

Unit 1 - Operations with Integers

Topics

Integers and Absolute Value

Adding Integers

Subtracting

Integers Distance

Multiplying

Integers

Dividing Integers

Properties of Numbers



Name: _____

Math Period: _____ Teacher: _____

Lesson 1: *Integers and Absolute Value*

Do Now:

Write an integer for each situation. Identify its opposite and describe its meaning. Then graph the integer and its opposite on a number line.

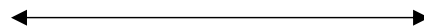
1. an elevator ascends 4 floors

2. to be at par



3. 11°F below zero

4. a profit of \$52 on a sale



Directions: Replace each **blank** with $<$, $>$, or $=$ to make a true sentence.

5. $0 \underline{\quad} -5$

6. $10 \underline{\quad} -10$

7. $-8 \underline{\quad} 3$

8. $11 \underline{\quad} 11$

9. $-18 \underline{\quad} -18$

10. $-18 \underline{\quad} 18$

11. $18 \underline{\quad} -18$

12. $18 \underline{\quad} 18$

13. $-120 \underline{\quad} -95$

14. $35 \underline{\quad} -12$

15. $-35 \underline{\quad} 12$

16. $41 \underline{\quad} 17$

Absolute Value:

Evaluate each expression:

17. $|-7|$

18. $|14|$

19. $|-11|$

21. $|-18| - |-8|$

23. $|8 - 4|$

25. $|-16| + |-22|$

Evaluate each expression if $a = -3$, $b = 0$, and $c = 1$.

27. $|a| + |c|$

29. $5 - |ac|$

31. $c + |5|$

Lesson 1 Homework

Directions: Evaluate Each Expression:

20. $|-9| - |6|$

22. $|-12| + |1|$

24. $|23| - |18|$

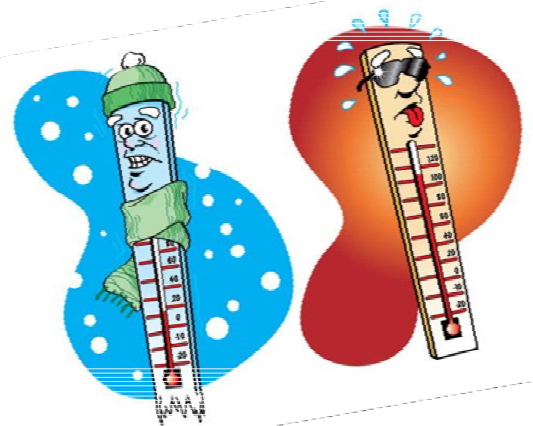
Evaluate each expression if $a = -3$, $b = 0$, and $c = 1$.

26. $|a| - |c|$

28. $|ab| + c$

30. $c + |-5|$

32. At 6:15 a.m. the temperature was -8°F . At 12:15 p.m. the temperature was -12°F .
At 6:16 p.m. the temperature was -10°F . Order the temperatures from least to greatest.



Lesson 2: Adding Integers

Do Now:

a) $|-3 + 5| =$

b) $|-3| + 5 =$

c) Evaluate the expression if $a = -3$, $b = 0$ and $c = 1$

Expression: $5 - |ac|$

Find each sum.

1. $-19 + (-7)$

2. $-29 + 30$

3. $-32 + 9$

4. $10 + 37$

5. $34 + 22$

6. $-16 + (-28)$

7. $-4 + (-50)$

8. $-12 + (-63)$

9. $26 + (-9)$

11. $12 + (-22)$

13. $-36 + (-36)$

15. $-34 + 17$

17. $70 + (-108)$

19. $-71 + (-86)$

21. $25 + 18 + (-25)$

23. $80 + 15 + (-26)$

25. $-29 + 29 + 44$

26. $-1 + (-8) + (-49)$

27. $-16 + (-56) + (-90)$

28. $-18 + 13 + (-35)$

29. $10 + (-34) + 34$

30. $30 + (-9) + 1$

31. $-24 + 7 + (-7)$

32. $51 + (-21) + (-12)$

Summary: In your Own Words!

- How do we add integers with the same sign?
- How do we add integers with different signs?

Lesson 2 Homework



Adding Integers

Find each sum.

10. $-17 + (-23)$

12. $18 + (-56)$

14. $-54 + 45$

16. $-16 + (-24)$

18. $-52 + 36$

20. $-39 + (-40)$

22. $-65 + (-2) + 9$

24. $-5 + 4 + (-27)$

33. At 4:00 a.m., the outside temperature was -28°F . By 4:00 p.m. it rose 38 degrees. What was the temperature at 4:00 p.m.?

34. Three friends decided to exercise together four times a week to lose fat and increase muscle mass. While all three were healthier after six weeks, one had lost 5 pounds, another had gained 3 pounds, and one had lost 4 pounds. What was the total number of pounds gained or lost by the three friends?

35. The latest thrill ride at a popular theme park takes roller coaster fans on an exciting ride. In the first 20 seconds, it carries its passengers up a 100-meter hill, plunges them 72 meters down, and quickly takes them back up a 48-meter rise. How much higher or lower from the start of the ride are they after these 20 seconds?

Lesson 3: Subtracting Integers

Do Now:

1. $|-7| + 5 =$

2. $|-7 + 5| =$

3. $|-7| + |5| =$

The rule of subtraction:

Find each difference.

1. $-26 - (-30)$

3. $-18 - 54$

5. $-41 - (-19)$

7. $31 - (-56)$

9. $-32 - 28$

11. $-14 - 64$

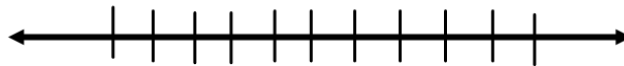
13. $-81 - 4$

15. $-44 - (-21)$

31. Randi takes the stairs at work whenever possible instead of the elevator. She must climb up 51 steps from her office to get to the accounting department. The human resources department is 34 steps below her office. How many steps are there between human resources and accounting?

Throwback!

1. Put on a number line:
-3, 4, 0, -2, 1.5, -2.5



2. Simplify: $|-8 + (-2)|$

3. Simplify: $7 - 4(11 - 2^3)$

4. Evaluate: $(3)(-2)$

5. Evaluate: $(-3)(-2)$

Lesson 3 Homework

Find each difference.

2. $25 - 32$

4. $59 - (-19)$

6. $-20 - 13$

8. $15 - (-40)$

10. $10 - (-23)$

12. $-12 - (-36)$

14. $9 - 30$

16. $140 - (-9)$

29. Linda entered an elevator on floor 9. She rode down 8 floors. Then she rode up 11 floors and got off. What floor was she on when she left the elevator?

30. The NASDAQ lost 36 points on a Monday, but rebounded the next day, gaining 24 points. What was the total change in points?



Lesson 4: Distance between Integers

DO NOW:

a) What is the distance between -4 and 5? What about 5 and -4?

b) What is the distance between -5 and -3? What about -3 and -5?

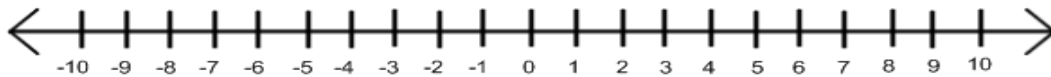
c) What is the distance between 7 and -1? What about -1 and 7?



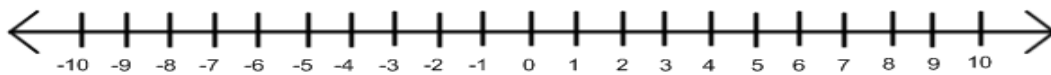
Classwork:

A. Use the number line to answer each of the following:

1. What is the distance between 0 and -8?



2. What is the distance between -2 and $-1\frac{1}{2}$?



3. What is the distance between -6 and -



B. Formula for the Distance Between Two Rational Numbers

3. Find the distance between -3 and 2.

The steps are:

1. Start at -3.
2. Count the number of units from -3 to 2.



Difference

VS

Distance

Distance Formula

For two rational numbers p and q , the distance between p and q is $|p - q|$.

Change in Elevation vs. Distance

5. A hiker starts hiking at the beginning of a trail at a point which is 200 feet below sea level. He hikes to a location on the trail that is 580 feet above sea level and stops for lunch. What is the vertical distance between 200 feet below sea level and 580 feet above sea level?

6. After lunch, the hiker hiked back down the trail from the point of elevation, which is 580 feet above sea level, to the beginning of the trail which is 200 feet below sea level. What is the vertical distance between 580 feet above sea level and 200 feet below sea level?

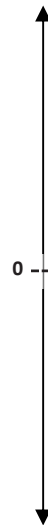
7. What is the change in elevation?

8. Circle yes or no. ABSOLUTE VALUE?

Distance yes no

Difference yes no

Change yes no



E. Use the distance formula to find each answer.
Support your answer using a number line diagram.

8. Find the distance between -7 and -4.



9. Find the change in temperature if the temperature rises from -18°F to 15°F (use a vertical number line).

10. Would your answer for #8 be different if the temperature dropped from 15°F to -18°F?

11. What is the change in elevation from 140 feet above sea level to 40 feet below sea level? Explain.

12. The distance between a negative number and a positive number is 12. What are the numbers

Let's Summarize !

WHAT DID WE LEARN?



Lesson 4 Homework:

Find the distance between the integers on a number line.

17. -6 and 0

18. -1 and -19

19. 3 and -5

20. 14 and 21

21. -16 and 2

22. 0 and -7

23. -23 and 15

24. 9 and -1

25. -4 and 4

26. -56 and -60

27. -105 and 110

28. -212 and -342

31. Randi takes the stairs at work whenever possible instead of the elevator. She must climb up 51 steps from her office to get to the accounting department. The human resources department is 34 steps below her office. How many steps are there between human resources and accounting?

Lesson 5: Multiplying Integers

Find each product.

1. $8(16)$

2. $-4(17)$

3. $-1(-40)$

4. $-5(-7)$

5. $0(-54)$

6. $29(-2)$

7. $-20(-20)$

8. $-31(-4)$

9. $-2(-15)(-6)$

10. $3(-5)(-8)$

11. $-10(17)(-2)$

12. $-2(-2)(-2)$

13. $12(10)(5)$

14. $-50(-21)(2)$

15. $-8(-13)(-25)$

16. $-5(16)(4)$

Simplify each expression.

17. $-6r \cdot (12s)$

18. $-15 \cdot (9v)$

19. $2ab \cdot (-25)$

20. $-27y \cdot (-z)$

21. $-60m(-2)(-3n)$

22. $-9u(-4)(-w)$

23. $29g(0)(-15)$

24. $-b(-12)(11)$

25. $19h(-1)(-2s)$

26. $-h(-jk)$

27. $(-1)(-a)(-bc)$

28. $(-1)(-fg)(-xy)$

Evaluate each expression if $a = -1$, $b = -6$, and $c = 5$.

29. $-11a$

30. $4ab$

31. $-8bc$

32. $-10ac$

33. $15ab$

34. $12ac$

35. abc

36. $-abc$

37. $-11a(-bc)$

38. $4ab(-8c)$

39. $9a(-2b)(5c)$

40. $-3a(-2b)(-c)$

41. In Montyville, the value of homes has experienced an annual change of -2 percent. If the rate continues, what will be the change over 10 years?

42. The Good Food n' More grocery store loses an average of \$210 a day due to breakage, shoplifting, and food expiration. How much money does the store lose on average per 7-day week?

Lesson 6: Dividing Integers

Find each quotient

1. $-44 \div 4$

2. $0 \div (-5)$

3. $-21 \div 21$

4. $32 \div 8$

5. $-17 \div (-17)$

6. $-49 \div 7$

7. $80 \div (-4)$

8. $-64 \div (-8)$

9. $\frac{72}{-9}$

10. $\frac{-100}{-5}$

11. $\frac{-90}{6}$

12. $\frac{360}{12}$

13. $\frac{-400}{-25}$

14. $\frac{-525}{5}$

15. $\frac{84}{-6}$

16. $\frac{215}{5}$

Evaluate each expression if $a = -2$, $b = 5$, and $c = -4$.

17. $-35 \div b$

18. $54 \div a$

19. $-56 \div c$

20. $205 \div b$

21. $\frac{c}{-2}$

22. $\frac{b}{5}$

23. $\frac{2}{a}$

24. $\frac{-4}{c}$

25. $\frac{-28}{c}$

26. $\frac{ac}{-8}$

27. $\frac{bc}{a}$

28. $\frac{250}{ab}$

Find the average (mean) of each group of numbers.

29. 23, 20, 27, 18

30. -8, 9, 4, 0, 2, -1

31. 17, 21, 4

32. -20, -15, -12, -1, 1, 12, 15, 20

33. -7, -3, -9, 0, 21, -2, -14

Lesson 5 Homework

11. $-10(17)(-2)$

13. $12(10)(5)$

Simplify each expression.

17. $-6r \cdot (12s)$

19. $2ab \cdot (-25)$

23. $29g(0)(-15)$

Evaluate each expression if $a = -1$, $b = -6$, and $c = 5$.

29. $-11a$

31. $-8bc$

Lesson 6 Homework

Evaluate the quotient:

9. $\frac{72}{-9}$

10. $\frac{-100}{-5}$

11. $\frac{-90}{6}$

12. $\frac{360}{12}$

13. $\frac{-400}{-25}$

14. $\frac{-525}{5}$

15. $\frac{84}{-6}$

16. $\frac{215}{5}$

Evaluate each expression if $a = -2$, $b = 5$, and $c = -4$.

17. $-35 \div b$

18. $54 \div a$

19. $-56 \div c$

20. $205 \div b$

21. $\frac{c}{-2}$

22. $\frac{b}{5}$

23. $\frac{2}{a}$

24. $\frac{-4}{c}$

Find the average (mean) of each group of numbers.

29. 23, 20, 27, 18

30. $-8, 9, 4, 0, 2, -1$

31. 17, 21, 4

Lesson 7: Properties of Real Numbers

Do Now: Evaluate:

1) $4 + 5$

6) $5 + 4$

2) $2 + (15 + 9)$

7) $(2 + 15) + 9$

3) $7 \cdot 3$

8) $3 \cdot 7$

4) $(6 \cdot 10) \cdot 2$

9) $6 \cdot (10 \cdot 2)$

5) $3(8 + 1)$

10) $3(8) + 3(1)$

Did you notice anything?

Properties of Numbers:

1) Commutative Property of Addition:

2) Commutative Property of Multiplication:

3) Distributive Property:

4) Associative Property of Addition:

5) Associative Property of Multiplication:

6) Additive Inverse:

7) Multiplicative Inverse:

8) Identity Property of Addition:

9) Identity Property of Multiplication:

10) Multiplicative Property of Zero:

Properties of Numbers

Name the property shown by each statement.

1. $55 + 6 = 6 + 55$

2. $6 \cdot 7 = 7 \cdot 6$

3. $(x + 3) + y = x + (3 + y)$

4. $1 \cdot mp = mp$

5. $9 + (5 + 35) = (9 + 5) + 35$

6. $67 + 0 = 67$

7. $7x \cdot 0 = 0$

8. $4(3 \cdot z) = (4 \cdot 3)z$

Simplify each expression.

9. $a(5 - 7)$

10. $(24 + s) + 16$

11. $c + (17 + 8)$

12. $72g(1)$

13. $31 + (21 + p)$

14. $(e \cdot 4) \cdot 12$

15. $(m + 11) + 19$

16. $(9 \cdot b) \cdot 10$

17. $19 + (v + 8)$

18. $(28 + 12) + x$

19. $8s \cdot 0$

20. $4 \cdot (r \cdot 5)$

21. The volume of a box is given by $V = \ell \cdot w \cdot h$ where ℓ = length, w = width, and h = height. Find the volume of a box if the length is 25 cm, width is 13 cm, and height is 4 cm.

22. In math class each assignment is worth 20 points. David got 17, 20, 19, and 13 points on his last four assignments. How many points did David score all together?

23. State whether the following statement is true or false: Multiplying any number by one produces the original number. Explain.

