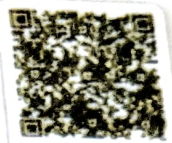


Using the Order of Operations with Integers

You can use the order of operations to simplify expressions involving integers.



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EXAMPLE 2

Simplify each expression using the order of operations.

A $-4(3 - 9) + (-2)^2$

$$\begin{aligned} -4(3 - 9) + (-2)^2 &= -4(-6) + (-2)^2 \\ &= -4(-6) + 4 \\ &= 24 + 4 \\ &= 28 \end{aligned}$$

Perform operations inside parentheses.

Evaluate $(-2)^2$.

Multiply.

Add.

B $-21 + \frac{(-3)^2}{3}$

$$\begin{aligned} -21 + \frac{(-3)^2}{3} &= -21 + \frac{9}{3} \\ &= -21 + 3 \\ &= -18 \end{aligned}$$

Evaluate $(-3)^2$.

Divide.

Add.

C $6 \times (-2)^3 \div 3 + 1$

$$\begin{aligned} 6 \times (-2)^3 \div 3 + 1 &= 6 \times (-8) \div 3 + 1 \\ &= -48 \div 3 + 1 \\ &= -16 + 1 \\ &= -15 \end{aligned}$$

Evaluate $(-2)^3$.

Multiply.

Divide.

Add.

YOUR TURN

Simplify each expression using the order of operations.

4. $-7 \times (-4) \div 14 - 2^2$

-2

5. $-5(-3 + 1)^3 - 3$

37

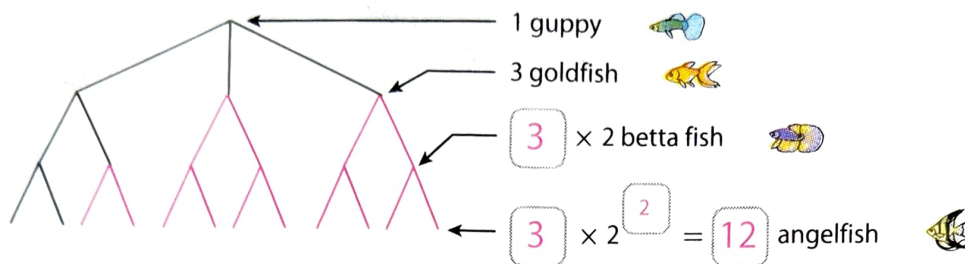


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Guided Practice

1. In a video game, a guppy that escapes a net turns into three goldfish. Each goldfish can turn into two betta fish. Each betta fish can turn into two angelfish. Complete the diagram and write the number of fish at each stage. Write and evaluate an expression for the number of angelfish that can be formed from one guppy. (Explore Activity)



$$3 \times 2^2 = 12 \text{ angelfish}$$

Complete to simplify each expression. (Examples 1 and 2)

$$\begin{aligned} 2. \quad 4 + (10 - 7)^2 \div 3 &= 4 + (\underline{3})^2 \div 3 \\ &= 4 + \underline{9} \div 3 \\ &= 4 + \underline{3} \\ &= \underline{7} \end{aligned}$$

$$\begin{aligned} 3. \quad 36 \div 2^2 - 4 \times 2 &= 36 \div \underline{4} - 4 \times 2 \\ &= \underline{9} - 4 \times 2 \\ &= \underline{9} - 8 \\ &= \underline{1} \end{aligned}$$

$$\begin{aligned} 4. \quad 2 + (-24 \div 2^3) - 9 &= 2 + (-24 \div \underline{8}) - 9 \\ &= 2 + \underline{-3} - 9 \\ &= \underline{-1} - 9 \\ &= \underline{-10} \end{aligned}$$

$$\begin{aligned} 5. \quad -4^2 \times (-3 \times 2 + 8) &= -4^2 \times (\underline{-6} + 8) \\ &= -4^2 \times \underline{2} \\ &= \underline{-16} \times \underline{2} \\ &= \underline{-32} \end{aligned}$$



ESSENTIAL QUESTION CHECK-IN

6. How do you use the order of operations to simplify expressions with exponents?

Find the value of any expressions within parentheses first.

Then evaluate all powers. Then multiply or divide from left to right, and finally add or subtract from left to right.

10.3 Independent Practice

TEKS 6.7.A



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Simplify each expression using the order of operations.

7. $5 \times 2 + 3^2$ 19

8. $15 - 7 \times 2 + 2^3$ 9

9. $(11 - 8)^2 - 2 \times 6$ -3

10. $6 + 3(13 - 2) - 5^2$ 14

11. $12 + \frac{9^2}{3}$ 39

12. $\frac{8+6^2}{11} + 7 \times 2$ 18

13. **Explain the Error** Jay simplified the expression $-3 \times (3 + 12 \div 3) - 4$. For his first step, he added $3 + 12$ to get 15. What was Jay's error? Find the correct answer.

Jay worked inside the parentheses first, but he should have performed the division $12 \div 3 = 4$ first; -25.

14. **Multistep** A clothing store has the sign shown in the shop window. Pani sees the sign and wants to buy 3 shirts and 2 pairs of jeans. The cost of each shirt before the discount is \$12, and the cost of each pair of jeans is \$19 before the discount.



- a. Write and simplify an expression to find the amount Pani pays if a \$3 discount is applied to her total.

$3 \times 12 + 2 \times 19 - 3$; \$71

- b. Pani says she should get a \$3 discount on the price of each shirt and a \$3 discount on the price of each pair of jeans. Write and simplify an expression to find the amount she would pay if this is true.

$3 \times (12 - 3) + 2 \times (19 - 3)$; \$59

- c. **Analyze Relationships** Why are the amounts Pani pays in **a** and **b** different?

In part **a**, the \$3 discount is applied 1 time; in **b** it is applied 5 times.

- d. If you were the shop owner, how would you change the sign? Explain.

Sample answer: If the shop owner wants to make more money, the sign should say "\$3 off your entire purchase." If customers can take the discount off every item, a lot more money is discounted from each purchase.