Name_____ Date_____

1.3 Solving Equations with Variables on Both Sides

For use with Exploration 1.3

Learning Target: Write and solve equations with variables on both sides.

Success Criteria:
- I can explain how to solve an equation with variables on both sides.
- I can determine whether an equation has one solution, no solution, or infinitely many solutions.
- I can use equations with variables on both sides to model and solve real-life problems.

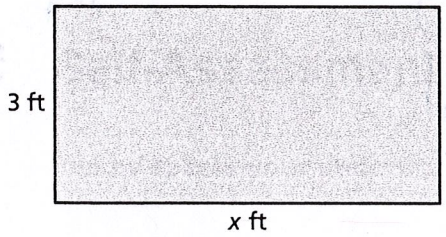
1 EXPLORATION: Finding Missing Measures in Figures

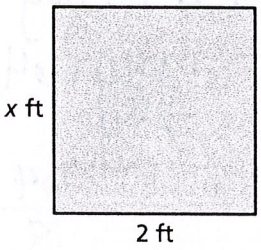
Work with a partner.

a. If possible, find the value of x so that the value of the perimeter (in feet) is equal to the value of the area (in square feet) for each figure. Use an equation to justify your answer.

$P = 2l + 2w$ $A = lw$ $P = A$

$2l + 2w = lw$





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

$2x + 6 = 3x$

$-2x \quad -2x$

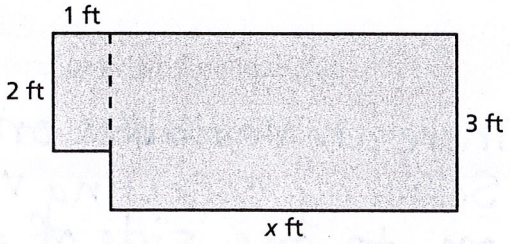
$6 = x$

$2x + 2(2) = 2x$

$2x + 4 = 2x$

$-2x \quad -2x$

$4 \neq 0$ not possible



$2x + 2(3) + 2(1) = 3x + 2(1)$

$2x + 6 + 2 = 3x + 2$

$2x + 8 = 3x + 2$

$-2x \quad -2x$

$8 = x + 2$

$-2 \quad -2$

$6 = x$

$SA = 2lw + 2lh + 2wh$

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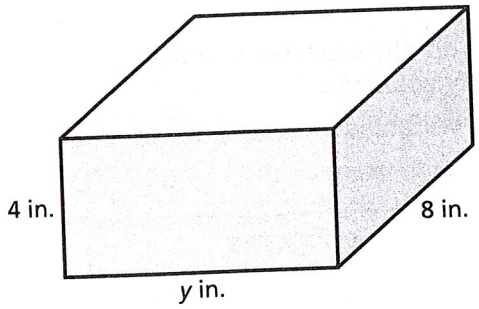
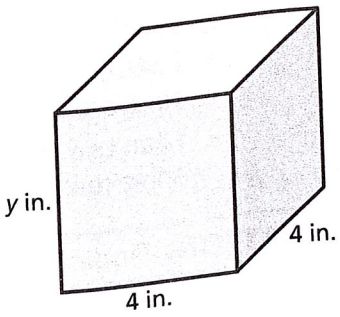
$V = lwh$

1.3 Solving Equations with Variables on Both Sides (continued)

$SA = V$

b. If possible, find the value of y so that the value of the surface area (in square inches) is equal to the value of the volume (in cubic inches) for each figure. Use an equation to justify your answer.





$2(4y) + 2(8 \cdot 4) + 2(8y) = 4 \cdot 8 \cdot y$

$8y + 2(32) + 16y = 32y$

$8y + 64 + 16y = 32y$

$24y + 64 = 32y$

$-24y \quad -24y$

$\frac{64}{8} = \frac{8y}{8}$

$\boxed{8 = y}$

$4(4y) + 2(4 \cdot 4) = 4 \cdot 4 \cdot y$

$16y + 2(16) = 16y$

$16y + 32 = 16y$

$-16y \quad -16y$

$32 \neq 0$

not possible

c. How are the equations you used in parts (a) and (b) different from equations used in previous sections? Explain how to solve this type of equation.

There are variables on both sides of =. Solve by collecting variable terms all on to one side of =.