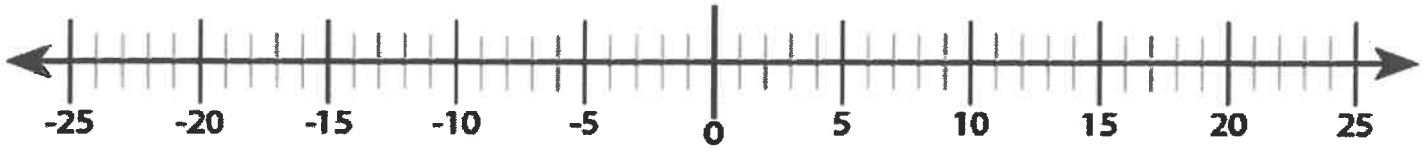
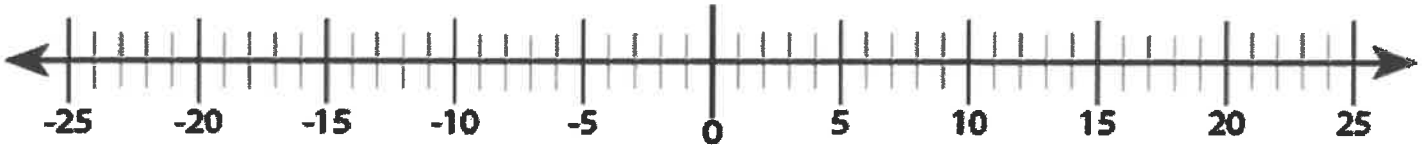
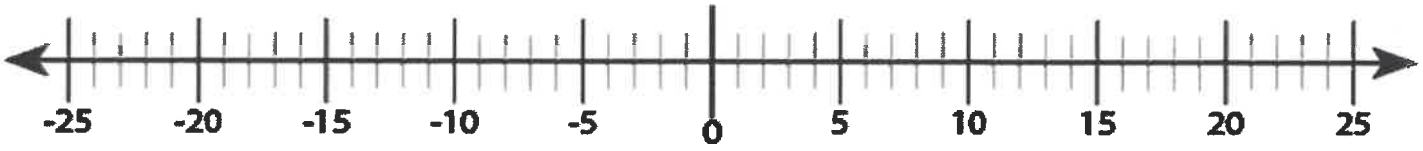
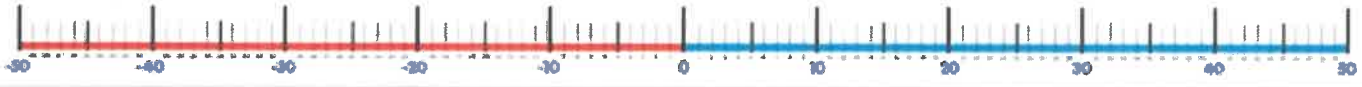


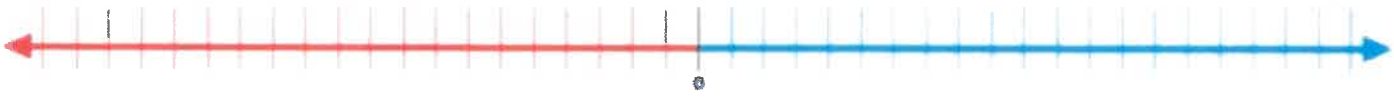




Positive and Negative Number Line



Blank Positive and Negative Number Line

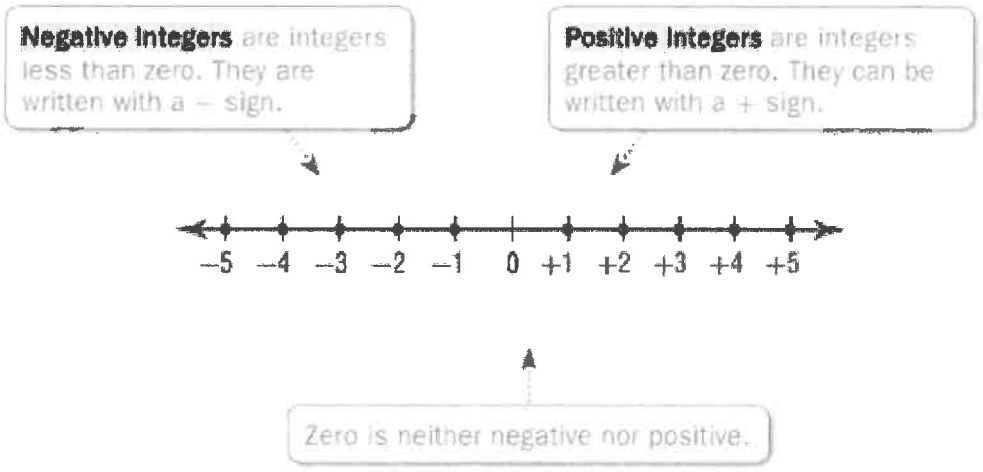


Integers & Absolute Value notes

Integer: A whole number that is positive, negative or zero; {...-4,-3,-2,-1,0,1,2,3,4 ...}

Create and complete the graphic organizer:

Describe it:	Picture:
Examples:	Non-examples:



Integers can be graphed on a number line. To **graph** an integer on the number line, draw a dot on the line at its location.

Identify Integers

Write an integer for each situation.

1. **an average temperature of 5 degrees below normal**

2. **an average rainfall of 5 inches above normal**

Got It? **Do these problems to find out.**

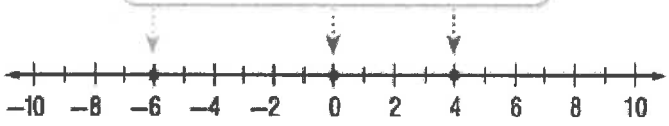
Write an integer for each situation.

a. 6 degrees above normal **b.** 2 inches below normal

Graph Integers

3. **Graph the set of integers {4, −6, 0} on a number line.**

Draw a number line. Then draw a dot at the location of each integer.



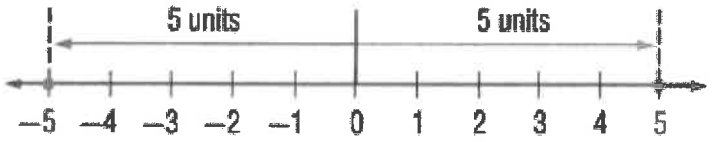
Got It? **Do these problems to find out.**

Graph each set of integers on a number line.

c. {−2, 8, −7} **d.** {−4, 10, −3, 7}

Absolute Value

Words The absolute value of a number is the distance between the number and zero on a number line.



Examples $|-5| = 5$ $|5| = 5$

Examples

Tutor

Evaluate each expression.

4. $|-4|$

5. $|-5| - |2|$

Got It? Do these problems to find out.

e. $|8|$ **f.** $2 + |-3|$ **g.** $|-6| - 5$

Comparing and Ordering Integers:

Use >, < or = to compare integers

A) $-1 \bigcirc 1$

B) $-6 \bigcirc -4$

C) $3 \bigcirc 5$

D) $|-1| \bigcirc 1$

*Whatever # is to the left is the number that is smallest! Unless there is an absolute value.

ex. Which is warmer?

A) $-67^\circ F$ or $-65^\circ F$

B) $-67^\circ F$ or $10^\circ F$

C) $-17^\circ F$ or $-16.9^\circ F$

ex. Write an inequality to tell which # is greater.

A) -22 or -1

B) -15 or -14

Additive Inverse: Opposite

7 and -7 -3 and 3

* when you add a number and its additive inverse = 0!!!!

$$-5 + 5 = 0$$

Number — Additive Inverse

$$14 + -14 = 0$$

Example 1: Introduction to the Integer Game

Let's demonstrate how to play the Integer Game.

All students will play later in the lesson.

Model the game with the cards & one student

How to Play

The Integer Game is designed for 2 to 4 players. Students play the game with a partner or a group of students Each player begins the game with a score of zero. The object of the game is to return to a score of zero by picking up and discarding integer cards. Below are the basic rules:

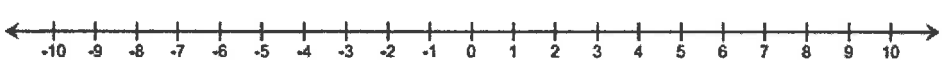
1. Choose a dealer (this student will also play). Deal each player four cards.
2. The dealer turns one more card face up on the playing surface, starting a discard pile. The remaining cards become a draw pile.
3. The player to the dealer's left begins play. On his turn, a player may select the top card from either the draw pile or the discard pile. The player must keep this card and discard another card from his hand to the discard pile.
4. A player's goal is to have his hand's total card value stay as close to zero as possible. So for each turn, a player must determine how the card drawn affects his hand's total card value, by counting up or down accordingly. Also, a player must decide which card to discard so as to keep the total value of his hand as close to zero as possible.
5. Play continues with the next player, in the same manner, until all players have picked up and discarded a card four times.
6. The player(s) with a score of zero wins the round.

Integers & Absolute Value notes

Using the Integer Game and the Number Line

What is the sum of the card values shown? Use the counting on method on the provided number line to justify your answer.

5	−5	−4	8



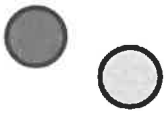
a. What is the final position on the number line?

b. What card or combination of cards would you need to get back to 0?

Adding integers Notes

Demonstrate the following problem in the box provided.

Find 6 + (-3).



Demonstrate the following problem in the box provided.

Find -2 + (-3).

Adding integers Notes

Demonstrate the following problem in the box provided.

Find -2 + (-2).

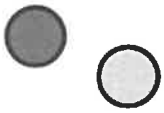
Demonstrate the following problem in the box provided.

Find 8 + (-11).

Adding integers Notes

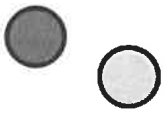
Demonstrate the following problem in the box provided.

Find 2 + (-8).



Demonstrate the following problem in the box provided.

Find (-7) + 6.



Adding integers Notes

Adding Integers

Adding Integers With the Same Sign

The sum of two positive integers is **positive**.
Ex. 2 + 3 = 5

The sum of two negatives is **negative**.
Ex. -2 + (-3) = -5

Adding Integers With the Different Signs

To add integers with different signs, first find the absolute value of each integer. Then, subtract the lesser absolute value from the greater. The sum has the sign of the integer with the greater absolute value.

Examples: 2 + (-3) = -1 -2 + 3 = 1

Let's celebrate by singing!

Integer Song (sing to "Row, Row, Row your Boat)

Same sign, add and keep,
Different signs subtract,
Take the sign of the bigger number
Then it'll be exact!

Adding integers - Word Problems

1.) A football team loses 5 yards on one play and then loses 8 yards on the next play. How many yards did they lose in two plays?

How do we represent a loss of 5 yards?

How do we represent a loss of 8 yards?

What does our addition sentence look like?

What is the answer to the question?

2.) You park in a garage 3 floor below ground level. Then you get in the elevator and go up 12 floors. What floor do you get off the elevator?

How do we represent 3 floors below ground level?

How do we represent going up 12 floors?

What does our addition sentence look like?

What is the answer to the question?

Adding integers - Word Problems

3.) In 2002, Tiger Woods won the Masters Tournament. His scores were -2, -3, -6, and -1 for four rounds? What was his final score?

What does -2 represent in golf?

Is it a good score or a bad score? Why?

What does our addition sentence look like?

What is the answer to the question?

4.) A local bookstore has 30 copies of a bestseller when it opens on Monday morning. On Monday, it sells 6 copies of the book. On Tuesday, it sells 3 copies. On Wednesday, it receives a shipment containing 24 copies of the book and also sells 8 copies. How many books does the bookstore have at the end of day on Wednesday?

How do we represent selling 6 books?

How do we receiving 24 books?

What does our addition sentence look like?

What is the answer to the question?

Adding integers - Word Problems

5.) A research team aboard an underwater research vessel descends 1,500 feet beneath the surface of the water. They then ascand 525 feet and descend again 350 feet. Where are they currently located?

How do we represent descending feet?

How do we represent ascending feet?

What does our addition sentence look like?

What is the answer to the question?

6.) Peter weighs 156 pounds, but he would like to wrestle in a lower weight class. He loses 4 pounds one week, gains back 2 pounds the next, loses 5 pounds the third week, and loses 3 pounds the fourth week. How much does Peter weigh at the end of four weeks?

How do we represent weight loss?

How do we represent weight gain?

What does our addition sentence look like?

What is the answer to the question?

Subtracting Integers

Additive Inverse

A number that when added to a given number results in a sum of zero.

Ex: (+3) + (-3) = 0

-3 is the additive inverse of 3.

a) 5 - 7 = -2 b) 5 + (-7) = -2

Why do you think these are equal?

Subtracting Integers

-When finding the difference, you have to add the opposite.

-Then, follow the rules of adding with integers.

Let's practice finding the difference.

1) 5 - 2 =

2) 7 - 10 =

3) -3 - 5 =

4) -11 - (-4) =

Subtracting integers

More Examples:

1) 9 - (-5)

2) -6 - (-10)

3) -9 - 7

4) -4 - (-12)

5) -3 - (-8)

6) 5 - 15

Addition Rules

- Same signs, add and keep that sign.
- Different signs, subtract.
- Keep the sign of which has more (positive or negative).

Subtraction Rules

- Add the opposite.
- Follow the addition rules.

Subtracting integers - Word Problems

Mt. Everest, the highest elevation in Asia, is 29,028 feet above sea level. The Dead Sea, the lowest elevation, is 1,312 feet *below* sea level. What is the *difference* between these two elevations?

In Buffalo, New York, the temperature was -14°F in the morning. If the temperature dropped 7°F, what is the temperature now?

Subtracting integers - Word Problems

A submarine was situated 450 feet below sea level. If it descends 300 feet, what is its new position?

In the Sahara Desert one day it was 136°F. In the Gobi Desert a temperature of -50°F was recorded. What is the difference between these two temperatures?

Subtracting integers - Word Problems

Sylvia checked the balance in her bank account early in the morning and saw that she was overdrawn 90 dollars. In the afternoon, she wrote a check for 20 dollars. What is the balance in her account now?

The record high temperature for Massachusetts is 104 degrees Fahrenheit. The record low is -18 degrees Fahrenheit. What is the difference between high and low?

Subtracting integers - Word Problems

You are 5 dollars in debt. You borrow 12 dollars more. What is the total amount of your debt?

Subtracting integers - Word Problems

Now you try...

While reviewing last month's finances, Leah noticed that she had spent $200 on a trampoline and deposited $200 that she had earned from selling books to a used bookstore. Which integer represents the change in Leah's savings?

100	0	-1	1

The leaderboard at the Greene Golf Tournament shows that Brenna's score was 0 on her first round and 2 on her second round. What was Brenna's total score for the two rounds?

-2	-1	1	2

Ben started the week with $4,000 in his bank account. At the end of the week, his balance was $7,000. Which integer represents the change in Ben's bank account balance?

-11,000	11,000	-3,000	3,000

There was a diver 0 meters below the water's surface. She is now 0 meters below the surface. Which integer represents her change in depth?

0	1	2	-1

Subtracting integers - Word Problems

At the Springfield Golf Tournament, the leaderboard shows Elise's score as 7 on the front nine and 2 on the back nine. What was Elise's total score for the rounds?

-9 | 8 | 9 | -8

After earning 500 points on a game show, Rudy got to compete in the bonus round. By the end of the bonus round, he had a total of 800 points. What was Rudy's score for the bonus round?

Write your answer as an integer (for example, -3).

A submarine started 4 meters below the surface of the water. It is now 0 meters below the surface. What was its change in depth?

Write your answer as an integer (for example, -3).

From 600 feet above sea level, Cassie took off in her helicopter and ascended 200 feet. What is Cassie's elevation now?

Write your answer as an integer (for example, -3).

Multiply and divide integers

For multiplication of integers you need to remember two simple rules:

1) If two integers have the same sign, their product is positive.

2) If two integers have different signs, their product is negative.

Multiply and divide integers

Practice Problems

1) 6×-4

2) 4×2

3) 3×-4

4) -6×4

5) 5×-4

6) -3×4

7) -5×6

8) -2×-1

9) -8×-2

10) 11×12

11) -7×5

12) 9×-6

13) 10×5

14) 9×2

15) -12×7

16) 8×-12

17) $9 \times 10 \times 6$

18) $-6 \times -10 \times -8$

19) $7 \times 9 \times 7$

20) $6 \times 6 \times -2$

21) $-5 \times -4 \times -10$

22) $9 \times 9 \times -5$

23) $8 \times 3 \times 8$

24) $7 \times 5 \times -5$

For Division of integers you need to remember two simple rules:

1) If two integers have the same sign, their quotient is positive.

2) If two integers have different signs, their quotient is negative.

Multiply and divide integers

Practice Problems

Find each quotient.

1) $35 \div -5$

2) $-8 \div 4$

3) $-24 \div 4$

4) $-8 \div -2$

5) $8 \div 4$

6) $-24 \div 8$

7) $-21 \div 7$

8) $6 \div -6$

9) $-132 \div -11$

10) $-60 \div -15$

11) $-52 \div -4$

12) $60 \div 12$

Lesson 15: Multiplication and Division of Integers

Exercise 1

a. In one year, Melinda's parents spend $2,640 on cable and internet service. If they spend the same amount each month, what is the resulting monthly change in the family's income?

Exercise 2

Use the fundraiser chart to help answer the questions that follow.

Grimes Middle School Flower Fundraiser

Customer	Plant Type	Number of Plants	Price per Plant	Total	Paid? Yes or No
Tamara Jones	tulip	2	$4.00		No
Mrs. Wolff	daisy	1	$3.00	$ 3.00	Yes
Mr. Clark	geranium	5	$2.00		Yes
Susie (Jeremy's sister)	violet	5	$2.00	$ 10.00	Yes
Nana and Pop (Jeremy's grandparents)	daisy	4	$3.00	$12.00	No

Jeremy is selling plants for the school's fundraiser, and listed above is a chart from his fundraiser order form. Use the information in the chart to answer the following questions. Show your work, and represent the answer as an integer; then, explain your answer in the context of the situation.

a. If Tamara Jones writes a check to pay for the plants, what is the resulting change in her checking account balance?

Numerical Answer:

Explanation:

b. Mr. Clark wants to pay for his order with a $20 bill, but Jeremy does not have change. Jeremy tells Mr. Clark he will give him the change later. How will this affect the total amount of money Jeremy collects? Explain. What rational number represents the change that must be made to the money Jeremy collects?

Numerical Answer:

Explanation:

c. Jeremy's sister, Susie, borrowed the money from their mom to pay for her order. Their mother has agreed to deduct an equal amount of money from Susie's allowance each week for the next five weeks to repay the loan. What is the weekly change in Susie's allowance?

Numerical Answer:

Explanation:

d. Jeremy's grandparents want to change their order. They want to order three daisies and one geranium, instead of four daisies. How does this change affect the amount of their order? Explain how you arrived at your answer.

e. Jeremy approaches three people who do not want to buy any plants; however, they wish to donate some money for the fundraiser when Jeremy delivers the plants one week later. If the people promise to donate a total of $15.00, what will be the average cash donation?

f. Jeremy spends one week collecting orders. If 15 people purchase plants totaling $270, what is the average amount of Jeremy's sale?