Variables on Both Sides

ID: 11131

Time Required
15–20 minutes

Activity Overview

In this activity, students will encounter various scenarios involving perimeter of polygons. The students will write equations and solve them in order to answer the questions provided.

Topic: Solving Equations with Variables on Both Sides

- *The student will use algebraic expressions to form equations relating two different perimeters to each other.*
- *The student will solve equations with variables on both sides.*
- *The students will use the App4Math to check their answers.*
- *The student will answer a deeper-level inquiry question regarding the relationship between two regular polygons and the difference in their perimeters for different lengths of sides.*

Teacher Preparation and Notes

- *Teacher preparation must include having students set up and solve equations with variables on both sides. These equations include the Distributive Property.*
- *Students should also be encouraged to show their work, whether it be on paper or in the document itself. If the teacher prefers paper, then use a prepared handout labeled by tab number to correspond to the tabs in the .tns file.*
- *Be sure the App4Math is installed on all calculators.*
- ***To download the student worksheet and App4Math application, go to education.ti.com/exchange and enter "11131" in the keyword search box.***

Associated Materials

- *VariablesOnBothSides_Student.doc*
- *App4Math*

Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

- *Solving Equations with a Calculator? No Way! (TI-Nspire technology) — 8758*
- *One Step at a Time (TI-Nspire technology) — 8678*
- *Solving Equations (TI-84 Plus family) — 6035*
- *Solving Equations with more than one operation (TI-84 Plus family) — 5190*
- *Solving Multi-Step Equations — LearningCheck™ Quiz (TI-84 Plus family) — 3667*

Introduction to App4Math

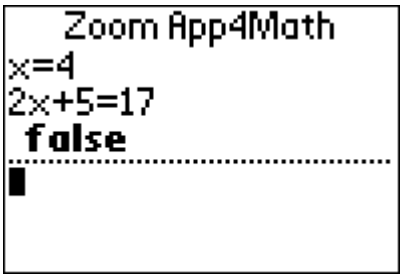
You may want to take a few minutes introducing **App4Math** to your students.

A few quick notes:

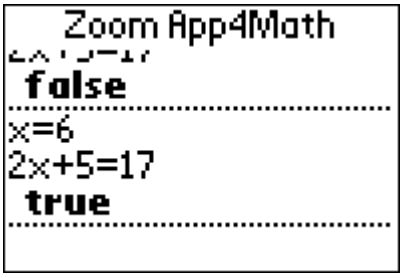
- *x*, *y*, *z* , etc. can be entered using the alpha keys or by repeatedly pressing [X,T,Θ,n].
- Use [Y=] for the equals sign.
- The up and down arrows can be used to cycle through previously written equations. This will help eliminate a lot of repeated key entry.

Have the students use the app4math to check if $x = 4$ is a solution to $2x + 5 = 17$.

Students need to enter the value of *x* first and then the equation.



Now have them check to see if $x = 6$ is the solution. (The arrow keys will be helpful here to recall the equation $2x + 5 = 17$.)

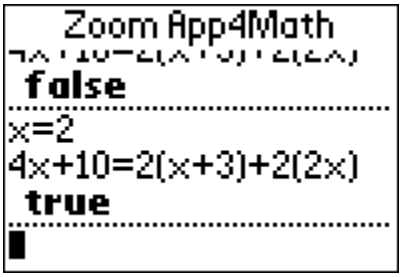


Problem 1 – A Square and a Rectangle Have Different Perimeters

Student should observe the labels for the length of the sides, and be certain to understand the translation from the text on the left side to the labels. Then, students are to write expressions for the perimeter of the square and of the rectangle. (*Sample answers: Perimeter of the square: 4x; Perimeter of the rectangle: 6x + 6*).

Students will use the perimeter expressions to create and solve an equation that shows the relationship between the perimeters of the figures. (*Answer: a. 4x + 10 = 2(x + 3) + 2(2x); x = 2*)

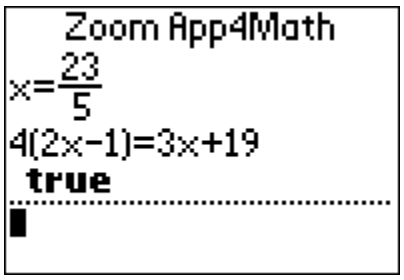
Students should use the **App4Math** app to check their answer.



Problem 2 – An Equilateral Triangle and a Square with Different Perimeters

Students should again observe the labels on the polygons, and be sure that the labels agree with the written description. Then, students will write expressions for the perimeter of the square and triangle. Then, students will create an equation show the relationship between the perimeters and solve the equation to find the length the sides of the triangle and square.

Student worksheet solutions



- Side of the triangle is x and side of the square is $2x + 1$.
- The perimeter of the square is $4(2x + 1)$.
- The perimeter of the triangle is $3(x)$.
- $4(2x – 1) = 3x + 19$
- $x = \frac{23}{5}$; side of square is $\frac{51}{5}$ cm or 10.2 cm
- The correct **App4Math** screen is to the right.

Problem 3 – A Hexagon and an Octagon with Sides that are Related by a Scale Factor

Student worksheet solutions

- x
- $6(2x)$
- $8(x)$
- $12x = 8x + 20$, $x = 5$, hexagon side length = 10

Problem 4 – An Equilateral Triangle and a Rectangle that Share a Common Side

Student worksheet solutions

- $3x + 9 = 14 + 2x$, x = 23

Problem 5 – A Regular Decagon and 15-gon

Student worksheet solutions

- Because the side lengths for both polygons all equal x, the perimeter of the 15-gon will be longer by the length 5x because it has five more sides.