


$$\text{crocodile} \times \text{snail} = 0$$


$$\text{crocodile} + \text{snail} = 7$$

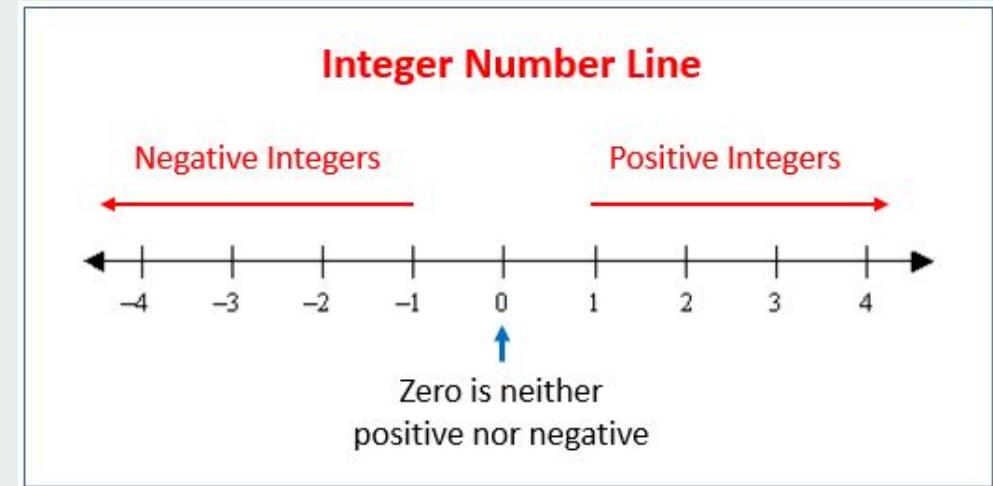
$$14 - 3 \times 3 = \text{turtle}$$


$$\text{crocodile} + \text{snail} + \text{turtle} = ?$$

Explain whether or not it is possible
to find the values of  &  !

Unit 7

Integers





Integers

Integers - the set of numbers containing **whole numbers** and their opposites. They can be either positive or negative.

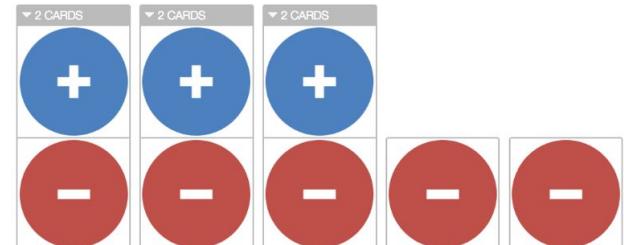
Zero is not considered either positive or negative.

Adding Integers Pictorially

Remember!

When adding integers;

1. Draw a “positive” chips for every positive number and “negative” chips for a negative number
2. Cancel out a “positive” chip with a “negative” chip
3. Count how many chips are leftover and use their sign





$$(+3) + (-2) =$$

$$(-4) + (-1) =$$

Adding Integers Pictorially

Remember!

When adding integers;

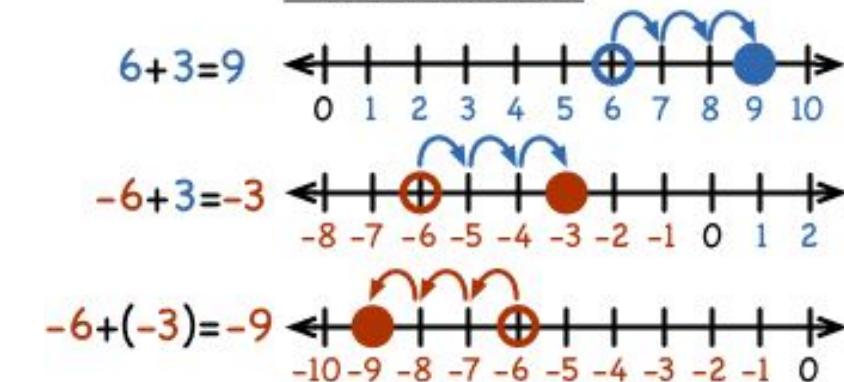
1. Start at your first integer
2. Go right for “positive” and left for “negative”
3. Answer is where you end up.

Find the Sum:

$$6+3=9$$

$$-6+3=-3$$

$$-6+(-3)=-9$$





$$(+3) + (-2) =$$

$$(-4) + (-1) =$$

Adding Integers Symbolically

Remember!

When adding integers;

1. **ZERO Principle:** The sum of any integer and its opposite is equal to zero.
2. Adding same sign: ADD and keep the sign
3. Adding two different signs: SUBTRACT and keep the sign of the highest number



Adding Integers

a) $(-6) + (+6) =$

b) $(1) + (+7) =$

c) $(-5) + (-2) =$

d) $(-9) + (7) =$

e) $(8) + (-5) =$



Adding Integers

a) $(17) + (+12) =$

b) $(+55) + (-23) =$

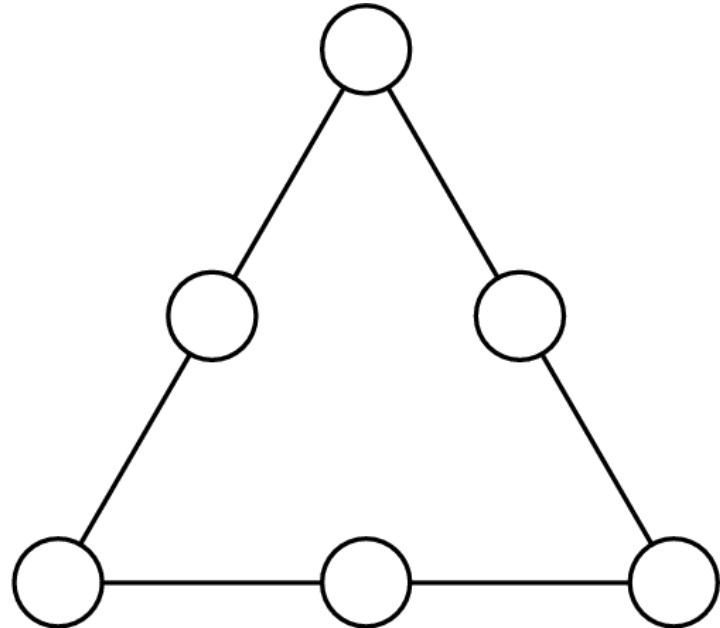
c) $(-13) + (-15) =$

d) $(-37) + (15) =$

e) $(-23) + (23) =$

DO NOW!

Arrange the numbers 1-6 so that all three sides equals the same sum. How many solutions can you find?



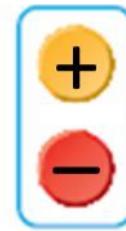
$$(-7) + 9 + 5 + (-5) + 7 + (-9) =$$

Assignment

Adding practice and Error Analysis

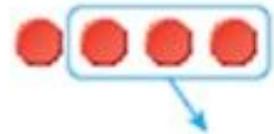
Subtracting Integers Pictorially

- In some cases, you may need to add zero pairs.
- One positive and one negative form a zero pair.



$$1 + (-1) = 0$$

 $-4 - (-3) =$



Start with 4 negative counters to represent -4

Take away 3 negative counters to represent subtracting
-3

Count what is left.



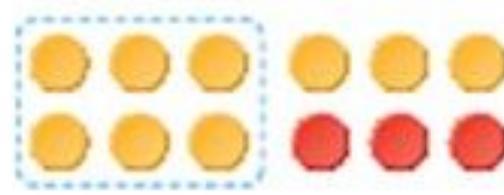
$$6 - (-3) =$$

Start with 6 positive counters

I need to subtract 3 negative counters, but I have no negatives.

I can add 3 zero pairs. WHY?

Now, take away 3 negative counters to represent subtracting -3.





$$(-2) - (-5) =$$

$$2 - 3 =$$

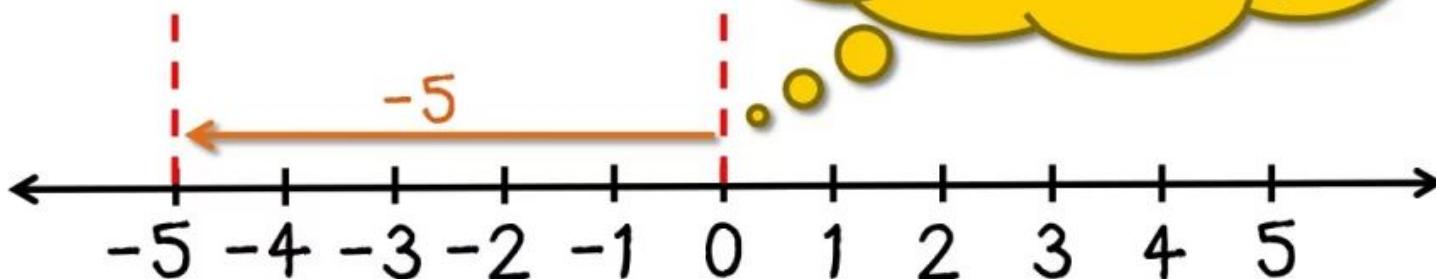
Core Lesson

I owe my brother \$5. I fold his laundry, and he forgives \$3 of my debt.

$$-5 - (-3) = ?$$

take away debt

If I subtract a positive number, I move left. So to subtract a negative number, I move right.



Simon buys a house for \$150,000. However, he does not have this much money, so he takes out a mortgage (borrows from a lender) to cover the cost. Every month, he pays the lender back \$850.

Initial Mortgage \$150 000

Monthly payment \$850

Equation: $-150000 - (-850) = \text{Debt Still } \underline{\text{To}} \text{ Pay}$

January: $-150000 - (-850) = -149150$

February: $-149150 - (-850) = -148300$

March: $-148300 - (-850) = -147450$

Shayla borrows \$50 dollars from her parents to buy a video game. Every week she returns her \$5 allowance to her parents, until she pays back the debt.

Initial Owed \$50

Weekly Payment \$5

$$\text{Week 1: } -50 - (-5) = -45$$

$$\text{Week 2: } -45 - (-5) = -40$$

$$\text{Week 3: } -40 - (-5) = -35$$

$$\text{Week 4: } -35 - (-5) = -30$$

Subtracting Integers

When subtracting integers:

- 1) Always keep the first sign
- 2) Change the **operation** to addition
- 3) Change the second sign

TIPS:

- Any time you see a positive and a negative together you can change the two signs to a negative.
- Any time you see two negatives together you can change the two signs to a positive.



Subtracting Integers

a) $15 - (-15) =$

b) $(-2) - (-23) =$

c) $(-13) - (7) =$

d) $(-15) - (20) =$

Calculate $(-2) - (+3) + (+10)$

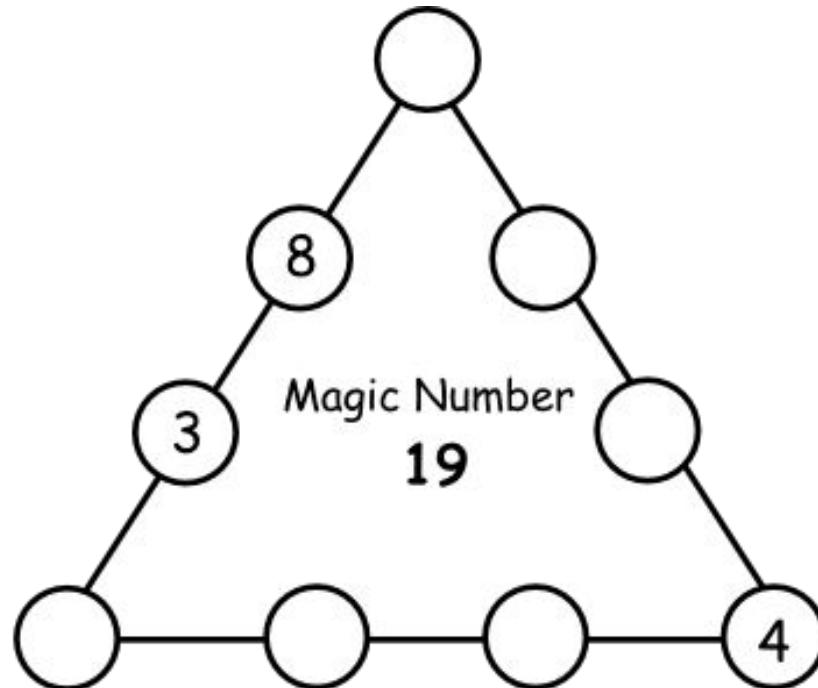
Calculate $(+10) + (-4) + (-6) + (+10)$.

Assignment

Subtracting Integers Worksheet then 1,2,3 SWITCH

DO NOW!

Use the numbers 1-9.



The temperature dropped 3 degrees from midnight to noon. Then it rose 9 degrees from noon to 10:00 P.M. It is now -12°C . What was the temperature at midnight?



Agnes is doing a project for a science fair. She is recording the rise and fall of the water level in a pond. One day, the pond level was 20 cm below the normal level. The next time Agnes measured the water level, it had risen by 60 cm. What was the new reading?

The bus leaves Wilson with people aboard. At the first stop seven people get off. At the second stop eight people get on. At the next stop five get off and 17 get on. When the bus arrives at its final stop there are 24 people on the bus. How many were on the bus when it left Wilson?

Assignment

Word Problem Solve - Lotto Groups of 3



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?

30 340 feet



A submarine was situated 800 feet below sea level. If it ascends 250 feet, what is its new position?



-550 ft

The table shows changes in the number of subscribers to a community newsletter over a six-month period. There were 207 subscribers at the beginning of this period. How many were there at the end?

Month	Change in subscribers
1	+8
2	+6
3	-12
4	+5
5	-8
6	-10



196



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



-21 F



Roman Civilization began in 509 B.C. and ended in 476 A.D. How long did Roman Civilization last?



985 years

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



-750 ft

**Your checking account is overdrawn by \$50.
You write a check for \$20. What is the balance
in your account?**



-70\$



**On the first play, the football team lost 6 yards.
On the second play, the team lost 5 yards. What
was their total change in yards?**



-11 yards

The price of a share of stock started the day at \$37. During the day it went down \$3, up \$1, down \$7, and up \$4.What was the price of a share at the end of the day?



\$32



An elevator went up 15 floors, down 9 floors, up 11 floors, and down 19 floors. Find the net change.



2 floors

In golf, the average score a good player should be able to achieve is called "par." Par for a whole course is calculated by adding up the par scores for each hole. Scores in golf are often expressed at some number either greater than or less than par.

Ms. Floop is having a pretty good day at the Megalopolis City Golf Club. Her score so far after 15 holes is -3. If par for 15 holes is 63, what is her score?



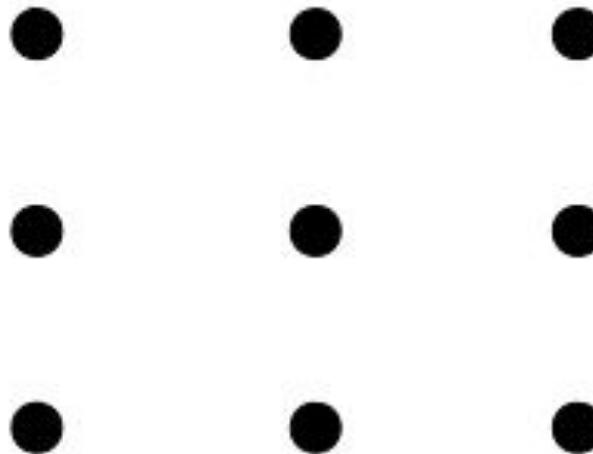
60

The mailman delivered a \$22 check and 3 - \$14 bills today. He also took back 1- \$5 bill. What is the total in the mailbox?



-15\$

DO NOW!



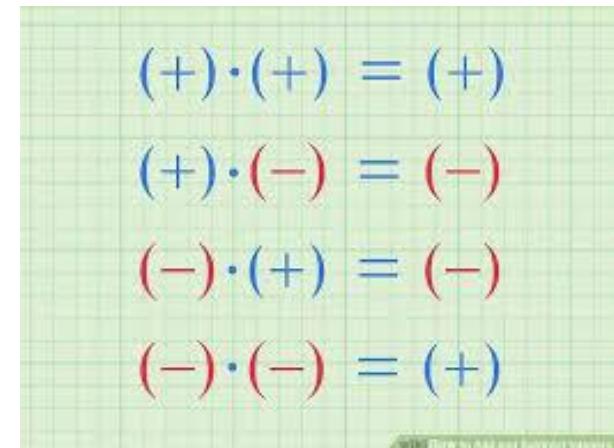
Puzzle: Copy the above image to paper. Draw no more than four straight lines (without lifting the pencil) and connect all nine dots. No back-tracking either.

Multiplying and Dividing Integers

When multiplying and dividing integers the same rules apply to both operations.

- 1) If the integers have the same sign the result will be positive

- 2) If the integers have opposite signs the result will be negative.


$$(+)\cdot(+) = (+)$$
$$(+)\cdot(-) = (-)$$
$$(-)\cdot(+) = (-)$$
$$(-)\cdot(-) = (+)$$



Examples

a) -3×4

b) $4(-25)$

c) -8×-2

d) $10(-5)$



Examples

a) $-45 \div (-5)$

b) $-16 \div 8$

c) $-56 \div 7$

d) $-81 \div (-9)$

Write an equivalent statement using multiplication

a) $-72 \div (-9)$

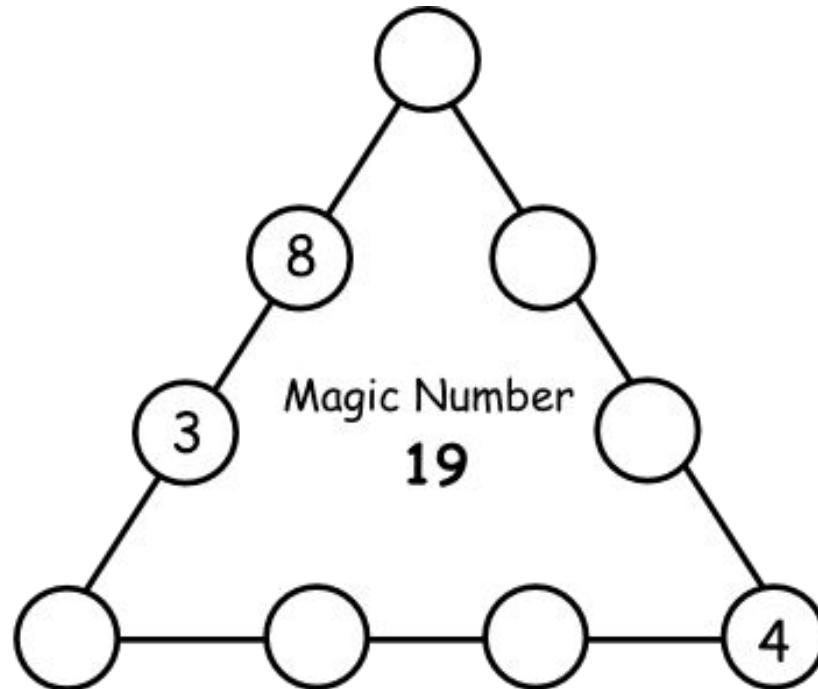
b) $84 \div 7$

c) $66 \div (-11)$

d) $-124 \div (-12)$

DO NOW!

Use the numbers 1-9.



Remember!

To solve a one-step equation we must get the variable alone by performing opposite operations on the constants on the same side, for example;

$$J - 13 = 20$$



Determine the missing integer in each equation

a) $-72(x) = -800$

b) $-132 \div (x) = -11$

c) $25x = 2500$

d) $-192 \div x = 24$



The sum of two integers is 23 less than the product. What are the two integers?

Review!

- a) What is the product of two negative numbers?

- b) What is the quotient of one negative and one positive number?

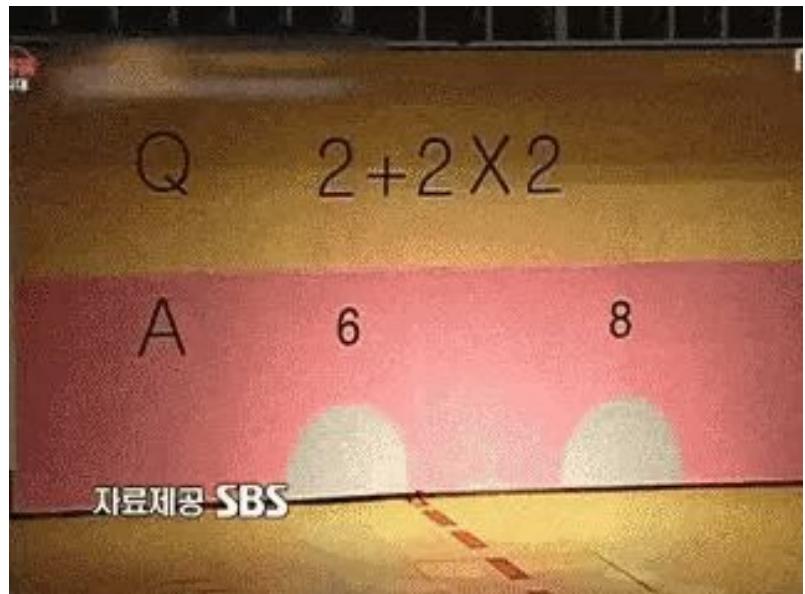
- c) What is BEDMAS?



Remember!

BEDMAS is an acronym to help remember an order of operations in algebra basics.

BEDMAS stands for brackets, exponents, division, multiplication, addition and subtraction.



Examples

a) $(7 + 3) \div 2 \times 3^2$

b) $42 \div 2^2 - 8 \div 2$

Examples

c) $-4+3(2+5)-2$

d) $-8(6) \div (-2) - [-9(-3)]$



$$\frac{[8 \times (-2) - 7] - 10 \div (-5)}{-3 - 4}$$

Writing Equations from Word Problems

1. Read the problem carefully and figure out what it is asking you to find.
2. Assign a **variable** to the quantity you are trying to find.
3. Write down what the **variable** represents.
4. Re-read the problem and write an **equation** for the quantities given in the problem.
5. Solve the equation.
6. Check your solution.

1. When 6 is added to four times a number, the result is 50. Find the number.

Step 1: What are we trying to find? **A number.**

Step 2: Assign a **variable** for the number. **Let's call it n .**

Step 3: Write down what the **variable** represents. **Let $n = \text{a number}$**

Step 4: Write an equation.

Step 5: Solve the equation.

Step 7: Check the answer.

The sum of a number and 9 is multiplied by -2 and the answer is -8. Find the number.



On an algebra test, the highest grade was 42 points higher than the lowest grade. The sum of the two grades was 138. Find the lowest grade.



Jenny has 7 marbles and Kenny has 5. How many do they have together?

Jenny and Kenny together have 37 marbles, and Kenny has 15. How many does Jenny have?

Jenny, Kenny, and Penny together have 51 marbles. Kenny has double as many marbles as Jenny has, and Penny has 12. How many does Jenny have?

2 tickets

One for the answer

One for the equation

Jane is on page 79 of her book. The book has 254 pages. How many pages does she still have to read?

The average temperature of Earth's surface is about 15 °C. The temperature of Earth's crust increases by about 25 °C for each kilometre below the surface. What is the average temperature 3 km below Earth's surface?



Practice!

Pages 249-250 Questions #3, 6, 8, 14

Pages 265-267 Questions # 5, 8, 10, 15

Pages 271-273 Questions #3, 4, 6, 8, 11, 12

Pages 280 and 282 all questions