PREALG: Integers and Order of Operations

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Name: _____ Date: _____ Score: / 30

Learning Objectives

- Add, subtract, multiply, and divide integers
- Apply the order of operations (PEMDAS/GEMDAS)
- Evaluate expressions with parentheses and exponents
- Solve real-world problems involving integers

Simplify each expression completely. Show all steps and circle your final answer.

Adding and subtracting integers

1. Add the integers: 5 + -12

$$5 - 12$$

Answer: _____

2. Subtract: -11 - 5. (Hint: rewrite as -11 + (-5) and apply integer addition rules.)

$$-11 + 5$$

Answer: _____

3. A football team gains 16 yards on one play and loses 4 yards on the next. What is the net yardage?

$$16 - 4$$

Answer: _____

4. Add the integers: -7 + -14

$$-7 - 14$$

Answer: _____

5. Subtract: 7 - 14. (Hint: rewrite as 7 + (-14) and apply integer addition rules.)

$$7 + 14$$

Answer: _____

6. A football team gains 7 yards on one play and loses 5 yards on the next. What is the net yardage?

$$7 - 5$$

Answer: _____

7. Add the integers: 14 + 3

$$14 + 3$$

Answer: _____

8. Subtract: 2 - 8. (Hint: rewrite as 2 + (-8) and apply integer addition rules.)

$$2 + 8$$

Answer: _____

9. A football team gains 18 yards on one play and loses 11 yards on the next. What is the net yardage?

$$18 - 11$$

Answer: _____

Multiplying and dividing integers

10. Multiply: (-5) x (8)

$$(-5) \times (8)$$

Answer: _____

11. A diver descends 8 feet per minute for 8 minutes. Express the total change in depth as an integer.

$$(-8) \times (8)$$

Answer: _____

12. Multiply: (-4) x (-8). Both factors are negative.

$$(-4) \times (-8)$$

Answer: _____

13. Multiply: (-8) x (5)

$$(-8) \times (5)$$

Answer: _____

14. A diver descends 2 feet per minute for 2 minutes. Express the total change in depth as an integer.

$$(-2) \times (2)$$

Answer: _____

15. Multiply: (-9) x (-4). Both factors are negative.

$$(-9) \times (-4)$$

Answer: _____

16. Multiply: (-3) x (6)

$$(-3) \times (6)$$

Answer: _____

17. A diver descends 8 feet per minute for 6 minutes. Express the total change in depth as an integer.

$$(-8) \times (6)$$

Answer: _____

18. Multiply: (-8) x (-8). Both factors are negative.

$$(-8) \times (-8)$$

Answer: _____

Order of operations (no parentheses)

19. Evaluate using the order of operations: 9 + 4 x 4. Remember: multiply before you add.

$$9 + 4 \times 4$$

Answer: _____

20. A store sells 7 items at $9 each, plus a $3 fee. What is the total: 3 + 7 x 9?

$$3 + 7 \times 9$$

Answer: _____

21. Evaluate using the order of operations: 10 + 3 x 5. Remember: multiply before you add.

$$10 + 3 \times 5$$

Answer: _____

22. A store sells 3 items at $10 each, plus a $8 fee. What is the total: 8 + 3 x 10?

$$8 + 3 \times 10$$

Answer: _____

23. Evaluate using the order of operations: 12 + 5 x 3. Remember: multiply before you add.

$$12 + 5 \times 3$$

Answer: _____

24. A store sells 3 items at $5 each, plus a $2 fee. What is the total: 2 + 3 x 5?

$$2 + 3 \times 5$$

Answer: _____

Order of operations (with parentheses)

25. Evaluate: (8 + 5) x 4. Parentheses come first!

$$(8 + 5) \times 4$$

Answer: _____

26. 4 groups each containing (5 + 10) students. How many students total? Evaluate (5 + 10) x 4.

$$(5 + 10) \times 4$$

Answer: _____

27. Evaluate: (5 + 5) x 6. Parentheses come first!

$$(5 + 5) \times 6$$

Answer: _____

28. 5 groups each containing (9 + 4) students. How many students total? Evaluate (9 + 4) x 5.

$$(9 + 4) \times 5$$

Answer: _____

29. Evaluate: (2 + 5) x 7. Parentheses come first!

$$(2 + 5) \times 7$$

Answer: _____

30. 2 groups each containing (7 + 10) students. How many students total? Evaluate (7 + 10) x 2.

$$(7 + 10) \times 2$$

Answer: _____

PREALG: Integers and Order of Operations

ANSWER KEY & SOLUTIONS

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Topics: Multiplying and dividing integers, Order of operations (no parentheses), Adding and subtracting integers, Order of operations (with parentheses). All answers verified by independent computation.

Solutions

Adding and subtracting integers

1. Add the integers: 5 + -12

$$5 - 12$$

→ *Identify signs: a = 5, b = -12.*
→ *Same sign? Add absolute values and keep the sign. Different signs? Subtract and keep the sign of the larger absolute value.*
→ *Answer: -7.*

Answer: $= -7$

2. Subtract: -11 - 5. (Hint: rewrite as -11 + (-5) and apply integer addition rules.)

$$-11 + 5$$

→ *Rewrite subtraction as addition of the opposite: -11 + (-5).*
→ *Apply integer addition rules.*
→ *Answer: -6.*

Answer: $= -6$

3. A football team gains 16 yards on one play and loses 4 yards on the next. What is the net yardage?

$$16 - 4$$

→ *Represent loss as negative: gains 16, loses 4 means 16 + (-4).*
→ *Net yardage = 16 + (-4) = 12 yards.*
→ *Positive result means net gain; negative means net loss.*

Answer: $= 12$

4. Add the integers: -7 + -14

$$-7 - 14$$

→ *Identify signs: a = -7, b = -14.*
→ *Same sign? Add absolute values and keep the sign. Different signs? Subtract and keep the sign of the larger absolute value.*
→ *Answer: -21.*

Answer: $= -21$

5. Subtract: 7 - 14. (Hint: rewrite as 7 + (-14) and apply integer addition rules.)

$$7 + 14$$

→ *Rewrite subtraction as addition of the opposite: 7 + (-14).*
→ *Apply integer addition rules.*
→ *Answer: 21.*

Answer: $= 21$

6. A football team gains 7 yards on one play and loses 5 yards on the next. What is the net yardage?

$$7 - 5$$

→ *Represent loss as negative: gains 7, loses 5 means 7 + (-5).*
→ *Net yardage = 7 + (-5) = 2 yards.*
→ *Positive result means net gain; negative means net loss.*

Answer: $= 2$

7. Add the integers: 14 + 3

$$14 + 3$$

→ *Identify signs: a = 14, b = 3.*
→ *Same sign? Add absolute values and keep the sign. Different signs? Subtract and keep the sign of the larger absolute value.*
→ *Answer: 17.*

Answer: $= 17$

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8. Subtract: 2 - 8. (Hint: rewrite as 2 + (-8) and apply integer addition rules.)

$$2 + 8$$

→ *Rewrite subtraction as addition of the opposite: 2 + (-8).*
→ *Apply integer addition rules.*
→ *Answer: 10.*

Answer: $= 10$

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9. A football team gains 18 yards on one play and loses 11 yards on the next. What is the net yardage?

$$18 - 11$$

→ *Represent loss as negative: gains 18, loses 11 means 18 + (-11).*
→ *Net yardage = 18 + (-11) = 7 yards.*
→ *Positive result means net gain; negative means net loss.*

Answer: $= 7$

Multiplying and dividing integers

10. Multiply: (-5) x (8)

$$(-5) \times (8)$$

→ *Different signs (negative and positive) → product is negative.*
→ *Multiply absolute values: 5 x 8 = 40.*
→ *Result: -40.*

Answer: $= -40$

11. A diver descends 8 feet per minute for 8 minutes. Express the total change in depth as an integer.

$$(-8) \times (8)$$

→ *Descending means negative direction: -8 feet per minute.*
→ *Multiply: (-8) x 8.*
→ *Total change: -64 feet (negative means below the starting point).*

Answer: $= -64$

12. Multiply: (-4) x (-8). Both factors are negative.

$$(-4) \times (-8)$$

→ *Same signs (both negative) → product is positive.*
→ *Multiply absolute values: 4 x 8 = 32.*
→ *Result: 32.*

Answer: $= 32$

13. Multiply: (-8) x (5)

$$(-8) \times (5)$$

→ *Different signs (negative and positive) → product is negative.*
→ *Multiply absolute values: 8 x 5 = 40.*
→ *Result: -40.*

Answer: $= -40$

14. A diver descends 2 feet per minute for 2 minutes. Express the total change in depth as an integer.

$$(-2) \times (2)$$

→ *Descending means negative direction: -2 feet per minute.*
→ *Multiply: (-2) x 2.*
→ *Total change: -4 feet (negative means below the starting point).*

Answer: $= -4$

15. Multiply: (-9) x (-4). Both factors are negative.

$$(-9) \times (-4)$$

→ *Same signs (both negative) → product is positive.*
→ *Multiply absolute values: 9 x 4 = 36.*
→ *Result: 36.*

Answer: $= 36$

16. Multiply: (-3) x (6)

$$(-3) \times (6)$$

→ *Different signs (negative and positive) → product is negative.*
→ *Multiply absolute values: 3 x 6 = 18.*
→ *Result: -18.*

Answer: $= -18$

17. A diver descends 8 feet per minute for 6 minutes. Express the total change in depth as an integer.

$$(-8) \times (6)$$

→ *Descending means negative direction: -8 feet per minute.*
→ *Multiply: (-8) x 6.*
→ *Total change: -48 feet (negative means below the starting point).*

Answer: $= -48$

18. Multiply: (-8) x (-8). Both factors are negative.

$$(-8) \times (-8)$$

→ *Same signs (both negative) → product is positive.*
→ *Multiply absolute values: 8 x 8 = 64.*
→ *Result: 64.*

Answer: $= 64$

Order of operations (no parentheses)

19. Evaluate using the order of operations: 9 + 4 x 4. Remember: multiply before you add.

$$9 + 4 \times 4$$

→ *Step 1: Multiply first: 4 x 4 = 16.*
→ *Step 2: Then add: 9 + 16 = 25.*

Answer: $9 + 16 = 25$

20. A store sells 7 items at $9 each, plus a $3 fee. What is the total: 3 + 7 x 9?

$$3 + 7 \times 9$$

→ *Multiply first: 7 x 9 = 63. Then add: 3 + 63 = 66.*

Answer: $3 + 63 = 66$

21. Evaluate using the order of operations: 10 + 3 x 5. Remember: multiply before you add.

$$10 + 3 \times 5$$

→ *Step 1: Multiply first: 3 x 5 = 15.*
→ *Step 2: Then add: 10 + 15 = 25.*

Answer: $10 + 15 = 25$

22. A store sells 3 items at $10 each, plus a $8 fee. What is the total: 8 + 3 x 10?

$$8 + 3 \times 10$$

→ *Multiply first: 3 x 10 = 30. Then add: 8 + 30 = 38.*

Answer: $8 + 30 = 38$

23. Evaluate using the order of operations: 12 + 5 x 3. Remember: multiply before you add.

$$12 + 5 \times 3$$

→ *Step 1: Multiply first: 5 x 3 = 15.*
→ *Step 2: Then add: 12 + 15 = 27.*

Answer: $12 + 15 = 27$

24. A store sells 3 items at $5 each, plus a $2 fee. What is the total: 2 + 3 x 5?

$$2 + 3 \times 5$$

→ *Multiply first: 3 x 5 = 15. Then add: 2 + 15 = 17.*

Answer: $2 + 15 = 17$

Order of operations (with parentheses)

25. Evaluate: (8 + 5) x 4. Parentheses come first!

$$(8 + 5) \times 4$$

→ *Step 1: Add inside parentheses: 8 + 5 = 13.*
→ *Step 2: Multiply: 13 x 4 = 52.*

Answer: $13 \times 4 = 52$

26. 4 groups each containing (5 + 10) students. How many students total? Evaluate (5 + 10) x 4.

$$(5 + 10) \times 4$$

→ *(5 + 10) x 4 = 15 x 4 = 60.*

Answer: $15 \times 4 = 60$

27. Evaluate: (5 + 5) x 6. Parentheses come first!

$$(5 + 5) \times 6$$

→ *Step 1: Add inside parentheses: 5 + 5 = 10.*
→ *Step 2: Multiply: 10 x 6 = 60.*

Answer: $10 \times 6 = 60$

28. 5 groups each containing (9 + 4) students. How many students total? Evaluate (9 + 4) x 5.

$$(9 + 4) \times 5$$

→ *(9 + 4) x 5 = 13 x 5 = 65.*

Answer: $13 \times 5 = 65$

29. Evaluate: (2 + 5) x 7. Parentheses come first!

$$(2 + 5) \times 7$$

→ *Step 1: Add inside parentheses: 2 + 5 = 7.*
→ *Step 2: Multiply: 7 x 7 = 49.*

Answer: $7 \times 7 = 49$

30. 2 groups each containing (7 + 10) students. How many students total? Evaluate (7 + 10) x 2.

$$(7 + 10) \times 2$$

→ *(7 + 10) x 2 = 17 x 2 = 34.*

Answer: $17 \times 2 = 34$