

1.8

Order of Operations

► **GOAL:** Apply the rules for order of operations to whole numbers and decimals.

1. Selena and Nathan were asked to evaluate $5 \times 1 + 2 \times (3 - 1)$. They each got a different answer.

Selena's Solution

$$\begin{aligned} 5 \times 1 + 2 \times (3 - 1) &= 5 + 2 \times (3 - 1) \\ &= 7 \times (3 - 1) \\ &= 7 \times 2 \\ &= 14 \end{aligned}$$

Nathan's Solution

$$\begin{aligned} 5 \times 1 + 2 \times (3 - 1) &= 5 \times 3 \times (3 - 1) \\ &= 15 \times (3 - 1) \\ &= 15 \times 2 \\ &= 30 \end{aligned}$$

- a) What was Selena's error?

- b) What was Nathan's error?

- c) Solve the problem.

2. Place brackets to make each equation true.

a) $5 - 1 \times 6 = 24$

c) $3 + 4 \times 6 - 5 = 7$

e) $1 + 2^2 = 9$

b) $12 \div 4 - 1 = 4$

d) $6 + 8 \div 2 = 7$

f) $20 - 3 \times 2 + 5 = 9$

3. Evaluate each expression. Show your work.

a) $(6 + 5) \times (7 - 3)$

c) $(7 - 3)^2 + (7 + 1)^2$

e) $(1 + 2 + 3 + 4)^2$

b) $2^3 + 3^2$

d) $1^2 + 2^2 + 3^2 + 4^4$

f) $\sqrt{2 + 7}$

At-Home Help

You can use the memory aid **BEDMAS** to remember the rules for order of operations.

B Brackets

E Exponents and square roots

D Divide and **M**ultiply from left to right

Add and **S**ubtract from left to right

Here are some additional tips to help you.

- If there is more than one set of brackets, do the calculations in the inner brackets first.
- If a square root sign covers an expression, do the calculations inside the square root first.

4. Evaluate each expression. Show your work.

a) $5^2 - \sqrt{25}$

e) $3 \times 4 - 3 \div 2 + 2$

b) $9 \times 8 - 7^2$

f) $(1 + 5 + 3)^2 \times (4 \times 2 - 7)$

c) $100 - [(2 + 3) \times (1 + 4)]$

g) $(2^2 + 6) - \sqrt{70 - 6}$

d) $\sqrt{(2 + 3) \times (1 + 4)}$

h) $[2 \times (5 + 4)] \div \sqrt{36}$

5. The teacher has 15 gold prize ribbons, 22 blue ribbons, and 53 red ribbons. There are 12 boys and 18 girls in the class. If the teacher divides the ribbons evenly among the students, how many ribbons will each student have? Write an expression using brackets, then solve your expression to find the answer.

6. For the bake sale, Sandra baked 4 trays of cookies, with 12 cookies on each tray. Teo baked 6 pans of brownies and divided each pan into 8 pieces. How many items will Sandra and Teo have for sale in total? Write a mathematical expression, then solve your expression to find the answer.