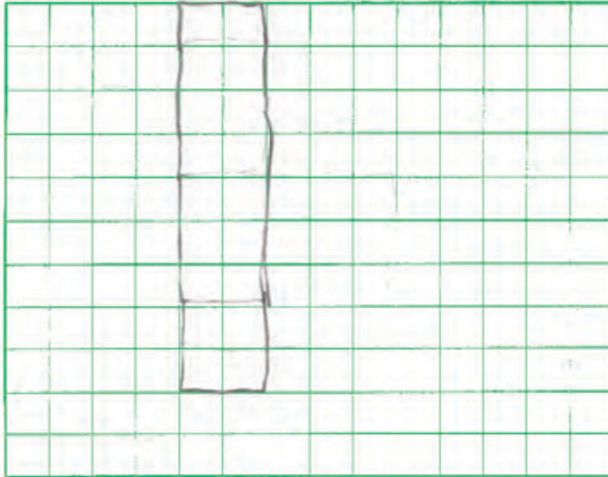
KEY	
	= 1 square unit

Which 2 figures have the same area?

Show your work or explain how you got your answer.

Answer C and D

On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.



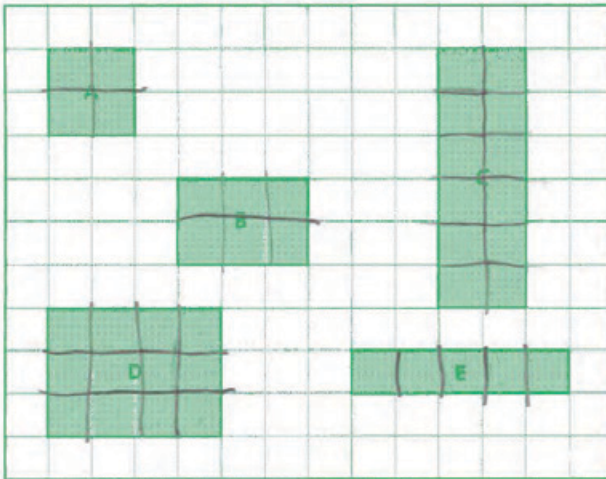
12, 6, 4


Score Point 2 (out of 3 points)

This response demonstrates partial understanding of the mathematical concepts embodied in the task. This response adequately explains the process (drawing lines through the figures in the diagram and labeling them with accurate numerical values) to arrive at the correct answers D and C. However, the last figure does not have an area of 22 square units.

Additional

The diagram shows the size of 5 different rectangles.



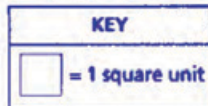
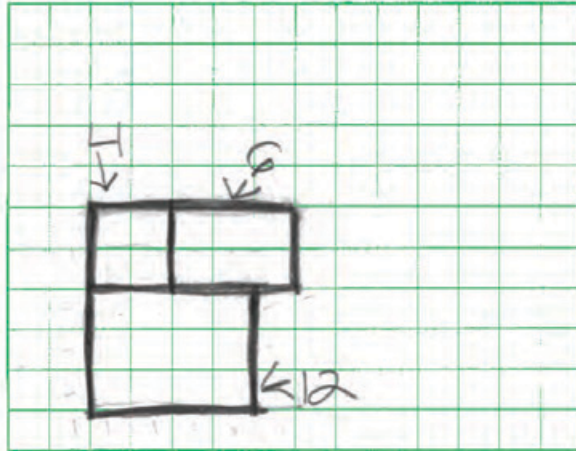
KEY	
	= 1 square unit

Which 2 figures have the same area?

Show your work or explain how you got your answer.

Answer Square and rectangle

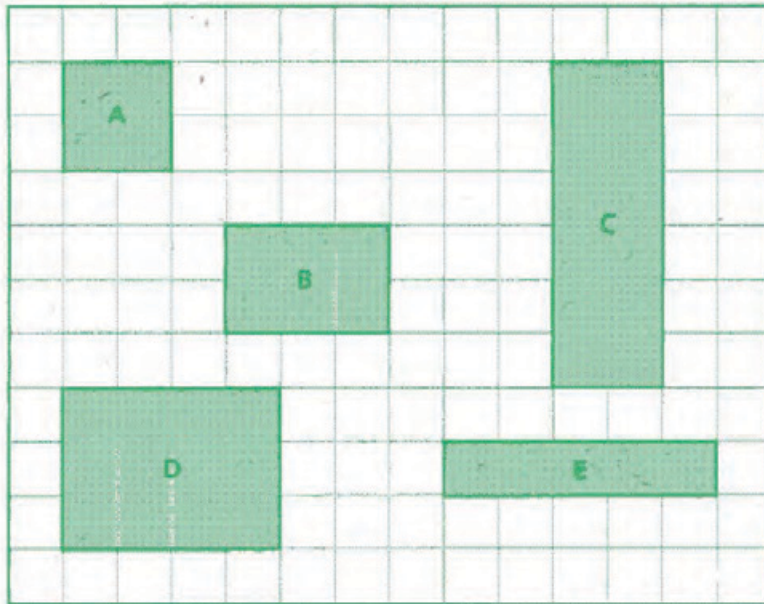
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 2 (out of 3 points)

This response demonstrates partial understanding of the mathematical concepts embodied in the task. This response answers the first part of the question adequately by properly drawing lines in the diagram (drawing correct lines without labeling is sufficient). A figure of 22 square units is constructed correctly by combining the rectangles A, B, and D. However, the two figures that have the same area are not correctly identified.

The diagram shows the size of 5 different rectangles.



KEY	
	= 1 square unit

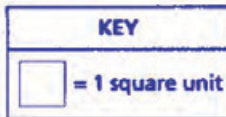
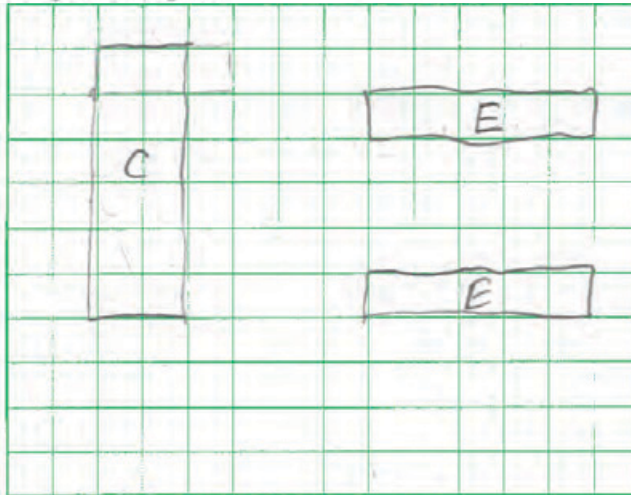
Which 2 figures have the same area?

Show your work or explain how you got your answer.

D and C are the same because they add up to 12.

Answer D and C

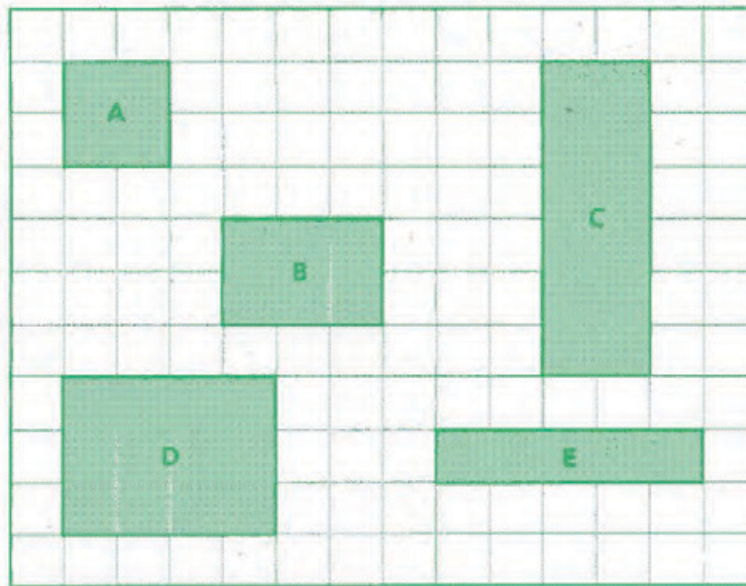
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 2 (out of 3 points)

This response demonstrates partial understanding of the mathematical concepts embodied in the task. This response adequately explains the work by indicating that the squares were counted in order to arrive at the correct answer D and C. However, although the rectangles drawn on the last grid cover 22 square units, they are not joined to form one figure. Note: Two of the same rectangles given may be used to form a figure that has an area of 22 units.

The diagram shows the size of 5 different rectangles.



KEY	
	= 1 square unit

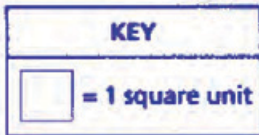
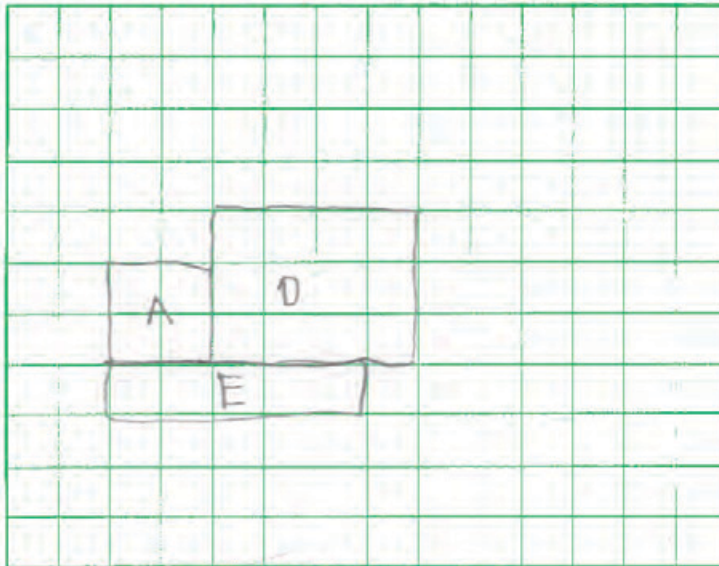
Which 2 figures have the same area?

Show your work or explain how you got your answer.

$$\begin{aligned} A &= 4 \\ B &= 6 \\ C &= 8 \\ D &= 12 \\ E &= 6 \end{aligned}$$

Answer E and D

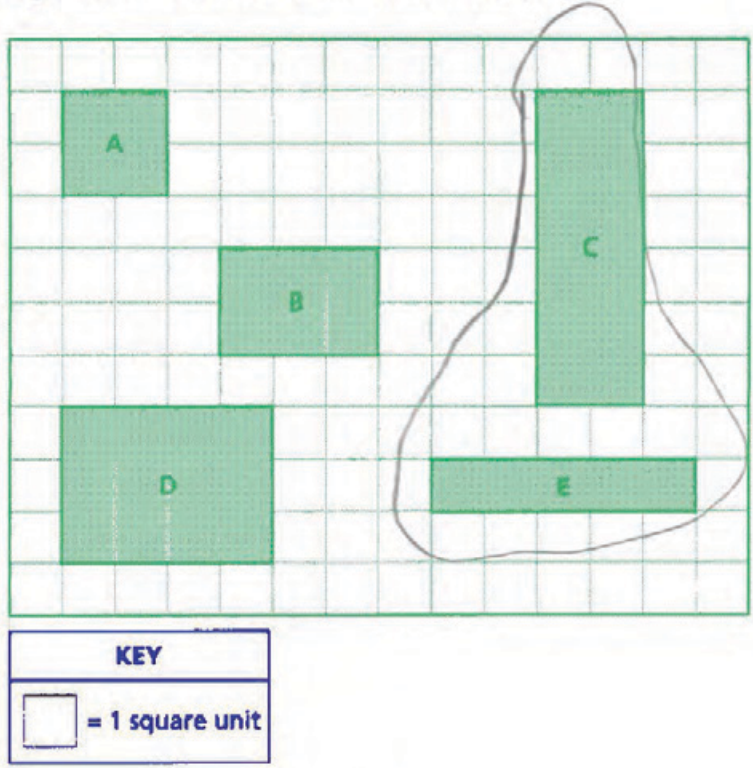
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.



Score Point 1 (out of 3 points)

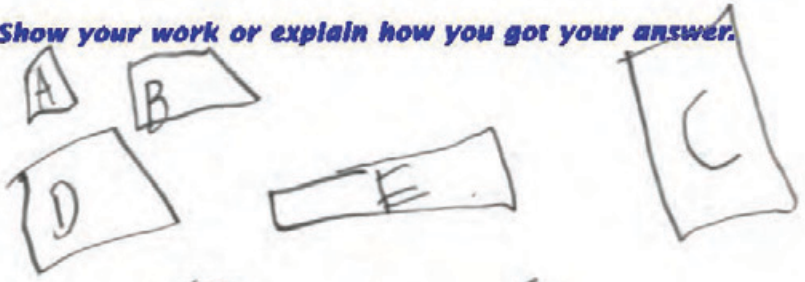
This response demonstrates only a limited understanding of the mathematical concepts embodied in the task. Although the values of B and E are incorrect, C and D are correct. The answer given (C and D) is correct. However, the three rectangles drawn on the last grid do not have an area of 22 units.

The diagram shows the size of 5 different rectangles.



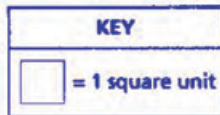
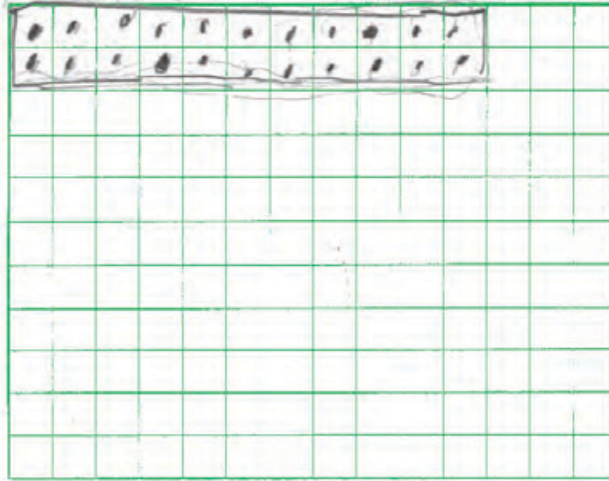
Which 2 figures have the same area?

Show your work or explain how you got your answer.



Answer ~~F~~ and C

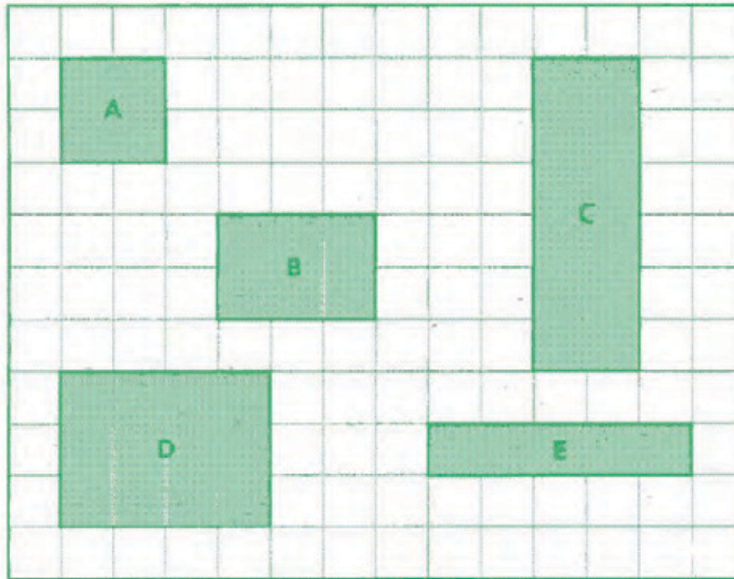
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 1 (out of 3 points)

This response demonstrates only a limited understanding of the mathematical concepts embodied in the task. The two figures named (E and C) and the work shown are incorrect. However, the figure shown in the last grid has 22 square units and is correct. Note: it is not required to label the rectangles used in the figure shown.

The diagram shows the size of 5 different rectangles.



KEY	
	= 1 square unit

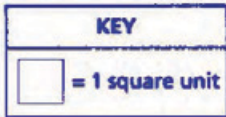
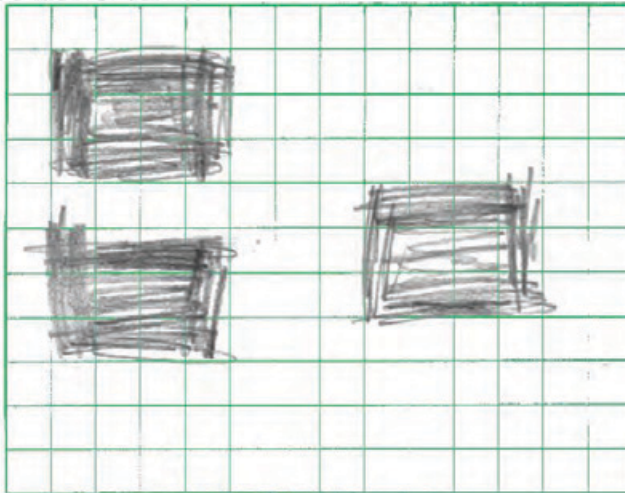
Which 2 figures have the same area?

Show your work or explain how you got your answer.

I counted very carefully
and D and C are equal

Answer D and C

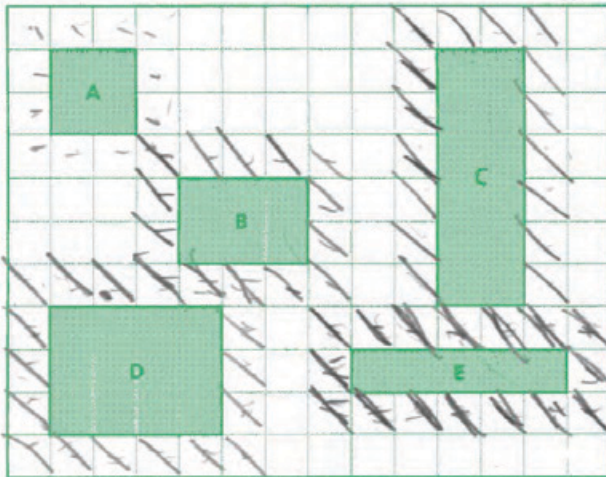
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 1 (out of 3 points)

The work shown in this response demonstrates only a limited understanding of the mathematical concepts embodied in the task. The answer given (D and C) is correct. However, the attempt in the final grid to construct a figure with an area of 22 units exhibits multiple flaws related to a misunderstanding of the aspects of the task: the number of units indicated is 36, and the rectangles are not joined.

The diagram shows the size of 5 different rectangles.



~~C = 20~~
~~E = 16~~
~~B = 14~~
~~D = 18~~
~~A = 12~~
~~E = 18~~

KEY	
	= 1 square unit

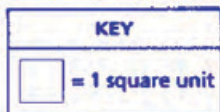
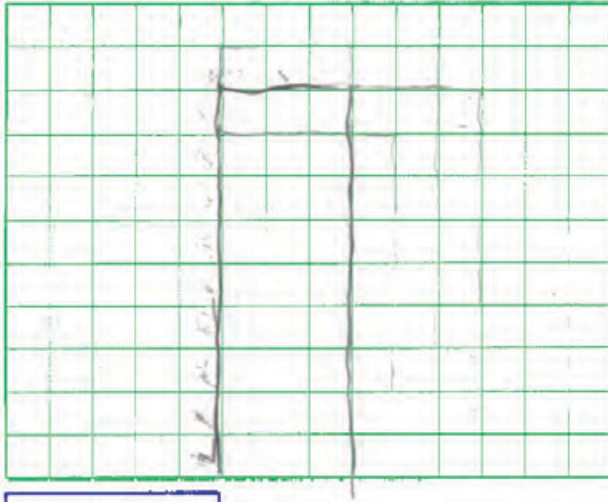
Which 2 figures have the same area?

Show your work or explain how you got your answer.

B = 14 D = 18
 A = 12
 E = 16
 C = 20 D ? C

Answer _____ and _____

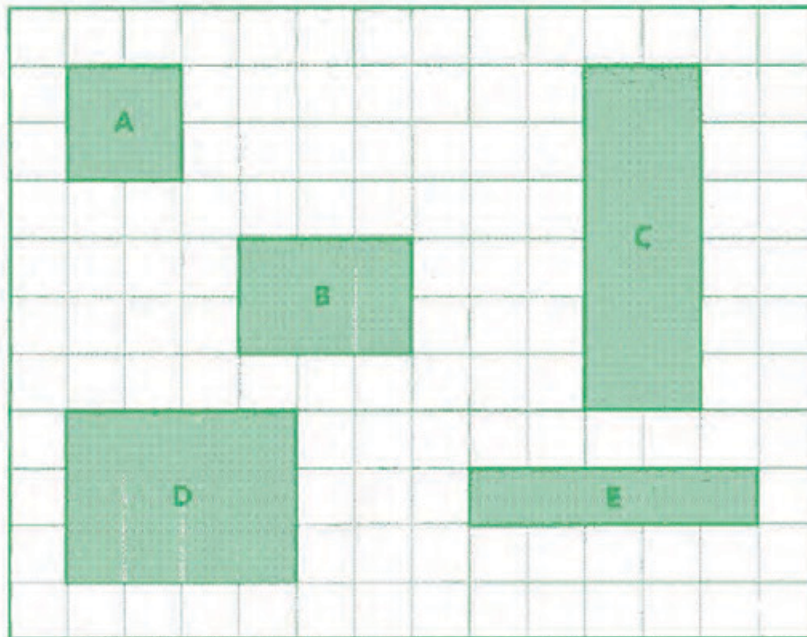
On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.




Score Point 0 (out of 3 points)

This response contains a correct answer (D and C); however, it is arrived at by using an obviously incorrect procedure. The figure drawn on the final grid is incorrect. Holistically, this response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.

The diagram shows the size of 5 different rectangles.



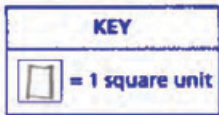
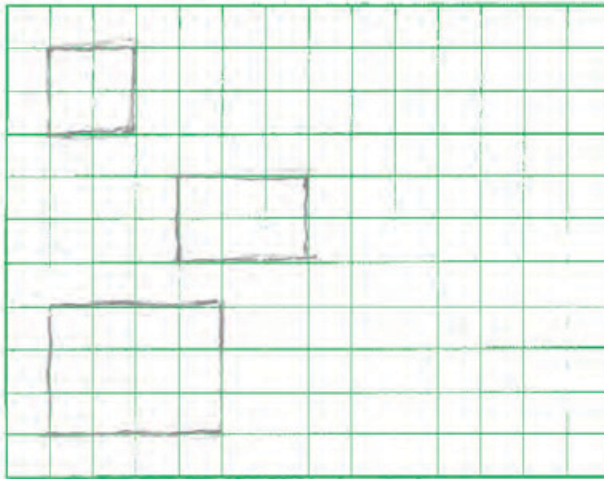
KEY	
	= 1 square unit

Which 2 figures have the same area?

Show your work or explain how you got your answer.

Answer A and B

On the grid below, join 3 of the rectangles together, without overlapping, to form one figure that has an area of 22 square units. Use the rectangles shown in the diagram on page 8.



Score Point 0 (out of 3 points)

This response contains no work and an incorrect answer. The figures drawn in the final grid do have an area of 22 square units but the rectangles are not joined. This response is not sufficient to demonstrate even a limited understanding of the mathematical concepts embodied in the task.