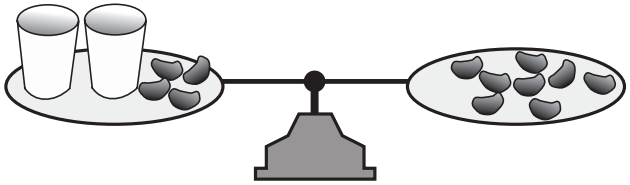
Name _____ Date _____

SKILL WORKOUT
Solving Multistep Equations

Take Your Mark: OPENING ACTIVITY

A group of students needs to determine how many beans have the same combined weight as a cup on the balance below. The students remove 4 beans from each side of the balance, then decide that a cup must have the same weight as 2 beans.



Are the students correct? Why or why not?

CA Content Standard 1A5.0: Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.
CA Content Standard 1A15.0: Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.

SKILL WORKOUT
Solving Multistep Equations

BACKGROUND INFORMATION

Objective

Students will solve equations in two or more steps.

Take Your Mark: OPENING ACTIVITY
APPROXIMATELY 5–10 MINUTES

Have students follow two steps to isolate an object on one side of a balance.

- Read through the problem with students. Emphasize that the students in the problem want to find the weight of one cup, but there are two cups on the balance.
- Give students a few minutes to respond to the prompt: "Are the students correct? Why or why not?"

Answers

The students are correct because removing 4 beans from each side of the balance maintains the balance, leaving 2 cups on one side and 4 beans on the other side. Since 4 beans have the same weight as 2 cups, each cup must be equivalent to 2 beans.

CA Content Standard 1A5.0: Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.
CA Content Standard 1A15.0: Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.

Get Ready: INSTRUCTION
APPROXIMATELY 15 MINUTES

Briefly review the vocabulary.

- Have students read the terms in the gray box. Ask them to underline the term that is least familiar to them and put a star next to a term they think they could teach someone else how to remember.
- Have students turn to a partner and discuss the terms they chose. Encourage students to share their strategies for remembering these terms. If time allows, have a few students share their ideas with the class.

Have students use an equation to analyze the problem from the Opening Activity.

- Guide students through the scaffolding questions.

  Write an equation to represent the balance shown in the Opening Activity. $2x + 4 = 8$

  Simplify the equation to show the result of removing 4 beans from each side of the balance. $2x = 4$

  Simplify the equation further to show the number of beans that have the same weight as one cup. $x = 2$

KAP tip

To explain to students that they should balance the equation using addition or subtraction first, tell them that they need to get the variable by itself on one side of the equation. Then they should try to get rid of any coefficients in front of the variable.

UNIVERSAL ACCESS

ENGLISH LEARNERS

Draw the balance from the Opening Activity on the board and label it with the known information. Cross out four beans from each side of the balance. Write question marks above each cup.

STUDENTS WITH SPECIAL NEEDS

If students have trouble writing an equation, explain that they can use a variable to represent the weight of each cup. Explain that each bean can be treated as one unit of weight, so no variable will be necessary to represent its weight.

Name _____ Date _____

Get Ready: INSTRUCTION

VOCABULARY TERMS

Additive inverse: Also called the opposite of a number—the sum of any number and its additive inverse is zero: $a + (-a) = 0$

Distributive Property: The product of a factor and a sum is equal to the sum of the products: $a(b + c) = ab + ac$

Equation: A mathematical sentence that uses an equals sign to show that two quantities are equal

Inverse operations: Operations that are opposites—for example, addition is the inverse operation of subtraction and multiplication is the inverse operation of division

Multiplicative inverse: The opposite of a number in a multiplication operation—for a non-zero number b, the multiplicative inverse is $\frac{1}{b}$, such that $b \cdot \frac{1}{b} = 1$; the multiplicative inverse is also called the reciprocal

Solving an equation: Finding the value of the variable that makes an equation true

INTRODUCTION

In the Opening Activity, when the students manipulated the balance they had to be careful to keep it balanced.

- Write an equation to represent the balance shown in the Opening Activity.
- Simplify the equation to show the result of removing 4 beans from each side of the balance.
- Simplify the equation further to show the number of beans that have the same weight as one cup.

Name _____ Date _____

Get Set: GUIDED PRACTICE

SOLVING TWO-STEP EQUATIONS WITH INVERSE OPERATIONS

Many equations contain more than one mathematical operation. To solve these equations you can use inverse operations to undo each operation.

Solve the equation $3x - 5 = 7$ for x.

- What operation should you undo first?
- What is the inverse of this operation?
- Use this to undo the operation.
- What must you do next to put the x by itself on the left side of the equation?
- What is the solution to the equation?

COMBINING LIKE TERMS

Before you use inverse operations to solve an equation, it is often necessary to distribute quantities and combine terms.

Solve the equation $2(x + 3) - 4x = 2$.

- Use the Distributive Property to distribute the 2 into the parentheses.
- Combine like terms to simplify the equation further.
- Use an inverse operation to put a multiple of x by itself on the left side of the equation.
- Use another inverse operation to put x by itself.

Get Set: GUIDED PRACTICE
APPROXIMATELY 15 MINUTES

Explain how to solve two-step equations with inverse operations.

- Read through the text with students. Emphasize that when an equation contains more than one operation, students can use an inverse operation to undo each operation.
- Guide students through the scaffolding questions.

  What operation should you undo first? Subtraction

  What is the inverse of this operation? Addition

  Use this to undo the operation. $3x = 12$

  What must you do next to put the x by itself on the left side of the equation? Divide both sides of the equation by 3.

  What is the solution to the equation? $x = 4$

Emphasize the importance of combining like terms.

- Explain that whenever students are solving an equation, they should distribute and combine like terms before attempting to isolate the variable.
- Guide students through the scaffolding questions.

  Use the Distributive Property to distribute the 2 into the parentheses. $2x + 6 - 4x = 2$

  Combine like terms to simplify the equation further. $-2x + 6 = 2$

  Use an inverse operation to put a multiple of x by itself on the left side of the equation. $-2x = -4$

  Use another inverse operation to put x by itself. $x = 2$

DAY 3

Get Set: GUIDED PRACTICE (CONTINUED)

Model an example with variables on both sides of the equation.

- Read through the text with students. Remind students that in order to solve an equation, students must isolate the variable on one side of the equation. Emphasize that inverse operations can be used to move a variable from one side of an equation to the other.
- Guide students through the scaffolding questions.

  Subtract 3x from both sides of the equation to remove the variable x from the right side of the equation. $5x + 2 - 3x = 10$

  Combine terms to simplify the equation. $2x + 2 = 10$

  Use an inverse operation to put a multiple of x by itself on the left side of the equation. $2x = 8$

  Use another inverse operation to put x by itself. $x = 4$

  What can you do to make sure your solution is correct? Substitute 4 for x in the original equation and make sure the equation is satisfied.

UNIVERSAL ACCESS

ENGLISH LEARNERS

Have students use algebra tiles to represent each equation. In order to determine what a single tile equals, have students divide each side into the same number of groups.

STUDENTS WITH SPECIAL NEEDS

Students may ask whether they can divide before they add. Confirm that they can, but explain that it is often easier to add or subtract before multiplying or dividing. Encourage students to divide before adding and confirm that the answer is the same.

.

Name _____ Date _____

VARIABLES ON BOTH SIDES OF AN EQUATION

Sometimes a variable is present on both sides of an equation. In order to solve the equation, you must put the variable on only one side of the equation. You can use inverse operations to move the variable from one side to the other.

Solve the equation $5x + 2 = 3x + 10$.

- Subtract $3x$ from both sides of the equation to remove the variable x from the right side of the equation.
- Combine terms to simplify the equation.
- Use an inverse operation to put a multiple of x by itself on the left side of the equation.
- Use another inverse operation to put x by itself.
- What can you do to make sure your solution is correct?

Name _____ Date _____

GO!: INDEPENDENT PRACTICE

Solve each of the following equations.

1. $2x + 6 = 12$

2. $15 - 3x = 3$

3. $2(x + 4) = 10$

DAY 3

GO!: INDEPENDENT PRACTICE
APPROXIMATELY 20 MINUTES

Have students complete the Independent Practice activity in pairs or small groups.

- Read the directions aloud and be sure that students understand the activity.

Give students approximately 15 minutes to complete the activity.

- As students work, circulate and ask them to explain their thinking. Redirect students as needed by asking them questions about their work. Effective questions might include the following:

  How can you put the variable by itself on one side of the equation?

  Can you simplify this equation before using inverse operations?

- Bring the class together and have students share their responses.

Answers

1 $x = 3$

$2x = 12 - 6 = 6$

$x = \frac{6}{2} = 3$

2 $x = 4$

$-3x = 3 - 15 = -12$

$x = \frac{-12}{-3} = 4$

3 $x = 1$

$2x + 8 = 10$

$2x = 10 - 8 = 2$

$x = \frac{2}{2} = 1$

DAY 3

INDEPENDENT PRACTICE

ANSWERS (CONTINUED)

4 $x = -1$

$-3x + 6 = 9$

$-3x = 9 - 6 = 3$

$x = \frac{3}{-3} = -1$

5 $x = 2$

$6 - 3x = 3x - 6$

$6 - 3x - 3x = -6$

$6 - 6x = -6$

$-6x = -6 - 6 = -12$

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

$x = 2$

6 $2x - 1 = 15$

John is 8 years old.

$2x = 15 + 1 = 16$

$x = \frac{16}{2} = 8$

KAP tip

If students have trouble constructing the equation, encourage them to use the variable x to represent John's age. Point out that students know Jillian's age, so no variable is necessary.

Name _____ Date _____

4. $2x + 6 - 5x = 9$

5. $3(2 - x) = 3x - 6$

6. **Write an equation to represent the situation below.**

Jillian's age is 1 year less than twice John's age. Jillian is 15 years old.

Solve the equation. How old is John?

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MATHEMATICS

REFLECTION & ASSESSMENT

Formal Assessment

- Review students' work from the Independent Practice section of the lesson. Focus on how students solve equations in two or more steps.

Informal Assessment

- As students engage in classroom discussion, note how successfully they apply strategies in the correct order to solve equations.

Journal Prompt

- Have students respond to the following prompt:

  Is the equation $2x + 6 = 15$ equivalent to the equation $2x = 11$? Explain your reasoning.

EXTENSION ACTIVITIES

Quick Math

- Present the following problem to students:

  Write an equation that contains the numbers 3, 6, and 21, and has a solution of $x = 4$.

Math Project

- Have students find real-world equations that require two or more steps to solve. Have students substitute reasonable values for all but one of the unknown variables, then solve the equation. Ask students to explain what the solution value means in the real-world context of the equation.

Reteaching

- Present the equation $2x + 3 = 5$ to students. Ask students to list the mathematical operations contained in the equation. Students should realize that this equation contains multiplication and addition. Next to each operation, have students list the inverse operation. Instruct students to apply the inverse operations they have listed to solve the equation. Repeat with additional equations.

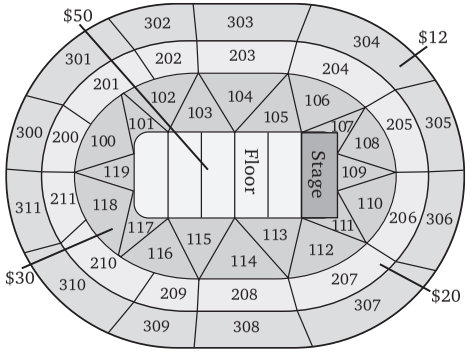
  Once students are comfortable with this task, present equations that require students to distribute and/or combine terms, and instruct students to simplify before applying inverse operations.

Name _____ Date _____

STRATEGY WORKOUT
Substitute and Compute

Take Your Mark: OPENING ACTIVITY

The biggest concert of the year is only two months away. You still need to get tickets for yourself and two friends. You have the seating chart and the ticket price for each area.



Use the seating chart to find the cost of the tickets for you and your friends.

Seating	Cost of 3 tickets
Floor Area	
100 Level	
200 Level	
300 Level	

What did you do to find the cost of the tickets?

DAY 3

STRATEGY WORKOUT
Substitute and Compute

BACKGROUND INFORMATION

Objective
Students will substitute values into algebraic expressions and formulas to compute answers.

Rationale
Students will be asked to evaluate expressions for a given value on the CAHSEE. This strategy gives them a step-by-step method to follow when answering these questions.

Take Your Mark: OPENING ACTIVITY
APPROXIMATELY 5–10 MINUTES

Have students substitute and compute to solve a problem.

- Have students read the story on this page and complete the task that follows.
- Ask, "What task are you trying to complete?" Call on a student to summarize the task in a single sentence. *We need to find the cost of 3 tickets in different sections of the arena.*
- Discuss the process students used to find the cost of the tickets, calling students' attention to the ways in which they used substitution to solve this real-world problem. Tell students that today they are going to practice using Substitute and Compute to solve math problems.

Answers

Seating	Cost of 3 tickets
Floor Area	*$ 150*
100 Level	*$ 90*
200 Level	*$ 60*
300 Level	*$ 36*

To find the cost of the tickets, multiply the price of a ticket in a certain seating area by 3.

Get Ready: INSTRUCTION
APPROXIMATELY 15 MINUTES

Help students make the connection between the Opening Activity and substituting in math problems.

- Read the introduction with students as they follow along in their books. Help students make the connection between the expression and the situation in the activity. Emphasize that the value of the variable (the ticket price) varies depending on where the seats are located. Tell students that substituting the known values for the variable and then computing is the way to evaluate expressions and formulas.
- Have students read the problem and follow the steps for Substitute and Compute to evaluate $4t$. Have students substitute the value of the variable and follow the order of operations (if needed) to solve the problem. *4(10) = 40*

Briefly review the order of operations.

- Ask students to tell you the order in which operations are performed. *Parentheses, exponents, multiplication or division (from left to right), addition or subtraction (from left to right)*
- Remind students that they can use the memory device *Please Excuse My Dear Aunt Sally*, or *PEMDAS*, to remember the order in which operations are performed.

Together as a class, use Substitute and Compute to solve Problem 1.

- Rewrite the expression, substituting 5 for s. *$(3 + 5)^2$*
- Simplify the expression in parentheses. *$(8)^2$*
- Simplify the exponential expression. *64*
- Have students compare their answers. *The correct answer is (D).*

Name _____ Date _____

Get Ready: INSTRUCTION

INTRODUCTION

In the Opening Activity, you found the cost of 3 tickets by multiplying the ticket cost of the seating area by the number of tickets. You could use the expression $3t$ to represent the cost of the tickets, where t is the ticket cost of that area. By replacing (substituting) the cost of the ticket for the variable in the expression, you can find the value of the expression.

What is the cost of 4 tickets, $4t$, if t is \$10?

On the CAHSEE, you will sometimes be asked to evaluate an expression for specific numbers. *Evaluating* means substituting numbers for variables and then simplifying.

You can complete the following steps to substitute values into an expression and then compute the answer.

Substitute and Compute

- Rewrite the expression, substituting the given values for the variables.
- Simplify, using the correct order of operations: parentheses, then exponents, then multiplication or division (from left to right), then addition or subtraction (from left to right).

1. Evaluate $(3 + s)^2$ when $s = 5$.

A 5

B 8

C 34

D 64

- Rewrite the expression, substituting 5 for s. _____
- Simplify the expression in parentheses. _____
- Simplify the exponential expression. _____

Sometimes a problem will contain a formula that relates to a real-world situation. Formulas may be provided, or you may have to recall formulas from memory. You will need to memorize the formulas for the perimeter and area of rectangles, parallelograms, triangles, and circles, and the volume of rectangular solids. You will also need to memorize the formula for the Pythagorean theorem.

Name _____ Date _____

Get Set: GUIDED PRACTICE

SUBSTITUTING INTO EXPRESSIONS AND EQUATIONS

Substitute and Compute can be used for problems that contain variables. You can compute the value of an expression when given values for the variables in the expression.

2. If $x = -2$ and $y = -3$ then $x^2 - (x + y) =$

A -1

B 1

C 3

D 9

Substitute the values for x and y into the expression below and simplify.

$x^2 - (x + y) =$ (_____)^2 − [(_____) + (_____)]=_____

_____

3. Tara's three sisters are 12 years old, 10 years old, and 17 years old. What is the mean of Tara's sisters' ages?

A 11

B 13

C 15

D 39

To find the mean, or average, add the values and divide by the number of terms. Substitute the values into the average formula and simplify.

$$\frac{\text{value 1} + \text{value 2} + \text{value 3}}{3}$$

$$\frac{\square + \square + \square}{3} = \frac{\square}{3} = \_\_\_\_$$

DAY 3

Get Set: GUIDED PRACTICE

APPROXIMATELY 20 MINUTES

Guide students through Problem 2.

- Remind students that they can look at the steps given for Substitute and Compute to solve the problem.
- Have students substitute the values of the variables into the expression $x^2 - (x + y)$. Then have students compute to find the answer.

$x^2 - (x + y) = (\ -2\ )^2 - [(\ -2\ ) + (\ -3\ )] = 4 - (-5) = 9$

Guide students through Problem 3.

- Have students use Substitute and Compute to solve the problem.

$\frac{12 + 10 + 17}{3} = \frac{39}{3} = 13$

Answers

2 **D**

3 **B**

UNIVERSAL ACCESS

ENGLISH LEARNERS

The mathematical term *expression* may be confusing to some English Learners who know other definitions of the word. Point out examples of expressions as you move through the lesson, and repeatedly restate the phrase *evaluate the expression* as *find the value*.

STUDENTS WITH SPECIAL NEEDS

Encourage students to write out every step to help them keep track of their work. For example, students can write the value of the variable directly above it to help them substitute. Then they can rewrite each step of the computation. Even if students can do the computation in their heads, they are more likely to make careless errors that way.

DAY 3

Get Set: GUIDED PRACTICE (CONTINUED)

Guide students to understand that a variable or word in a formula has a value and that the value is substituted to evaluate the formula.

- Explain that a formula has variables (or words) and operations like an expression. Some formulas use the actual words instead of variables to stand for the word.
- Tell students that there is often more than one variable in a formula, so more than one value is substituted. Help students understand that they should use the same method to substitute values into formulas and then compute using the order of operations.

Guide students through Problem 4.

- Have students use Substitute and Compute to solve the problem.

$$a^2 + b^2 = c^2$$
$$(5)^2 + b^2 = (13)^2$$
$$25 + b^2 = 169$$
$$b^2 = 144$$
$$b = 12$$

KAP tip *Encourage students to write formulas and pick a number to represent each variable in their formulas. Then have them evaluate their formulas. Have them check each other's work.*

Answers

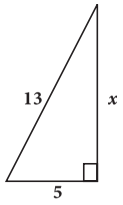
4 **B**

Name _____ Date _____

SHAPES AND FORMULAS

Substitute and Compute can often be used when working with geometric figures. First you must determine the shape you have and the formula that you need. Then you can substitute the known values into the formula.

4.



What is the value of *x* in the triangle shown above?

A 8

B 12

C 14

D 144

In the space below, write the formula you need, and then substitute values for variables. Finally, solve for the value of *x* using the correct order of operations.

In the problem above, you only needed one formula to solve the problem. Sometimes a figure may need to be broken up into more than one shape, or more than one formula may be needed.

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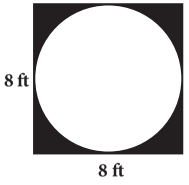
Name _____ Date _____

5.



Carol took a square piece of cardboard with sides measuring 8 feet and cut out a circle with a radius of 4 feet. Carol wants to paint the cardboard that is left. What is the approximate area of the shaded region, in square feet, that Carol wants to paint?
($A = \pi r^2$ and $\pi \approx 3.14$)

A 14

B 25

C 36

D 39

What formula can be used to find the area of a square? _____

What is the area of the square? _____

What formula can be used to find the area of a circle? _____

What is the approximate area of the circle? _____

Complete the equation below to find the approximate area of the shaded region.

Area to Paint = Total Area − Area Cut Out = _____ − _____ = _____

Get Set: GUIDED PRACTICE (CONTINUED)

Guide students through Problem 5.

- Have students use Substitute and Compute to solve the problem.

What formula can be used to find the area of a square? $A = s^2$

What is the area of the square? $A = 8 \times 8 = 64\ ft^2$

What formula can be used to find the area of a circle? $A = \pi r^2$

What is the approximate area of the circle? $A = 3.14(4)^2 = 50.24\ ft^2$

Area to Paint = Total Area − Area Cut Out = $64 - 50 = 14\ ft^2$

Answers

5 **A**

UNIVERSAL ACCESS

ENGLISH LEARNERS

Substitute and Compute can be particularly helpful for English Learners who may lose sight of a simple problem within a paragraph of tricky text. Encourage students to list the key information before solving the problem. For example, for question 4:

- 8×8 = area of square
- πr^2 = area of circle
- $r = 4$
- What is the area of the square minus the area of the circle?

STUDENTS WITH SPECIAL NEEDS

Emphasize that every problem can be broken into simple steps, and demonstrate each step explicitly whenever possible. It may also help to review the order of operations and post it somewhere in the classroom:

1) Parentheses ( ) 2) Exponents a^b
3) Multiplication $a \times b$ or 4) Division $a \div b$
5) Addition $a + b$ or 6) Subtraction $a - b$

GO!: INDEPENDENT PRACTICE

APPROXIMATELY 25 MINUTES

Have students complete the Independent Practice activity in pairs or small groups.

- Read the directions aloud and be sure that students understand the activity.

Give students approximately 10 minutes to work on the problem set.

- As students work, circulate and ask them to explain their thinking. Redirect students as needed by asking them questions about their work. Effective questions might include the following:

  What is the value of the variable?

  Which operation do you complete first? second? last?

  How can you check your answer?

Bring the class together and have students share their responses.

- Have student pairs share the formulas they used and the values they substituted into each problem.

Answers

1 **B** Students can substitute into the provided expression and compute to solve this problem.

$$\frac{a^2+b^2}{4} = \frac{4^2+6^2}{4} = \frac{16+36}{4} = \frac{52}{4} = 13$$

2 **C** Students can use the formula for the area of a triangle and substitute and compute to solve.

$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 16 \times 7 = 56$$

Name _____ Date _____

GO!: INDEPENDENT PRACTICE

Read the problems below. In each problem, substitute the known values for the variables. Then compute and select the correct answer choice.

1. **If $a = 4$ and $b = 6$ then $\frac{a^2+b^2}{4} =$**

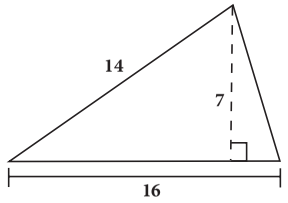
A 5

B 13

C 40

D 52

2.



What is the area of the triangle shown above?

A 37 square units

B 49 square units

C 56 square units

D 112 square units

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Name _____ Date _____

3. **Fred is building a rectangular fence around his garden. If his garden is 3 yards long and 4.5 feet wide, how many yards of fencing does he need?**

A 4.5 yards

B 7.5 yards

C 9 yards

D 15 yards

4. **What does y^3 equal when $y = -3$?**

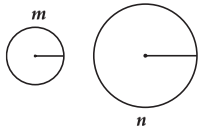
A -27

B -9

C 9

D 27

5.



The two circles shown above have radii of 2 meters and 8 meters. What is $\frac{\text{Circumference of Circle } m}{\text{Circumference of Circle } n}$?

A $\frac{1}{16}$

B $\frac{1}{4}$

C 4

D 16

DAY 3

GO!: INDEPENDENT PRACTICE
ANSWERS (CONTINUED)

3 **C** Students can use the formula for the perimeter of a rectangle and substitute and compute to solve. Since the answer must be in yards, students should convert the width of 4.5 feet to 1.5 yards.

Perimeter = 2(length) + 2(width) = 2(3 yds) + 2(1.5 yds) = 9 yds

4 **A** Students can substitute the value of -3 for y in the expression y^3 and simplify.

$y^3 = (-3)^3 = -27$

5 **B** Students should use the formula for the circumference of a circle and substitute the known radius into each. Students should then determine the ratio of the circumference of Circle m to the circumference of Circle n.

$$\frac{\text{Circumference of Circle } m}{\text{Circumference of Circle } n} = \frac{2\pi(\text{radius of } m)}{2\pi(\text{radius of } n)} = \frac{2\pi(2)}{2\pi(8)} = \frac{4\pi}{16\pi} = \frac{1}{4}$$

DAY 3

6 **C** Students can substitute into the Pythagorean theorem and compute to solve this problem.

$a^2 + b^2 = c^2$; $5^2 + 6^2 = c^2$; $25 + 36 = c^2$; $61 = c^2$; $\sqrt{61} = c$

7 **B** Students can substitute the value of 1 for x and -4 for y in the expression $x + 4(2x + y)$ and simplify.

$$\begin{aligned} x + 4(2x + y) &= 1 + 4(2(1) + (-4)) \\ &= 1 + 4(2 + (-4)) \\ &= 1 + 4(-2) \\ &= 1 + (-8) = -7 \end{aligned}$$

8 **B** Students can use the formula for the area of a trapezoid and substitute and compute to solve.

$$\begin{aligned} \text{Area of Trapezoid} &= \frac{1}{2}(\text{base 1} + \text{base 2})(\text{height}) \\ &= \frac{1}{2}(20 + 26)(12) \\ &= \frac{1}{2}(46)(12) \\ &= (23)(12) = 276 \end{aligned}$$

Name _____ Date _____

6. **A right triangle has legs measuring 5 meters and 6 meters. What is the length of the hypotenuse?**

A $\sqrt{11}$

B 7

C $\sqrt{61}$

D 11

7. **If $x = 1$ and $y = -4$ then $x + 4(2x + y) =$**

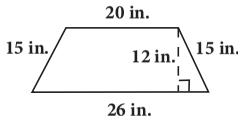
A −10

B −7

C 5

D 6

8.



What is the area of the trapezoid shown above?

A 76 square inches

B 276 square inches

C 312 square inches

D 345 square inches

REFLECTION & ASSESSMENT

Formal Assessment

- Review students' work from the Independent Practice as a class. Have students discuss why they chose the formulas they did and what values they used to substitute for the variables.

Informal Assessment

- As a quick quiz, draw a rectangle, parallelogram, triangle, circle, rectangular solid, and right triangle on the board. Label the values for the lengths of each of the different shapes. Have students substitute and compute to calculate the perimeter, circumference, area, and volume as appropriate.

Journal Prompt

- Have students respond to the following prompt: "Alan calculated the area of a parallelogram with a base of 3 meters and a height of 20 centimeters as 60 meters. Explain what Alan did incorrectly."

EXTENSION ACTIVITIES

Quick Math

- Have groups of students create their own problems to be solved using Substitute and Compute. Assign each group a different type of Substitute and Compute problem. Groups with expressions and equations should create two problems: one with one variable and one with two variables. Groups with shapes should create two problems: one with a provided formula and one without a provided formula. Once groups have created problems, have them exchange problems with other groups and solve them.

Math Project

- Select objects around the classroom, and have students determine whether they can find the perimeter, area, and/or volume of the objects selected. Make a list of these objects on the board, and then provide students with rulers or meter sticks to determine the dimensions of the objects. Have them substitute the dimensions into formulas to determine the perimeter, area, or volume as appropriate. Select a variety of units (centimeters, meters, inches, feet, yards) for students to use.

Reteaching

- Present problems where shapes are upside-down or backward compared to the regular view, or where students are provided the perimeter, area, or volume and need to solve for a dimension. Have students practice substituting and computing to solve for the unknown in these problems.