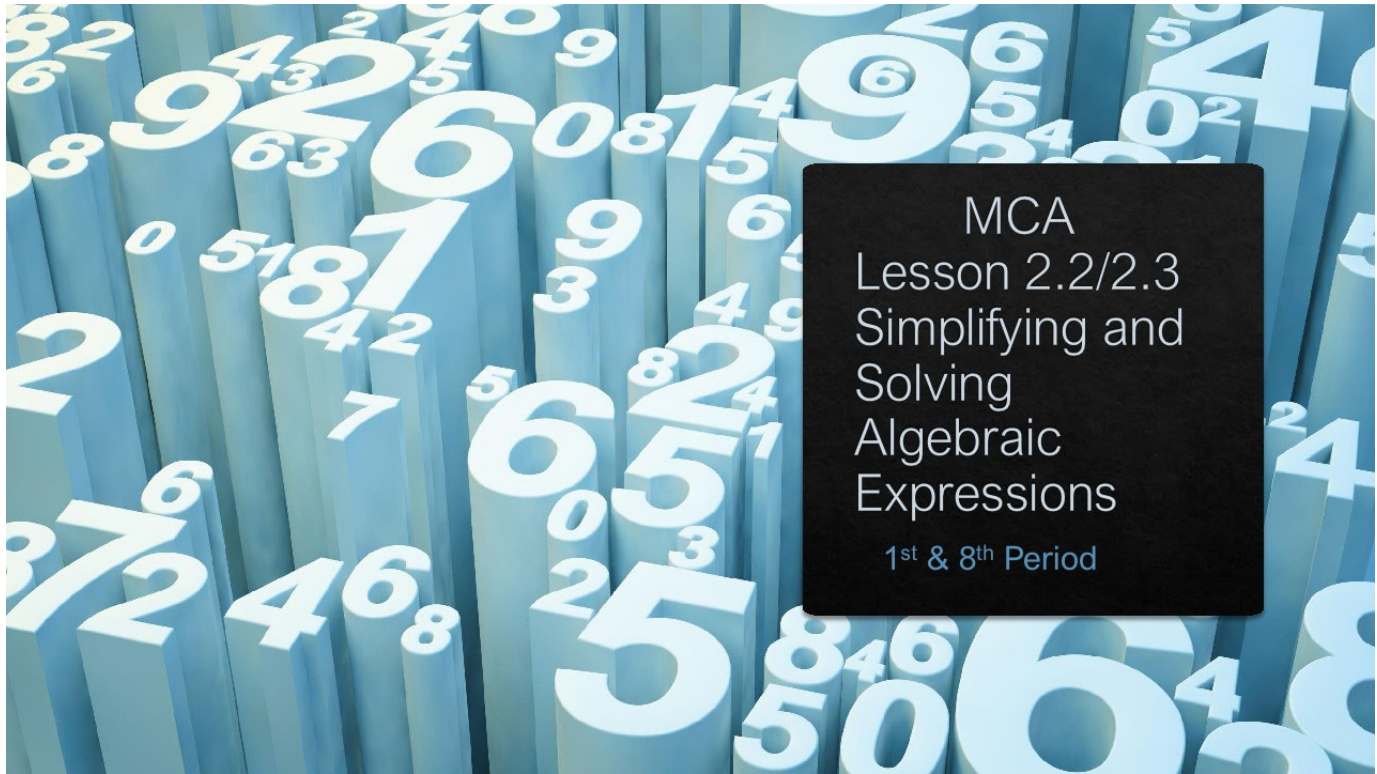# Lesson 2.2/2.3 Simplifying & Solving Algebraic Expressions

Monday, September 30, 2024   9:33 PM

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pdf

MCA lesson
2.2 and 2....

MCA
Lesson 2.2/2.3
Simplifying and
Solving
Algebraic
Expressions

1st & 8th Period

2.2 Simplifying Algebraic Expressions

2.3 Algebra and Problem Solving

What You Will Learn

Simplify an algebraic expression by rewriting the terms.

Use the Distributive Property to remove symbols of grouping.

Construct verbal mathematical models from written statements.

Translate verbal phrases into algebraic expressions.

Identify hidden operations when writing algebraic expressions.

Use problem-solving strategies to solve application

expressions.

Use problem-solving strategies to solve application problems.

Simplify each expression.

a. $-3(-5x)$ **b.** $7(-x)$ **c.** $\dfrac{5x}{3} \cdot \dfrac{3}{5} =$

d. $x^2(-2x^3)$ **e.** $(-2x)(4x)$ **f.** $(2rs)(r^2s)$

a) $15x$ b) $-7x$ c) $\dfrac{15x}{15} = \boxed{x}$

d) $-2x^5$ e) $-8x^2$ f) $2r^3s^2$

Students, draw anywhere on this slide!

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Simplify each expression.

$2(x-7)$

a. $-(3y + 5)$ **b.** $5x + (x - 7)2$

c. $-2(4x - 1) + 3x$ $5x + 2x - 14$

$-2(4x + {}^-1) {}^{+3x}$

a) $-3y - 5$

b) $7x - 14$

c) $-8x + 2 + 3x$
    $-5x + 2$

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d. $5x - 2[4x + 3(x - 1)]$ **e.** $-7y + 3[2y - (3 - 2y)] - 5y + 4$

d. $5x - 2[4x + 3(x - 1)]$

$5x - 2[4x + 3x - 3]$

$5x - 2[7x - 3]$

$5x - 14x + 6$

$\boxed{-9x + 6}$

e. $-7y + 3[2y - (3 - 2y)] - 5y + 4$

$-7y + 3[2y - 3 + 2y] - 5y + 4$

$-7y + 3[4y - 3] - 5y + 4$

$-7y + 12y = 9 - 5y + 4$

$\boxed{-5}$

Write and simplify an expression for (a) the perimeter and (b) the area of the triangle.

Area
$\frac{1}{2} bh$

$\frac{1}{2}(x+5)(2x)$

$\frac{1}{2}(2x)(x+5)$

$\frac{1}{2}(2x^2 + 10x)$

$\boxed{x^2 + 5x}$

$2x$

$2x + 4$

$1x + 5$
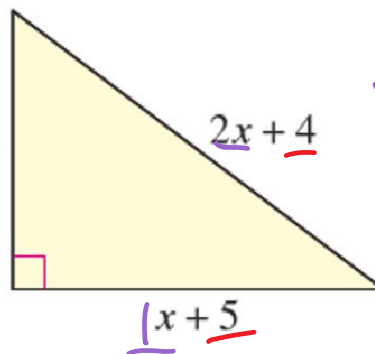
$2x + 2x + 1x$

$5x + 4 + 5$

$\boxed{5x + 9}$
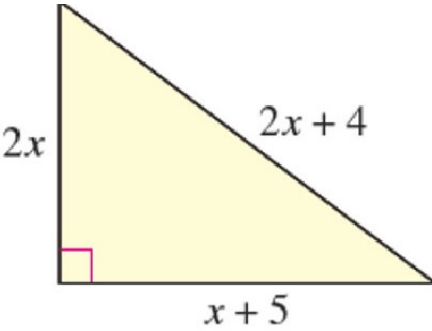
Perimeter

Write and simplify an expression for (a) the perimeter and (b) the area of the triangle.
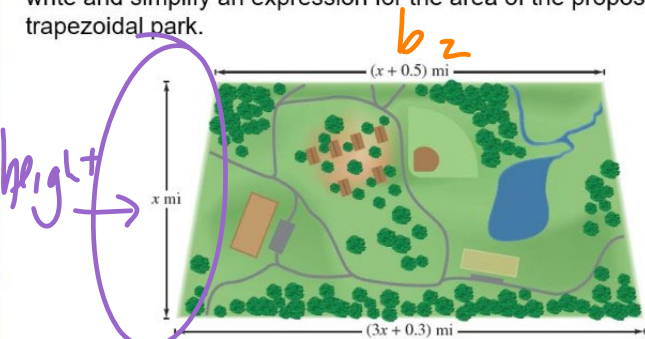
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The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$, where h is its height and b_1 and b_2 are the length of its bases. Use this formula to write and simplify an expression for the area of the proposed trapezoidal park.

height

b_2

b_1

$(x + 0.5)$ mi

x mi

$(3x + 0.3)$ mi

Handwritten work:

$A = \frac{1}{2}h(b_1 + b_2)$

$\frac{1}{2}(x)(3x + 0.3 + x + 0.5)$

$\frac{1}{2}(x)(4x + 0.8)$

$\frac{1}{2}(4x^2 + 0.8x)$

$2x^2 + 0.4x$

Students, draw anywhere on this slide!

A cash register contains n nickels and d dimes. Write an algebraic expression for this amount of money in cents.

$0.05n + 0.10d$

A person riding a bicycle travels at a constant rate of 12 miles per hour. Write an algebraic expression showing how far the person can ride in t hours.

$d = r \cdot t$

$12t$

A person paid x dollars plus 6% sales tax for an automobile. Write an algebraic expression for the total cost of the automobile.

$1x + x(0.06)$

$1.06x$

$32,000 + 32,000(0.06)$

A truck travels 100 miles at an average speed of *r* miles per hour. Write an expression that represents the total travel time.

$(1.06x)$

$32,000 + 32,000(...)$

$100r$

Summary of Additional Problem-Solving Strategies

1. **Guess, Check, and Revise** Guess a reasonable solution based on the given data. Check the guess, and revise it, if necessary. Continue guessing, checking, and revising until a correct solution is found.

2. **Make a Table/Look for a Pattern** Make a table using the data in the problem. Look for a number pattern. Then use the pattern to complete the table or find a solution.

3. **Draw a Diagram** Draw a diagram that shows the facts of the problem. Use the diagram to visualize the action of the problem. Use algebra to find a solution. Then check the solution against the facts.

4. **Solve a Simpler Problem** Construct a simpler problem that is similar to the original problem. Solve the simpler problem. Then use the same procedure to solve the original problem.

You deposit $500 in an account that earns 6% interest compounded annually. The balance *A* in the account after *t* years is $A = 500(1 + 0.06)^t$. How long will it take for your investment to double?

$\geq 1000?$

$$500(1.06)^5 = 670$$
$$500(1.06)^8 = 797$$
$$500(1.06)^{10} = 895$$
$$500(1.06)^{12} = \underline{1006}$$

You can solve this problem using a guess, check, and revise strategy.

The outer dimensions of a rectangular apartment are 25 feet by 40 feet. The combination living room, dining room, and kitchen areas occupy two-fifths of the apartment's area. Find the total area of the remaining rooms.
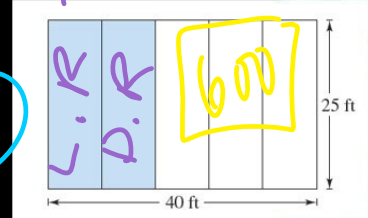
$A = \ell w$

$A = 40(25)$

$A = 1000$

$$\frac{2}{5} \cdot \frac{(1000)}{1} = \frac{2000}{5} = 400$$

$$\frac{3}{5} \cdot \frac{(1000)}{1} =$$

$$\frac{3000}{5}$$

600

$\begin{matrix} 1000 \\ -400 \end{matrix}$

For this problem, it helps to draw a diagram.

25 ft
40 ft
L.R   D.R   600