

COMMON CORE COLLABORATIVE CARDS



Grades 6–8

Additional resources available at

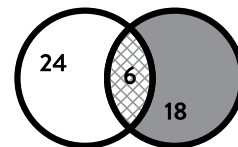
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TEACHER GUIDE

$$2^{3-7}$$

$$6x + 3y$$

$$\frac{2^4}{2^8}$$



EXPRESSIONS AND EQUATIONS

by Kit Norris

OVERVIEW

Common Core Collaborative Cards support the teaching and learning of mathematics in several ways. They can be used:

- As an activator for the day's lesson
- To review previous content
- As a learning center activity
- For students' independent practice

Common Core Collaborative Cards provide convenient and motivating ways to place students in collaborative teams for an upcoming unit or problem-solving lesson.

The Common Core Collaborative Cards series consists of three decks of cards per box, each focusing on the same domain in the Common Core State Standards (CCSS). Each deck provides problems representing the standards articulated in the CCSS for a particular grade level.

Teachers using these decks have commented that they have been able to observe what their students understand as well as identify their misconceptions. Teachers have also noted that their students began to rely on each other more instead of seeking out the teacher to answer their questions.

The cards are designed to place students in groups of four. Students are each given a card and asked to solve the problem on it. They then look for three other students who have the same solution. Once they have located their team, the students must be ready to explain why each team member's card belongs in the group. Here is one group of cards from the Grade 6 Expressions and Equations deck:

The image shows four cards arranged in a 2x2 grid. Each card has a white background with a grey border and a grey shadow. The top half of each card contains a mathematical expression, and the bottom half contains instructions for students to work together to solve it.

- Top-left card:** Expression: $3x + 2y$. Instructions: Evaluate this expression when $x = 4$ and $y = 3$. Work with your team to verify that all four cards have the same answer.
- Top-right card:** Expression: $16 - 18 \div (2 + 1) + 2^3$. Instructions: Cordelia thinks the value of this expression is 16. What do you think the value is? Work with your team to verify that all four cards have the same answer.
- Bottom-left card:** Expression: $x + x + y + y + y$. Instructions: Evaluate the expression when $x = 3$ and $y = 6$.
- Bottom-right card:** Expression: $2^2 + 5(2)^2 - 3(2)$. Instructions: Find the value.

All four cards in this set have the same answer, 18, so students who receive one of these cards form a group.

GROUP MEMBER ROLES

The cards offer a second feature: the reverse side of each card indicates the role the student holding the card is to perform in the group. After the students are presented with the task for that day's lesson, each member of the group takes on the role designated. These roles are as follows:

- Discussion Director
- Resource Manager
- Recorder
- Team Captain

Teachers can easily identify the roles that students are expected to perform since students place their cards on their desks with the side indicating the role facing up. The roles are explained as follows:

If you are the **Discussion Director**, your job is to . . .

- Make sure that everyone has read the problem and understands what the question is asking. You can ask, "What do we know?" "What do we want to find out?" and "Can we make a prediction?"
- Invite everyone in the group to participate. You can use statements such as, "What is your idea?" and "What are you thinking?"

If you are the **Resource Manager**, your job is to . . .

- Ask the teacher a question if all of the members of the team have the same question.
- Get any supplies needed by the group.
- Keep track of time.

The Resource Manager's role goes beyond taking care of the supplies. The Resource Manager is the only member of the group who may ask the teacher a question. Before asking a question, every member of the group must have the same question, and the teacher can then direct the answer to the whole group. This helps the members of the group become more interdependent, since group members can answer many of their questions themselves rather than relying on the teacher.

If you are the **Recorder**, your job is to . . .

- Keep track of the thinking of the group. Be ready to answer how the group approached the problem. What strategy did the group use to solve the problem?
- Record the work of the group. Be organized and clear.
- Ask, "Is there anything else we need to include?"

If you are the **Team Captain**, your job is to . . .

- Make sure that everyone in your group can explain to the class the solution and the strategies used to solve the problem.
- Ask each member of your group, “How would you explain what we did to get this answer?” “What questions do you have?”
- Check the group’s solution by asking, “Does our answer make sense?”
- Take on any role if one member of your group is absent.

MANAGING THE CARDS IN YOUR CLASSROOM

Like any other classroom materials, you’ll need to manage your Common Core Collaborative Cards. It is essential to group the cards by shared answer after each use. Since the cards are designed to place students in groups of four and since class size will vary, this end-of-activity organizational task will make it easier to distribute the cards the next time you use them. Here are some suggestions for organizing the cards after each use:

- As you collect the cards from each student group, place a rubber band around each group of four cards with the same answer before storing.
- After the activity, collect the cards from the class in any order and designate a student to organize the cards into groups of four according to the answer.

WHAT THE RESEARCH SAYS

Research on the effectiveness of collaborative learning abounds. For more information on the research that informs this product, as well as a complete list of bibliographic references and suggestions for further reading, please visit didax.com/cccc.

COMMON CORE STATE STANDARDS – MATHEMATICAL PRACTICES

The Common Core State Standards define what mathematically proficient students know and are able to demonstrate. Combining the process standards from NCTM’s Principles and Standards for School Mathematics with the definition of mathematical proficiency from Kilpatrick, Swafford, and Findell’s *Adding It Up: Helping Children Learn Mathematics*, the Common Core Standards present the Mathematical Practices.

These practices focus on the specific actions taken by students who are mathematically proficient.

The eight mathematical practices are:

1. Make sense of problems and persevere in solving them.
 2. Reason abstractly and quantitatively.
 3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
 8. Look for and express regularity in repeated reasoning.
- (*Common Core State Standards for Mathematics*, 2010, pp. 6–8)

The authors of the Common Core carefully chose to begin the mathematical practices with problem solving. “Problem solving is not only a goal of learning mathematics but also a major means of doing so” (NCTM, 2000, p. 52). Students who are engaged in solving meaningful tasks are in the process of building their understanding. They are making connections, constructing arguments, analyzing approaches, looking for patterns, and reflecting on their thinking. These students are learning mathematics, and they have opportunities to exhibit the eight mathematical practices.

The Collaborative Cards provide students with opportunities to develop proficiency in the eight mathematical practices. Students solve problems, discuss strategies, and reason mathematically (Mathematical Practices 1–3). They work with patterns and apply them in various contexts (Mathematical Practices 7–8). They determine whether to calculate problems mentally or use paper and pencil (Mathematical Practice 5). By attending to the use of appropriate vocabulary and the accuracy of their responses, they are attending to precision (Mathematical Practice 6). They use equations to model problem situations (Mathematical Practice 4).

The Collaborative Cards provide teachers with insights into what individual students truly understand. As they apply their knowledge in new contexts, students use what they know. As one fifth-grade teacher in Grafton, Massachusetts stated, “I gained insights into my students’ misconceptions. These cards are an easy way to learn about students’ strengths.”


EXPRESSIONS AND EQUATIONS: GRADE 6

The Grade 6 deck focuses on the standards in the Expressions and Equations domain, as presented in the Common Core document on pages 43–44. This deck extends students' thinking beyond expressing pattern relationships and working with ordered pairs. In the Expressions and Equations domain, students read, write, and evaluate expressions. They refer to the expressions by using the appropriate vocabulary, such as *sum*, *factor*, *quotient*, *term*, and *coefficient*. Students apply properties such as the distributive property to create equivalent expressions, and they solve equations and inequalities using one variable. Grade 6 students also work with variables and the relationship between independent and dependent variables using graphs and tables and show the connection with the equation.

Here are four cards that all have the same answer, $x + 3$.

Three more than x


Write this phrase as an expression.



Peter has three more apples than Margaret.
If Margaret's apples are represented by x ,
how can we represent the number of apples that Peter has?

Input	Output
0	3
2	5
4	7

Find the rule represented in this table.
(Represent the input value as x).
Work with your team to verify
that all four cards have the same answer.



Ms. Brown asked her class:
"If x is the starting point, what rule is suggested by this number line?"

After students have found the solution to their own card, they then find the three other students who have the same answer. Once the four students have verified that they belong in the same group, they view the expression $x + 3$ as it is represented on the different cards: in words, in a context, in a table, and on a number line.

Answers for the Grade 6 Expressions and Equations deck are provided on pages 10–12 of this guide.

EXPRESSIONS AND EQUATIONS: GRADE 7

The Grade 7 deck focuses on the standards in the Expressions and Equations domain, as presented in the Common Core document on page 62. In Grade 7, students extend their understanding of expressions as they factor, add, subtract, and expand linear expressions. Students extend their work from the previous grade to solve equations and they continue to solve problems by representing the given context using variables in equations.

Here are four cards that all have the same answer, 40.

$$\frac{2}{5}x - 4 = 12$$


Solve for x .

(Your team has the same answer as the solution to this equation.)

$$\frac{3}{8}x + 6 = 21$$

Solve for x .

(Your team has the same answer as the solution to this equation.)



The length of a rectangle is 2 more inches than the width. The width is 9 inches. What is the perimeter of this rectangle?

Be ready to share with your team how you solved the problem.

$$\frac{3}{8}x = 15$$

Marco thinks: "If $\frac{3}{8}$ of some number is the same as 15, then $\frac{1}{8}$ must be 5. So the whole amount must be 8 times 5."

If you agree with Marco, your team has the correct solution to this equation. If you disagree, your team has the answer =10.

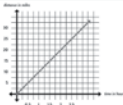
Once students have found their group of four, they work together to verify their solutions. At this time, students have an opportunity to discuss the pattern expressed on one of the cards, i.e., $\frac{3}{8}(x) = 15$. Might the logic used on this card also apply to another card, $\frac{2}{5}(x) - 4 = 12$? Students have an opportunity to experience two mathematical practices as they reflect on these cards. They can make use of structure as they multiply the fraction by its inverse in each case (Mathematical Practice #7: Look for and make use of structure) and they can generalize the pattern as they express the similarities between the two equations. (Mathematical Practice #8: Look for and express regularity in repeated reasoning.)

Answers for the Grade 7 Expressions and Equations deck are provided on pages 13–15 of this guide.


EXPRESSIONS AND EQUATIONS: GRADE 8

The Grade 8 deck focuses on the standards in the Expressions and Equations domain, as presented in the Common Core document on page 67. Students extend their understanding from the previous two grades to include positive and negative exponents, square and cube roots, and perform operations using scientific notation. Students also focus on proportional relationships and interpret unit rates as the slope of a graph. Students solve linear and simultaneous equations and apply their knowledge to represent real-world and mathematical problems using tables, graphs, and equations.

Here are four cards that all have the same solution, 10.



Vicky rode her bike to her grandmother's house. She then created this graph.
How many miles per hour was Vicky riding?



$P = 10t$

Martha wrote an equation to show how many pies she can make in a given amount of time. If P = the number of pies and t = the number of hours, how many pies can Martha make in one hour?

Time in hours	Number of books
1/4	2.5
1/2	5
3/4	7.5

Micky is recording how long it is taking him to read a stack of comic books. If Micky continues reading at the same speed, how many comic books will he have read in one hour?

$$0.25 \times 10^4 = 0.0025 \times \square^6$$

What value goes in the box to make this statement true?

This set of four cards enables the students who form this group to see the rate of change in a graph, a chart, and in an equation.

As students solve the question on their own card and then work with their team to establish that they all belong in the same group, they have opportunities to think beyond “finding the answer.” They are verifying, discussing, and extending their thinking about these topics. Thus, they are not only meeting the content standards laid out in the CCSS but are engaged in the problem-solving practices delineated in the CCSS Standards for Mathematical Practice.

Answers for the Grade 8 Expressions and Equations deck are provided on pages 16–18 of this guide.

VISIT DIDAX.COM/CCCC ...

For the following important resources:

- A complete bibliography and links to research that informed this product
- A complete correlation to the Common Core State Standards for each grade-level deck
- Meaningful tasks to be used at each grade level (once students have used the Common Core Collaborative Cards to form their groups)

ADDITIONAL MEANINGFUL TASKS

One of the best sources of meaningful tasks related to the Common Core is the book *NCSM: Great Tasks for Mathematics (K-5)* by Connie Schrock, Kit Norris, David K. Pugalee, Richard Seitz, and Fred Hollingshead. (National Council of Supervisors of Mathematics, 2013, ISBN: 978-0-9890765-0-0.)

GRADE 6 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

ANSWER
27

$$5 + 2^3 \times 3 - 2$$

Solve this equation.

Work with your team to verify that all four cards have the same ans

I think that 3^3 means the same as 3×3 .



Do you agree with Art?

Your team has the same value as 3

Is $2(8 + 5) + 1$ the same as $2(8) + 2(5) + 1$?



Danielle thinks that these two expressions represent the same value. Find that value.

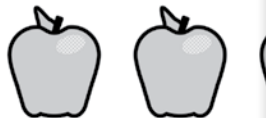
With your team, determine why these two expressions

Input	Output
3	7
4	9
5	11
6	13
•	•
•	•
13	7

What is the value of the output when the input is 13?

ANSWER
 $x + 3$

Three more than



Write this phrase as an expression

Peter has three more apples than Margaret. If Margaret's apples are represented by x , how can we represent the number of apples that

Input	Output
0	3
2	5
4	7

Find the rule represented in this table. (Represent the input value as x .) Work with your team to verify that all four cards have the same ans



Ms. Brown asked her class: "If x is the starting point, what rule is suggested by this number line?"

ANSWER
18

$$3x + 2y$$

Evaluate this expression when $x = 4$ and

Work with your team to verify that all four cards have the same ans

$$16 - 18 \div (2 + 1)$$

Cordelia thinks the value of this expression is 10. What do you think the value is? Work with your team to verify that all four cards have the same ans

$$x + x + y + y$$

Evaluate the expression when $x = 3$ and

$$2^2 + 5(2)^2 - 3(2)$$

Find the value.

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

GRADE 6 GROUPINGS

$$4m + 8z$$

$$4(m + 2z)$$

$$m + m + m + 2(4z)$$

$$(7 + 1)m + 2z$$



Carla went to the zoo. She saw 4 times as many monkeys as she saw on her last visit. If m represents the number of monkeys, write an expression to represent the number of monkeys and zebras that Carla saw at the zoo.

Two of these expressions are equivalent. Find the equivalent expressions. Your team has the answer expressed in expanded form.



When $m = 2$ and $z = 1$, the value of the expression is 10. When $m = 3$ and $z = 2$, the value of the expression is 20. When $m = 1$ and $z = 2$, the value of the expression is 10. What is the expression?

$$4(m + z + z)$$

$$m + m + 4(2z) + m + m$$

ANSWER
4m + 8z

Manny thinks these two expressions are equal. Britt disagrees. If you think the two expressions are equal, your team has the same expression in expanded form. If you think the expressions are not equal, your team has the answer 10.



You had some money in your wallet and your mother gave you \$17 more. You now have \$25. How many dollars did you have in your wallet before your mother gave you \$17?

25	
17	x

Find the value of x . This bar model matches your partner's work and solution.



$$25 =$$

$$x - 17$$

$$x + 17$$

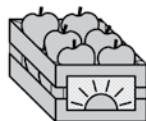
$$2x$$

Pedro had some baseball cards. His friend Marco had 17 more cards. Pedro now has 25 baseball cards. Select the equation that matches this situation and solve for x . Your team has the answer to the correct equation.

$$x + 17 = 25$$

ANSWER
8

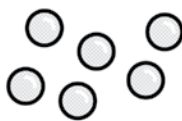
Which value for x will make this equation true?



Maria is helping her father pick apples. Today she picked three times as many apples as her mother. If her father picked 25 apples, how many apples did they pick altogether?



Harry has three times as much money as his brother. If William has \$25, how much money do they have altogether? Use the diagram above to help you find the answer.



$$3m =$$

$$\frac{m}{3}$$

$$3 + m$$

$$m -$$

Marcus has 25 marbles. Sarah has three times as many marbles as Marcus. Select the equation that best represents the situation and solve for m . Use this information to calculate how many marbles Marcus and Sarah have altogether. Your team has the answer.

Juanita's work:

$$(6 + 4)^2 =$$

$$(10)^2 =$$

$$100$$

Gwen's work:

$$(6 + 4)^2 =$$

$$6(2) + 4(2) =$$

$$12 +$$

$$20$$

ANSWER
100

Your partners have the correct solution to this problem.

GRADE 6 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccs.

$$3x + 2y < 15$$

x	y
4	
5	
2	
3	

ANSWER
 $x = 2, y = 3$

Which values for x and y in the table will make this inequality true?

$$3y - 2x > 4$$

x	y
1	
2	
0	
0	

Find the values for x and y in the table that will make this inequality true.

$$3x + 4y = 18$$

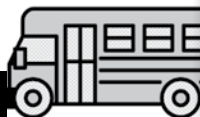
x	y
1	
3	
2	
2	

Which values for x and y in the table will make this equation true?

$$9 = 5y - 3x$$

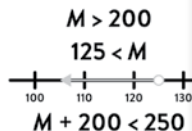
x	y
2	1
3	2
0	3
2	3

Select the values for x and y in the table that will make the equation true.



ANSWER
 $M > 125$

The sixth-grade class must raise more than \$200. So far the class has raised \$40 in a bake sale and \$60 in a car wash. Write an inequality that represents how many dollars the class must raise. (M = the amount of money to raise.)



Barry is driving from St. Louis to Kansas City. He has driven 125 miles and has not covered half the distance yet. If he must travel, select the inequality that represents the distance he must travel. (Your team has the same inequality expressed in a different way.)



$M > 15,000$
 $M + 1,250 > 15,000$
 $M > 15,000$
 $M > 15,000$

Glenda must save more than \$15,000 over the next 3 months. She saves \$125 each month. Will she reach her goal? Select the inequality that best describes how much money Glenda must save to reach her goal. (M = the amount of money she must save.)



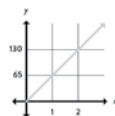
Ms. Caplan asks her class, "If we know that $1000M > 125,000$, what do we know about M ?"

Write the inequality that answers her question.

Hours	0	1	2
Distance	0	65	130

ANSWER
195

Val's father drove at a constant speed of 65 miles per hour. What is the value represented by the "?" in the table?



Grafton's mother drove the family car at a constant speed of 65 miles per hour. How many miles will she have driven after 3 hours?

D = distance in miles

t = time in hours

You are traveling at a constant speed of 65 miles per hour. Write an equation that describes the distance you have traveled in 3 hours. Your team has the same equation.

$$65 = d + t$$

$$d = 65t$$

$$d = \frac{65}{t}$$

If d = distance in miles and t = time in hours, select the correct equation when the rate of speed is 65 miles per hour. Use the equation to determine how many miles someone would travel in 3 hours at the rate of 65 miles per hour. (Your team has the same answer.)

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

GRADE 7 GROUPINGS

$$6x + 3y$$

The area of this rectangle is $6x + 3y$.
If the length of the rectangle is $2x + y$, what is the width?
(Your team's answer is the same as the width of the rectangle.)

$$6y + 3x^2$$

Find the common factor for the two terms of the expression.

$\frac{1}{6}$ of 12 is the same as $12 \div 6$, so ...

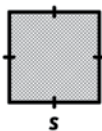


Tara sees the pattern. Multiplying a number by $\frac{1}{6}$ is the same as dividing the number by 6.

$$(?) (2ab - 4b) = 6ab - 12b$$

What number goes in the parentheses to make the statement true?

ANSWER
3



- I) $2s + s$
- II) $s + s$
- III) $4s$
- IV) $2s$

Select the expression that does not represent the perimeter of the square.
(Your partners have the same Roman numeral answer as you do.)

- I) $7b - 3a$
- II) $-3a + 7b$
- III) $-7b - 3a$
- IV) $-3a + 3b + 4b$

Select the expression that is not equivalent to $4b - 3a$.
(Your partners have the same Roman numeral answer as you do.)



- I) $6x - 3x$
- II) $2x + 10y$
- III) $2x - 10y$
- IV) $x + 10y$

If the perimeter of this equilateral triangle is $3x + 10y$, select the expression that represents one side of the triangle.
(Your partners have the same Roman numeral answer as you do.)

- I) $2(x + 5y)$
- II) $2x + 10y$
- III) $8x - 10y$
- IV) $2x + 5y + 5y$

Select the answer that is not equivalent to the expression $5x + 10y - 3x$.
(Your partners have the same Roman numeral answer as you do.)

ANSWER
III

- A) $12M + 12(M - 2) = 72$
- B) $12M + 12(M + 2) = 72$
- C) $12(M + M - 2) = 72$
- D) $72 = 12M + 12(M - 2)$

M = number of hours
 $M - 2$ = number of hours

Maria and Roberta each made \$12 per hour babysitting and earned \$72. Maria worked two more hours than Roberta. Select the equation that could not be used to find out how much money each earned.
(Your partners have the same letter answer as you do.)

- A) 20 adult tickets and 30 student tickets were sold.
- B) $T = 8A + 12S$
- C) $480 = 4(3A + 2S)$
- D) $480 = 12A + 8S$

A = number of adult tickets
 S = number of student tickets
 T = total amount of money

The seventh grade made \$480 selling tickets to a school play. Adult tickets cost \$12 and student tickets cost \$8. Select the above statement that could not be true.
(Your partners have the same letter answer as you do.)

- A) $M = 0.5P$
- B) $60 = P + 2P + 3P$
- C) $H = 3(\frac{1}{2}P)$
- D) $60 = P + \frac{1}{2}P + \frac{1}{2}P$

P = number of baseball cards
 M = number of baseball cards
 H = number of baseball cards

Harry has three times as many baseball cards as Peter. Together, they have 60 baseball cards. Select the equation that could not be true.
(Your partners have the same letter answer as you do.)

- A) $4.25O + 4.25C = T$
- B) $T + 4.25O = 4.25C$
- C) $4.25(O + C) = T$
- D) $T = 4.25C + 4.25O$

O = number of oatmeal cookies
 C = number of chocolate chip cookies
 T = total amount of money

Ms. Baker sold cookies for \$4.25 per cookie. She made both oatmeal and chocolate chip cookies. Select the above statement that could not be true.
(Your partners have the same letter answer as you do.)

ANSWER
B

GRADE 7 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccc.

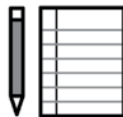
- A) $22s \geq 180$
 B) $180 - 22s \geq 48$
 C) $180 - 22s \leq 48$
 D) $22s \leq 180$

ANSWER
D

Latisha has \$180 to spend on a sweater and some shirts. The sweater costs \$48 and the shirts cost \$22 apiece. How many shirts can she buy? (Your partners have the same letter answer as you do.)

- A) $M = 0.20(120)$
 B) $180 - 0.20(120) = M$
 C) $180 - 120 = M$
 D) $180 - 0.80(120) = M$

M = amount of money in bank account

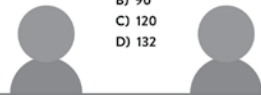


- A) Mary: 2
 B) Henry: 2
 C) Marguerite: 2
 D) Desean: 2

Grace has \$180 in her bank account. She wants to buy a pair of skates on sale for 20% off. The original price of the skates was \$120. How much money will she have left in her bank account? (Your partners have the same letter answer as you do.)

Four students conducted surveys of their classmates about how many hours they watched TV each night. The result of each student's survey is shown above. Who watched the smallest number of hours of TV each night? (Your partners have the same letter answer as you do.)

- A) 50
 B) 90
 C) 120
 D) 132



Mary says, "Consecutive numbers are 1, 2, 3, 4, and so on." Jon says, "Yes, and 2, 4, 6, and 8 are consecutive even numbers." Select the answer that is the sum of the first 11 consecutive even numbers. (Your partners have the same letter answer as you do.)

No. of Cubes	Sides Painted
1	5
2	9
3	13
4	17
...	...
8	?

ANSWER
II

These cube towers need to be painted. We don't have to paint the sides of cubes that are on the bottom. How many sides will be painted when we have a tower of 8 cubes? (Your partners have the same Roman numeral answer as you do.)

x	1	2	3	4	5	
y	5	9	13	17	21	

- I) $y = 3x$ III) $y = 3x + 1$
 II) $y = 4x + 1$ IV) $y = 4x - 1$

The above table shows a pattern. Which equation could be used to determine the tenth number in the pattern? (Your partners have the same Roman numeral answer as you do.)



Sally has one more than four times as many dollars as her brother Billy has. If Billy has a whole number of dollars, which of the above amounts could Sally actually have? (Your partners have the same Roman numeral answer as you do.)



- I) 12
 II) 15
 III) 18
 IV) 20

Pierre is thinking of a number. When he multiplies his number by 4 and adds 1, he gets 61. What is his number? (Your partners have the same Roman numeral answer as you do.)

- A) $2(N - 5) = 30$
 B) $\frac{1}{2}(N - 5) = 30$
 C) $\frac{1}{2}(N + 5) = 30$
 D) $2(N + 5) = 30$

ANSWER
A

Sally is thinking of a number. When she subtracts 5 from it and then multiplies by 2, her result is 30. Which equation describes how to solve for Sally's number? (Your partners have the same letter answer as you do.)

- A) $M = 1.04(1000)$
 B) $M = 0.04(1000)$
 C) $M = 0.96(1000)$
 D) $M - 0.96 = 0.04(1000)$

Mario put \$1000 in a savings account. The bank has an annual interest rate of 4%. Which equation can he use to calculate how much money he will have at the end of the first year? (Your partners have the same letter answer as you do.)

- A) \$22.00
 B) \$30.00
 C) \$18.00
 D) \$20.20

Kingsley makes and sells doll clothes. She usually sells each doll shirt for \$22.00. She decides to raise her price by 10%. Which equation represents the new price for 3 doll shirts? (Your partners have the same letter answer as you do.)



- A) $0.5N - 3 = 11$
 B) $\frac{1}{2}N + 3 = 11$
 C) $0.5(N - 3) = 11$
 D) $2N - 3 = 11$

Dean is thinking of a number. If he takes one half of his number and then adds -3, the result is 11. Which equation can be used to find Dean's number? (Your partners have the same letter answer as you do.)



Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccs.

GRADE 7 GROUPINGS

$$\frac{2}{5}x - 4 = 12$$

Solve for x .

(Your team has the same answer as the solution to the equation.)

$$\frac{3}{8}x + 6 = 21$$

Solve for x .

(Your team has the same answer as the solution to the equation.)



The length of a rectangle is 2 more inches than the width. The width is 9 inches. What is the perimeter of the rectangle?
Be ready to share with your team how you solve it.

$$\frac{3}{8}x = 15$$

Marco thinks: "If $\frac{3}{8}$ of some number is the same as 15, then $\frac{1}{8}$ must be 5. So the whole amount must be 8 times 5." If you agree with Marco, your team has the correct solution to this equation. If you disagree, your team has the answer -10 .

ANSWER
40



Rich Racer got a speeding ticket for doing 50 mph over the limit. He was fined \$80 plus an additional 10% of the fine for every 10 mph over the speed limit he was speeding. How much did Rich Racer have to pay?



One tenth of what number is 9.6?

Discuss with your group:
Is it easier to calculate this using a fraction or a decimal?



The football helmet Jayden wants to buy costs \$120. It is on sale for 20% off. How many dollars will Jayden have to pay?
Be ready to share your approach with your team. See whether they have another way to solve it.

$$100 \times 0.96 \div 10 \times 10 = ?$$

Find the value.

Be ready to explain to your team how you found the answer. Ask them whether they have an easier way.

ANSWER
96

$$4(n - 2) = 2n + 12$$

Solve this equation.

Be ready to show your work to your team. Discuss whether there is a different way to solve this equation.

$$\frac{3}{5}x = 6$$

I know that $\frac{3}{5}$ multiplied by some number is 6. So the same number multiplied by 5 must be 5 times 6.

Do you agree with Michelle's reasoning? If you do, then your team has the same answer as the correct answer to this equation. If not, your team has -10 as the value of x .

When I multiply a value by one-tenth, it is the same as dividing the value by this number.

What number is Henry thinking of?
Be ready to share examples of this relationship with your team.

$$-5(n - 2) = 2(n - 30)$$

Solve this equation.

Share your thinking with your team. Be ready to show the steps you took to solve this problem.

ANSWER
10

GRADE 8 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/cccs.

ANSWER
1/16

$$\frac{2^4}{2^8}$$

A unit fraction has a numerator of 1.
Express this value as a unit fraction with a whole number denominator.

$$2^{3-7}$$

Find the value.
(Write your answer without using exponents.)
Be ready to share your thinking with your team.

$$4^{-2} \times 3^0$$

Simplify this expression.
(Write your answer without using exponents.)
Be ready to share your thinking with your team.

$$\frac{32}{16} = 2 \quad 32 \times ? = 2$$

Pedro told his friend Manny: "When I divide 32 by 16, the result is 2. When I multiply 32 by the number I'm thinking of, the result is also 2."
What is Pedro's number?

ANSWER
16

$$(\sqrt{2})(\sqrt{2})(\sqrt{4})(\sqrt{4})(\sqrt{4})$$

Find the value.
Share with your team how you solved this expression.

$$(4^6)(4^5)^2 = 4^x$$

Determine the exponent that goes in the blank.

$$(4^{-1})(4^3)(4^0)$$

Find the value of this expression.
With your team, discuss how you could explain why 4^0 does not equal 0.

$$x^2 = 256$$

Solve this equation.
(Your team has the positive solution.)

ANSWER
100



How many times bigger is 4×10^3 than 4×10^1 ?
Be ready to explain to your team how you solved this problem.

$$7.2 \times 10^3 = 72 \times 10^x$$

Determine the value that goes in the blank.
Your team has an equivalent representation of the same number.

$$(2.5 \times 10^4)(4 \times 10^3)$$

Find the value.
Be ready to share with your team how you solved this problem.

$$[(\sqrt{5})^2(\sqrt{2})(\sqrt{2})]^2$$

Gerry and Samantha are looking at this expression. Gerry says, "We need to consider the order of operations." Samantha says, "We also need to know what happens when you square a square root." Find the value of the expression.

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccsc.

GRADE 8 GROUPINGS

$$3,600,000,000,000 =$$

$$\frac{(0.3 \times 10^{-3})(8 \times 10^2)}{2 \times 10^{-2}}$$

$$(0.004 \times 10^2)(0.3)$$

$$(4^2)(8^2)(2^2) = 2^{\square}$$

ANSWER
12

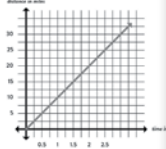
Joe wants to write the above value in scientific notation. What exponent will he use as the power of 10?

Find the value for this expression. Discuss with your team whether or not there is more than one way to solve this problem.

Find the value.

Find the value that goes in the box to make a true statement.

Distance in miles



Vicky rode her bike to her grandmother's house. She then created this graph. How many miles per hour was Vicky riding?

Time in hours	Number of books
1/4	2.5
1/2	5
3/4	7.5

Micky is recording how long it is taking him to read comic books. If Micky continues reading at the same rate, how many comic books will he have read in 1 hour?



$$P = 1$$

Martha wrote an equation to show how many pies she can make in a given amount of time. If P = the number of pies and T = the number of hours, how many pies can Martha make in 1 hour?

$$0.25 \times 10^4 = 0.0025 \times \square^6$$

ANSWER
10

What value goes in the box to make this statement true?

$$5(x - 2) = 3x - (-2)$$

- A) No solution
B) 1
C) Infinite number of solutions
D) -1

Help Hans solve this equation. (Your team has the same letter as the correct solution.)

$$\frac{4}{6}x - 4 = \frac{8}{12}x - 4$$

- A) Infinite number of solutions
B) No solution
C) 12
D) -12

Help Manuel solve this equation. (Your team has the same letter as the correct solution.)

$$4(2x - 3) = 2[3(x - 2)]$$

- A) 9
B) No solution
C) Infinite number of solutions
D) -9

Gina says, "I think I need to use the distributive property." Help Gina solve for x . (Your team has the same letter as the correct solution.)

$$\frac{3}{4}x = \frac{1}{2}x + 6$$

- A) 24
B) 12
C) No solution
D) 6

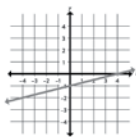
Solve for x . (Your team has the same letter as the correct solution.)

ANSWER
A

GRADE 8 GROUPINGS

Correlation to the Common Core State Standards for each group of 4 cards can be found at didax.com/ccc.

**ANSWER
D**



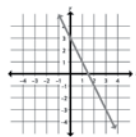
Which equation matches the graph
A) $y = 4x - 1$ B) $y = \frac{1}{4}x + 1$ C) $y = -4x - 1$

(Your team has the same letter as the correct solution.)

I'm thinking of a number. When I subtract 1 from my number and then multiply the difference by 4, I get the same value as when I multiply my number by 4 and then subtract 4 from the product

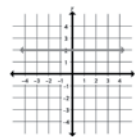
Select the solution to Matty's problem
A) No solution B) 8 C) -8 D) Infinite number

(Your team has the same letter as the correct solution.)



Select the equation that matches this graph
A) $y = -\frac{1}{2}x + 3$ B) $y = 2x + 3$ C) $y = -2x - 3$

(Your team has the same letter as the correct solution.)



Select the equation that matches this graph.
A) $y = 2x$ B) $y = x$ C) $x = 2$ D) $y = 2$

(Your team has the same letter as the correct solution.)

**ANSWER
C**

$$\begin{aligned} x + y &= 4 \\ \text{and} \\ 2x + 2y &= 8 \end{aligned}$$

Select the answer that best fits this system of equations
A) No solution B) One solution: (0, 0)
C) Infinite number of solutions D) One solution: (1, 2)
(Your team has the same letter as the correct solution.)

$$\begin{aligned} 2x + y &= 4 \\ \text{and} \\ 4x - y &= 2 \end{aligned}$$

Select the answer that best fits this system of equations
A) No solution B) One solution: (2, 0)
C) One solution: (1, 2) D) Infinite number of solutions
(Your team has the same letter as the correct solution.)

$$\begin{aligned} 3x + 2y &= 4 \\ \text{and} \\ 2y + 3x &= 6 \end{aligned}$$

Select the answer that best fits this system of equations
A) Infinite number of solutions B) When the equations meet in one point C) No solution D) One solution: (1, 2)
(Your team has the same letter as the correct solution.)

$$\begin{aligned} 2x + y &= 1 \\ \text{and} \\ 3x + 2y &= 3 \end{aligned}$$

Select the answer that best fits this system of equations.
A) Infinite number of solutions B) No solution
C) One solution: (-1, 3) D) One solution: (3, -1)
(Your team has the same letter as the correct solution.)

**ANSWER
B**

$$\begin{aligned} -2x - (x + 5) &= 10 \\ -2x - x + 5 &= 10 \\ -3x &= 5 \\ x &= -\frac{5}{3} \end{aligned}$$

Which letter answer best describes Melanie's error? A) She forgot to distribute the negative sign. B) She forgot to distribute the negative sign in parentheses. C) She forgot to subtract 5. D) She should have divided by 3 before subtracting.

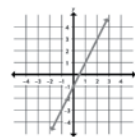
$$\begin{aligned} 2x - y &= 1 \\ \text{and} \\ -2y + 4x &= 2 \end{aligned}$$

Select the answer that best fits this system of equations
A) One solution (1, 2) B) Infinite number of solutions
C) No solution D) One solution: (2, 0)
(Your team has the same letter as the correct solution.)

$$\frac{2(x - 1)}{4} = x - 1$$

A) $x = \frac{1}{2}$ B) $x = 1$ C) $x = -\frac{1}{2}$

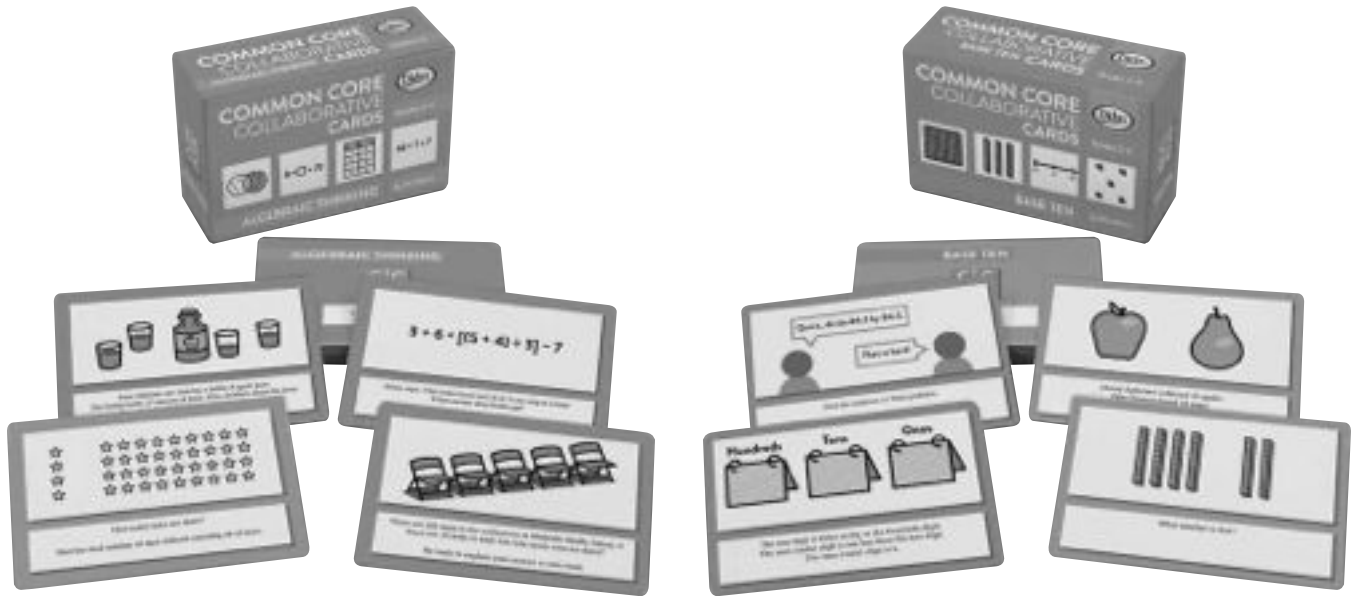
Select the correct solution to the equation
(Your partners have the same letter answer as the correct solution.)
Be ready to explain your thinking to your partner.



A) $m = 1$ and $b = 1$
B) $m = 2$ and $b = -1$
C) $m = -2$ and $b = -1$
D) $m = \frac{1}{2}$ and $b = -1$

For this graph, select the slope (m) and the y -intercept (b) from the choices shown.
(Your partners have the same letter answer as you do.)

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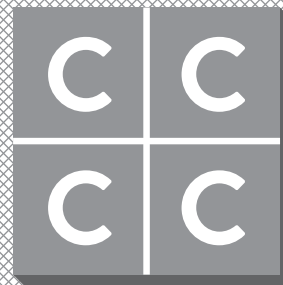
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EXPRESSIONS AND EQUATIONS

TEACHER GUIDE

Practice and reinforce the content from the Common Core State Standards with these innovative activity cards.

Created using the standards in the Expressions and Equations domain, these cards actively engage students in problem solving and promote mathematical discussion. Students solve the question on their individual card and then look for others who have the same solution. The four students holding cards with the same answer form a group; the back of their cards show the role that each student will play as the group works on the next task. Based on the most recent research about the effectiveness of collaborative learning, and in accordance with the Common Core Mathematical Practices, these card sets can be used repeatedly to group students for an upcoming unit or problem-solving lesson. Cards can also be used for small-group instruction or as an independent activity. Set includes 40 durable, two-color cards per grade level for a total of 120 cards. (Each grade-level deck includes four blank cards for teachers to create their own content.) Teacher's Guide includes suggestions for classroom use, activities, and access to website with additional tasks and resources.



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