May 24th, 2023

Dear Incoming 8th Grade Parents,

I have absolutely enjoyed getting to know some of your children in homeroom this year and others around the halls. Often over the summer, students forget the skills that they have learned in math the previous year. To help avoid some of this and to continue practicing math skills, your student will be given a math packet to complete this summer. The summer packet will be focusing on integer operations and fraction operations. **Calculators are not allowed.** Both concepts are essential for students to understand to be successful in their 8th grade year in Math and on the HSPT. We will only briefly review these concepts at the beginning of the school year. The summer work packet will be due **the first day of school.**

If your student finds he or she is struggling with any of the concepts they are more than welcome to email me at peloquin@saintantoninus.org. I will not be checking my email daily in the months of June and July but will check it on a weekly basis. Additionally, on the back of this letter, I have included a list of resources your child may utilize. I hope you all have a wonderful and blessed summer!

Sincerely,
Mrs. Meghan Peloquin

7th Grade Math
Number Sense Cheat Sheet

Operations on Integers

Integers

Adding

⊕ + ⊕ = ⊕

⊖ + ⊖ = ⊖

⊕ + ⊖ = ⊕

⊕ + ⊖ = ⊖

Greater Abs. Value

Subtracting

⊕ − ⊕ = ⊕ + ⊖

⊕ − ⊖ = ⊕ + ⊕

⊖ − ⊖ = ⊖ + ⊕

⊖ − ⊕ = ⊖ + ⊖

Multiplying & Dividing

⊕ × ÷ ⊖ = ⊖

⊖ × ÷ ⊖ = ⊕

⊖ × ÷ ⊕ = ⊖

⊕ × ÷ ⊕ = ⊕

Fractions

Multiplying
Multiply across!

Example:

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

If possible reduce!

Dividing
Change to multiplication & take reciprocal of second fraction!

Example:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

Reduce!

Adding & Subtracting
Need common denominators!

Example:

$$\frac{a}{b} + \frac{c}{d} = \frac{d}{d} \cdot \frac{a}{b} + \frac{c}{d} \cdot \frac{b}{b} = \frac{ad}{bd} + \frac{bc}{bd}$$

$$= \frac{ad+bc}{bd}$$

Decimals

Adding & Subtracting
Line up the decimals!

Example:

0.005 + 1.3 becomes

$$\begin{array}{r} 0.005 \\ +\ 1.300 \\ \hline 1.305 \end{array}$$

Multiplying
Multiply as normal & look at signs!

Dividing
Divisor needs to be a whole number!

Example:

55 ÷ 5.5 becomes

550 ÷ 55

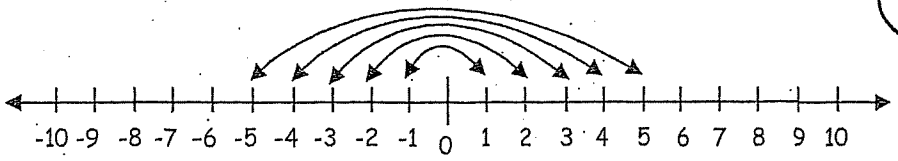
Operations on Decimals

	ADDIT ION	SUBTRACTION	MULTIPLICATION	DIVISION
DECIMALS	When adding decimals, ALWAYS line up your decimal points, use place holders if necessary Add, then drop the decimal point straight down. Example: 4.05 + 2.2 = 4.05 + 2.20 6.25	When subtracting decimals, ALWAYS line up your decimal points. Subtract, then drop the decimal point straight down. Example: 16.21 – 3.015 16.210 - 3.015 13.195	Treat the numbers like whole numbers, then multiply. Once you have an answer count how many numbers are to the RIGHT of the decimal point and put that many numbers to the RIGHT of the decimal point in the answer. Example: 8.8 x 7.42 7.42 X 8.8 65.296	We can't divide by a decimal, convert it to a whole number. The # of spaces you moved the decimal in the divisor is the same amount you should move it in the dividend, use place holders if necessary. Then divide like usual. $2.75\overline{)38.5} = 275\overline{)3850}$ (14; −2751; 1100; −1100; 0) The answer is 14
FRACTIONS	Find the least common denominator of all fractions, convert, then add numerators. Keep the denominator or change to a mixed number if necessary. $\frac{2}{3} + \frac{5}{7}$ $\frac{14}{21} + \frac{15}{21} = \frac{29}{21} = 1\frac{8}{21}$	Find the least common denominator of all fractions, convert, then subtract numerators. Borrow or change to impropers if necessary. Keep the denominator or change to a mixed number if necessary. $3\frac{1}{3} - 1\frac{2}{3}$ $2 + \frac{3}{3} + \frac{1}{3} - 1\frac{2}{3}$ $2\frac{4}{3} - 1\frac{2}{3} = 1\frac{2}{3}$	Multiply straight across. $8 \cdot \frac{5}{6}$ $\frac{8}{1} \cdot \frac{5}{6} = \frac{40}{6} = 6\frac{4}{6} = 6\frac{2}{3}$	Change the SECOND fraction ONLY to its reciprocal, THEN you may multiply straight across. $\frac{9}{13} \div \frac{7}{10}$ $\frac{9}{13} \cdot \frac{10}{7} = \frac{90}{91}$
INTEGERS	Same signs add and keep their sign, different signs subtract and keep the sign of the greater absolute value. 2 + 3 = 5 -5 + 6 = 1 -2 + (-3) = -5 11 + (-13) = -2	Change difficult subtraction problems to addition by adding the opposite and then follow the rules for adding integers. -4 – 9 = -4 + (-9) = -13 3 – (-7) = 3 + (+7) = 10	For any two integers, SAME signs equal a positive answer, DIFFERENT signs equal a negative answer. 6(8) = 48 -6(-8) = 48 -4(5) = -20 4(-5) = -20	For any two integers, SAME signs equal a positive answer, DIFFERENT signs equal a negative answer. 50/5 = 10 -50/-5 = 10 -60/12 = -5 60/-12 = -5

What Are Integers Anyway?

Integers are whole numbers and their opposites.

NO BETWEEN NUMBERS! (NO FRACTIONS OR NUMBERS TO THE RIGHT OF THE DECIMAL POINT)



POSITIVE NUMBERS ARE USUALLY NOT WRITTEN WITH A POSITIVE SIGN (+2, ETC.)!

Circle the integers (positive or negative numbers—no between fractions or decimals)

1. 7 $\frac{1}{2}$ .3 -9

2. -.4 $\frac{3}{4}$ -2 +5

3. $-3\frac{1}{2}$ 12 -6 $+\frac{6}{5}$

Give the opposite of each integer

4. 7 ☐

SAME NUMBER, JUST PUT ON A NEGATIVE SIGN...THE OPPOSITE OF POSITIVE IS MINUS!

5. -3 ☐

THE OPPOSITE OF A NEGATIVE IS A POSITIVE, SO JUST TAKE OFF THE SIGN!

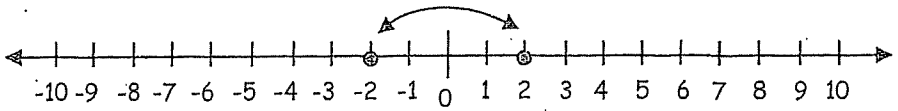
6. -5 ☐

7. -x ☐

8. y ☐

9. -a ☐

Put a dot on each number and its opposite on the number line, connect them with arrows



9. 2

10. -4

11. 6

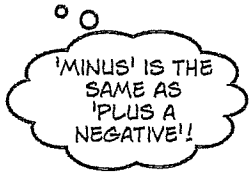
12. -10

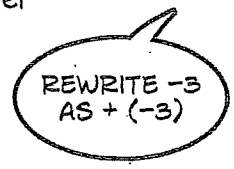
This one is done for you

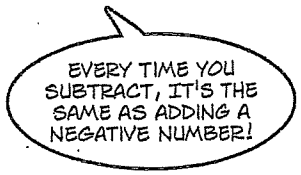
Subtraction as Adding Negatives

Any time you subtract, this is the same as adding a negative number

$10 - 3 \longrightarrow 10 + (-3)$







Rewrite the following subtraction problems as adding negative integers

1. $5 - 2 \longrightarrow$ $+(-\ \ )$

(Right now just focus on rewriting, rather than solving the problem)

2. $6 - 5 \longrightarrow$ $+(-\ \ )$
3. $7 - 4 \longrightarrow$ ____
4. $12 - 6 \longrightarrow$ ____
5. $10 - 3 \longrightarrow$ ____
6. $14 - 7 \longrightarrow$ ____
7. $20 - 5 \longrightarrow$ ____
8. $15 - 10 \longrightarrow$ ____
9. $-16 - 6 \longrightarrow$ ____
10. $-8 - 2 \longrightarrow$ ____
11. $13 - 7 \longrightarrow$ ____
12. $19 - 11 \longrightarrow$ ____
13. $-30 - 5 \longrightarrow$ ____
14. $a - b \longrightarrow$ ____
15. $x - y \longrightarrow$ ____

BACKWARDS:
Now write as a subtraction problem

16. $a + (-b) \longrightarrow$ ____

17. $\frac{2}{3} + \left(-\frac{1}{2}\right)$ ____

Same Sign Rule

SAME SIGN RULE
"SSR"

- ADD THE NUMBERS
- ADD THE SIGN!

IF ALL THE NUMBERS ARE NEGATIVE, JUST ADD UP ALL OF THE NUMBERS AND PUT ON A NEGATIVE SIGN!

IF ALL THE NUMBERS HAVE THE SAME SIGN, JUST GIVE YOUR ANSWER THE SAME SIGN AND ADD UP ALL THE NUMBERS!

With same signs you always ADD the numbers

2 NEGATIVE ONES + 3 NEGATIVE ONES = HOW MANY NEGATIVE ONES?

Add or subtract the following integers

1. $-2 + (-3) = -\square$

JUST ADD UP THE NUMBERS AS THOUGH THEY ARE POSITIVE, AND MAKE YOUR ANSWER NEGATIVE AT THE END!

SINCE BOTH NUMERS ARE NEGATIVE, YOUR ANSWER WILL BE NEGATIVE!

BOTH INTEGERS ARE NEGATIVE SO THE ANSWER WILL BE NEGATIVE.

2. $-4 + (-6) = -\square$

4 + 6 GOES HERE (YOU KNOW THAT THE ANSWER IS NEGATIVE BECAUSE EVERYTHING YOU ARE ADDING IS NEGATIVE!

3. $-5 + (-2) = -\square$

IF YOU TAKE AWAY 5 (-5) AND YOU TAKE AWAY 2 (-2) HOW MANY DID YOU REALLY TAKE AWAY?

4. $6 + 3 = +\square$

THIS TIME BOTH NUMBERS ARE POSITIVE, SO THE ANSWER WILL BE POSITIVE!

5. $-7 + (-7) = \square$

6. $-7 - 8 = \square$

THIS IS REALLY THE SAME AS SUBTRACTING 15 IN TWO STAGES

7. $-5 - 1 = \square$

8. $-10 + (-2) = \square$

9. $-1 + (-1) + (-1) = \square$

10. $-2 + (-2) + (-2) = \square$

11. $-7 - 2 - 3 = \square$

12. $-4 - 8 + (-2) = \square$

You Always Add Same Sign Integers

If integers have the same sign (either positive or negative) you ALWAYS ADD them. After you have added them, just make sure you PUT ON A NEGATIVE sign if the numbers you added are NEGATIVE.

(You don't normally put a positive sign on positive numbers. We assume that if a number has no sign, it's positive.)

Example

Add negatives together like they're positive; then put on a negative sign

A. $-3 - 3 =$

Both numbers are negative

Put on the negative sign: → □

□ Add them like they're positive

Smaller negatives when added equal a larger negative

ADD these SAME SIGN integers; remember to put on the right sign!

1. $-4 - 4 =$ □ IF YOU TAKE AWAY 4 TWICE YOU GET THIS!

2. $4 + 4 =$ □ IF YOU ADD 4 TWICE YOU GET THIS!

3. $-4 + (-10) =$ □

4. $(+7) + (+8) =$ □

5. $(-5) + (-1) =$ □ TAKE AWAY ONE MORE THAN 5!

6. $(-5) + (-5) =$ □ SAME AS 2 TIMES (-5)!

13. $6 + 7 =$ □

14. $(-8) - 10 =$ □

15. $(-2) - 3 =$ □

16. $-2 + (-14) =$ □

17. $17 + 3 =$ □

18. $-9 + (-3) =$ □

Opposite Sign Rule

Example

THE NUMBER WITH THE NEGATIVE SIGN IS GREATER THAN THE NUMBER THAT IS POSITIVE!

		Make both numbers positive		Find the difference (subtract)	Find the sign of the higher number; give your answer this sign	Answer:
A.	-12 + 10	12	10	2	-	-2

Follow the steps and fill in the boxes to get your answers

ADDITION RULE FOR OPPOSITE SIGN INTEGERS:

PRETEND THEY'RE POSITIVE... SUBTRACT... ADD THE WINNING SIGN!

		Make both numbers positive		Find the difference (subtract)	Find the sign of the higher number; give your answer this sign	Answer:
1.	6 + (-7)					

AFTER YOU MAKE BOTH NUMBERS POSITIVE, SUBTRACT THE SMALLER NUMBER FROM THE LARGER NUMBER!

		Make both numbers positive		Find the difference (subtract)	Find the sign of the higher number; give your answer this sign	Answer:
2.	-8 + 5					
3.	-10 + 4					
4.	7 - 12					
5.	-6 + 17					

Opposite Sign Rule

Follow the steps and fill in the boxes to get your answers

		Make both numbers positive		Find the difference (subtract)	Find the sign of the higher number; give your answer this sign	Answer:
1.	-7 + 3					
2.	4 + (-9)					
3.	-14 + 10					
4.	(-3) + 9					
5.	-18 + 20					
6.	6 + (-9)					

ADDITION RULE FOR OPPOSITE SIGN INTEGERS:

PRETEND THEY'RE POSITIVE... SUBTRACT... ADD THE WINNING SIGN!

Opposite Sign Rule

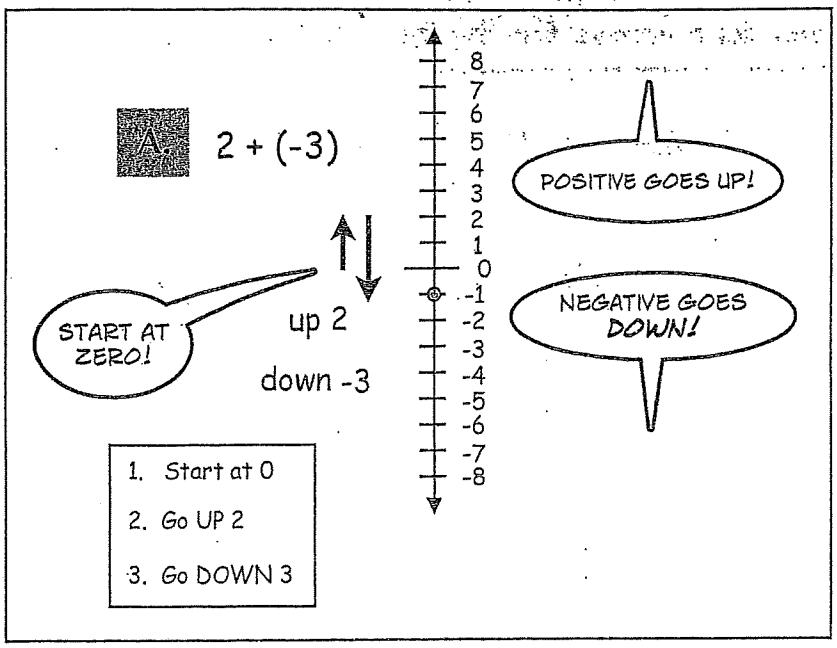
Follow the steps and fill in the boxes to get your answers

		Make both numbers positive		Find the difference (subtract)	Find the sign of the higher number; give your answer this sign	Answer:
1.	6 + (-8)					
2.	-6 + 8					
3.	-5 + 2					
4.	(-9) + 10					
5.	12 + (-20)					
6.	-30 + 24					
7.	16 - 19					

Elevator-Style Number Lines

Example

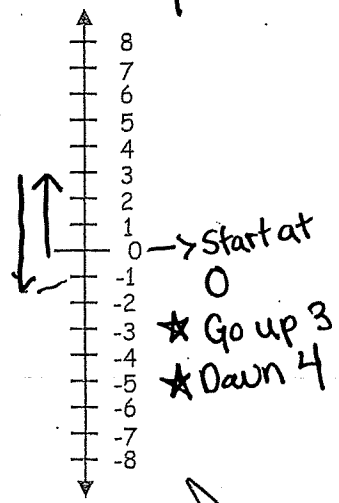
A. $2 + (-3)$



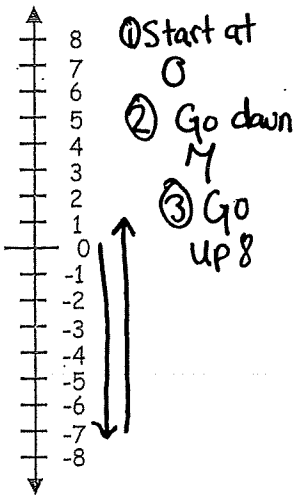
Draw up and down arrows for the integers; draw a dot on the final answer.

Positives go UP **Negatives go DOWN**

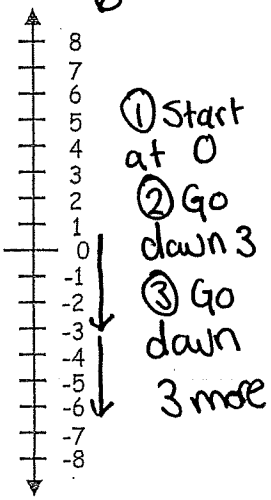
1. $3 + (-4) = -1$



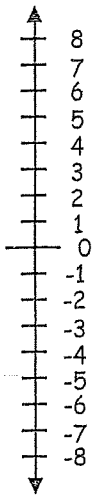
2. $-7 + 8 = 1$



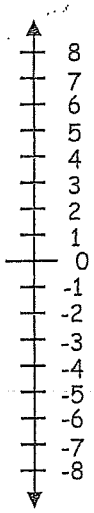
3. $-3 + (-3) = -6$



4. $6 + (-3)$



5. $-2 + (-5)$



NOTICE! THE ARROWS GO IN *OPPOSITE DIRECTIONS* WHENEVER YOU HAVE ONE POSITIVE AND ONE NEGATIVE INTEGER!

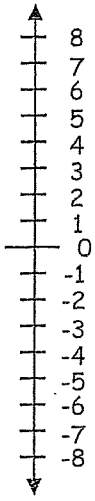
THIS IS WHY YOU *SUBTRACT* THESE INTEGERS!

Elevator-Style Number Lines

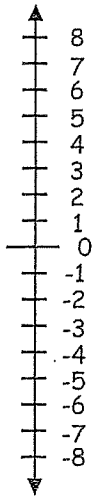
Draw up and down arrows for the integers; draw a dot on the final answer.

Positives go UP **Negatives go DOWN**

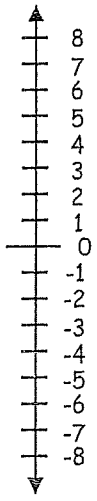
1. $5 + (-6)$



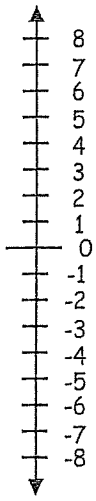
2. $6 + (-5)$



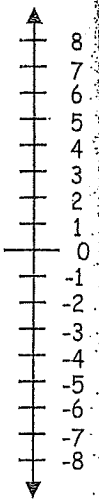
3. $-3 + (-5)$



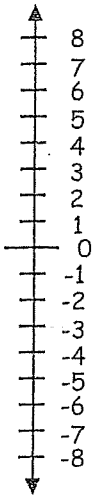
4. $-3 + (-4)$



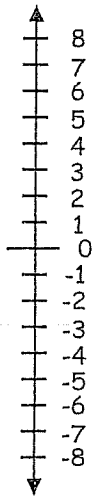
5. $8 + (-2$



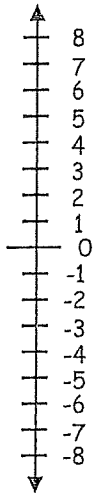
6. $-4 + 5$



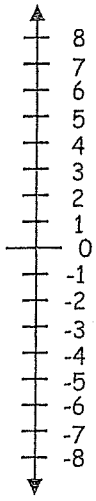
7. $5 + -4$



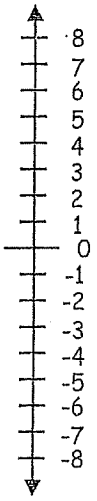
8. $-2 + 10$



9. $-2 + (-3)$



10. $5 + (-7)$

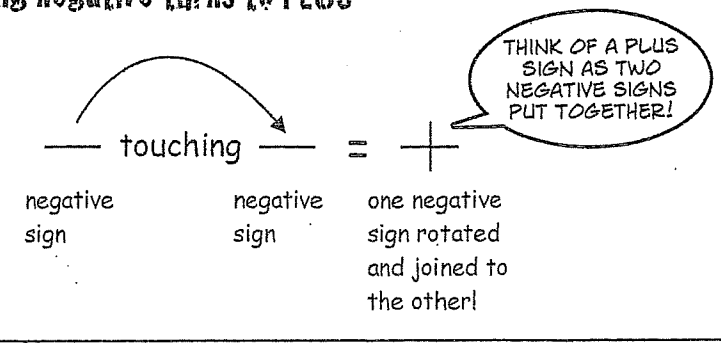


Double Negatives = Positive (or +)

Example

Negative touching negative turns to PLUS

A $3 - (-2) = 5$



1. $10 - (-2) =$ ☐
2. $10 - 2 =$ ☐
3. $7 - (-5) =$ ☐
4. $7 - 5 =$ ☐
5. $12 - (-4) =$ ☐
6. $14 - (-6) =$ ☐
7. $14 - 6 =$ ☐
8. $-14 - 6 =$ ☐
9. $20 - (-7) =$ ☐
10. $20 - 7 =$ ☐
11. $- (-8) - 4 =$ ☐
12. $-8 - 4 =$ ☐
13. $17 - (-4) =$ ☐
14. $- (-11) - 3 =$ ☐
15. $15 - (-6) =$ ☐
16. $2 - (-7) =$ ☐
17. $- (-5) - (-3) =$ ☐
18. $-6 - (-7) =$ ☐
19. $- 5 - (-5) =$ ☐
20. $-12 - (-10) =$ ☐

Multiplying Integers

ODD number of negative signs in the problem: NEGATIVE ANSWER

EVEN number of negative signs in the problem: POSITIVE ANSWER

BECAUSE EVERY TWO NEGATIVES CANCEL EACH OTHER OUT!

Examples

A. $-2 \cdot 3 = -6$

ODD number of negative signs in the problem: NEGATIVE ANSWER

B. $-3 \cdot -4 = 12$ (2 neg's cancel out)

EVEN number of negative signs in the problem: POSITIVE ANSWER

Circle EVEN or ODD and POS / NEG, give your product the correct sign

Cancel out every two negatives, if none are left, the answer is positive

1. $-5 \cdot 3 =$ ☐

EVEN / ODD number of negative signs in the problem (circle one)

POS / NEG answer (circle one)

2. $-5 \cdot -4 =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

WHEN NUMBERS TOUCH, THEY TIMES!

3. $(-1)(-1)(-1) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

4. $(-1)(-1)(-1)(-1) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

5. $8 \cdot (-3) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

6. $(-6)(-6) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

7. $(-1)(-2)(-6) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

8. $(-2)(-2)(-3)(-2) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

Multiplying Integers

Circle EVEN or ODD and POS / NEG, give your product the correct sign

Cancel out every two negatives, if none are left, the answer is positive

1. $-4 \cdot 8 =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

2. $-6 \cdot -8 =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

3. $7 \cdot (-2) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

4. $(-1)(-3)(-7) =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

5. $-11 \cdot -5 =$ ☐

EVEN / ODD number of negative signs in the problem

POS / NEG answer

6. $(-7)(4)(-1) =$ ☐

7. $(-2)(-3)(-5) =$ ☐

8. $-12 \cdot -2 =$ ☐

9. $(-7)^2 =$ ☐

10. $(-3)(-3)(-3) =$ ☐

multiply the numerators

11. $\frac{1}{-2} \cdot \frac{1}{3} =$ ☐/☐

multiply the denominators

12. $(-4)(-2)(7) =$ ☐

Integer Division

Examples

EVEN number of negative signs in the problem: POSITIVE ANSWER

ODD number of negative signs in the problem: NEGATIVE ANSWER

BECAUSE EVERY TWO NEGATIVES CANCEL EACH OTHER OUT!

A. $-10 \div 2 = -5$

ODD number of negative signs in the problem: NEGATIVE ANSWER

B. $-6 \div -2 = 3$ (2 neg's cancel out)

EVEN number of negative signs in the problem: POSITIVE ANSWER

Count the number of negative signs and solve the following division problems

1. $-8 \div (-2) =$ ☐

EVEN / ODD number of negative signs in the problem — POS / NEG answer

2. $-9 \div (3) =$ ☐

EVEN / ODD number of negative signs in the problem — POS / NEG answer

3. $-14 \div 7 =$ ☐

EVEN / ODD number of negative signs in the problem — POS / NEG answer

4. $-32 \div (-8) =$ ☐

EVEN / ODD number of negative signs in the problem — POS / NEG answer

5. $-27 \div -3 =$ ☐

EVEN / ODD number of negative signs in the problem — POS / NEG answer

7. $-33 \div 3 =$ ☐

8. $-5 \div (-1) =$ ☐

9. $42 \div (-6) =$ ☐

10. $-36 \div -9 =$ ☐

11. $-24 \div (-2) =$ ☐

12. $48 \div (-6) =$ ☐

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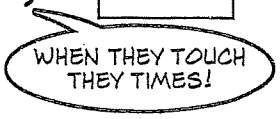
Integers: All Operations

Perform the following computations—watch the signs!

1. $-7 \cdot 3 =$ ☐
2. $-7 \cdot (-3) =$ ☐
3. $(-9) + (-9) =$ ☐
4. $(8)(-4) =$ ☐



5. $-16 \div 8 =$ ☐
6. $14 - 5 =$ ☐
7. $-6 \cdot 7 =$ ☐
8. $18 - 20 =$ ☐
9. $-20 \div (-4) =$ ☐
10. $5 - (-6) =$ ☐
11. $-5 - (-6) =$ ☐
12. $40 \div (-4) =$ ☐
13. $15 + (-3) =$ ☐
14. $15 \div (-3) =$ ☐
15. $(-7)(-7) =$ ☐
16. $64 \div (-8) =$ ☐
17. $-6 \cdot (-3) =$ ☐
18. $(-2)(-3)(-4) =$ ☐

Facts to Know *(cont.)*

Raising a Fraction to Higher Terms

When adding or subtracting fractions, sometimes it's necessary to raise fractions to higher terms. This is the opposite of reducing. To raise a fraction to higher terms, multiply both the numerator and the denominator of the fraction by the same number.

Sample: Raise $\frac{3}{4}$ to 20ths.

Step 1 ⟶ Divide the old denominator into the new denominator. $\frac{20}{4} = 20 \div 4 = 5$

Step 2 ⟶ Multiply both the numerator and denominator of the original fraction by 5. $\frac{3 \times 5}{4 \times 5} = \frac{15}{20}$

Step 3 ⟶ Check by reducing the new fraction. The reduced answer should be the original fraction. $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$

Adding Fractions with the Same Denominator

When the sum of an addition problem is an improper fraction, change the sum to a whole number or a mixed number.

Sample: $4\frac{8}{9} + 3\frac{4}{9} = ?$

Step 1 ⟶ Add the numerators of the fractions when the denominators are the same. $8 + 4 = 12$

Step 2 ⟶ Write the total over the denominator. $\frac{12}{9}$

Step 3 ⟶ Add the whole numbers. $4 + 3 = 7$

Step 4 ⟶ Change the improper fraction to a mixed number. $\frac{12}{9} = 1\frac{3}{9}$

Step 5 ⟶ Add the mixed number to the total of the whole numbers. $7 + 1\frac{3}{9} = 8\frac{3}{9}$

Remember, always reduce. $8\frac{3}{9} = 8\frac{1}{3}$

Adding Fractions with Different Denominators

When adding fractions with different denominators, find a common denominator.

A *common denominator* is one that can be divided evenly by all the denominators in the problem. The smallest number that can be divided evenly by the other denominators is the least common denominator, finding it saves steps in reducing.

Sample: What is $\frac{1}{2}$ pound of nuts and $\frac{3}{4}$ pound of nuts added together?

Step 1 ⟶ Find a common denominator.

Step 2 ⟶ The lowest number that can be divided evenly by both denominators 2 and 4 is 4.

Step 3 ⟶ Raise $\frac{1}{2}$ to 4ths.

Step 4 ⟶ Add the fractions with the least common denominator and change the total to a mixed number.

$$\frac{1}{2} = \frac{2}{4}$$
$$+ \frac{3}{4} = \frac{3}{4}$$
$$\frac{5}{4} = 1\frac{1}{4} \text{ pounds of nuts}$$

A Odds -> Work out on loose leaf (if needed)

Basic Fraction Concepts

Directions: Change the improper fractions to mixed numbers. Remember to reduce to lowest terms.

1. $\frac{7}{4}$ =
2. $\frac{9}{5}$ =
3. $\frac{4}{3}$ =
4. $\frac{8}{5}$ =
5. $\frac{11}{5}$ =
6. $\frac{14}{8}$ =
7. $\frac{15}{7}$ =
8. $\frac{22}{10}$ =
9. $\frac{34}{16}$ =
10. $\frac{40}{8}$ =

Directions: Change the mixed number to an improper fraction.

11. $1\frac{3}{4}$ =
12. $1\frac{3}{5}$ =
13. $2\frac{1}{4}$ =
14. $2\frac{7}{8}$ =
15. $3\frac{2}{5}$ =
16. $4\frac{1}{3}$ =
17. $5\frac{2}{3}$ =
18. $11\frac{1}{2}$ =
19. $5\frac{1}{8}$ =
20. $4\frac{5}{12}$ =

Directions: Reduce the fraction to lowest terms.

21. $\frac{2}{4}$ =
22. $\frac{4}{6}$ =
23. $\frac{3}{12}$ =
24. $\frac{8}{12}$ =
25. $\frac{9}{27}$ =
26. $\frac{12}{26}$ =
27. $\frac{14}{28}$ =
28. $\frac{10}{30}$ =
29. $\frac{50}{75}$ =
30. $\frac{111}{222}$ =

Directions: Raise the fraction to higher terms.

31. $\frac{1}{5}$ to 15ths =
32. $\frac{3}{4}$ to 12ths =
33. $\frac{2}{8}$ to 16ths =
34. $\frac{3}{20}$ to 40ths =
35. $\frac{5}{7}$ to 35ths =
36. $\frac{1}{6}$ to 36ths =
37. $\frac{2}{3}$ to 18ths =
38. $\frac{2}{9}$ to 45ths =

Directions: Add the fractions. Remember to reduce to lowest terms.

39. $\frac{1}{4} + \frac{2}{4}$ =
40. $\frac{3}{7} + \frac{2}{7}$ =
41. $\frac{7}{11} + \frac{4}{11}$ =
42. $\frac{6}{3} + \frac{4}{3}$ =
43. $\frac{2}{7} + \frac{6}{7}$ =
44. $2\frac{3}{4} + \frac{5}{4}$ =
45. $1\frac{5}{8} + \frac{7}{8}$ =
46. $2\frac{1}{3} + 4\frac{4}{3}$ =

Directions: Add the fractions. Remember to find a common denominator and then reduce to lowest terms.

47. $\frac{5}{8} + \frac{3}{4}$ =
48. $\frac{4}{7} + \frac{9}{28}$ =
49. $\frac{5}{9} + \frac{11}{36}$ =
50. $6\frac{5}{8} + 7\frac{11}{24}$ =
51. $\frac{2}{3} + \frac{7}{12} + \frac{3}{4}$ =
52. $\frac{3}{5} + \frac{1}{2} + \frac{7}{10}$ =
53. $8\frac{1}{6} + 3\frac{7}{24}$ =
54. $5\frac{6}{35} + 9\frac{2}{7}$ =
55. $\frac{13}{20} + \frac{4}{5} + \frac{1}{4}$ =

2 How to Notes/Examples Subtract Fractions

Facts to Know

Subtracting Fractions with the Same Denominators

When fractions have the same denominators, subtract the numerators only and place the total over the denominator.

Sample: From a bag that contained $\frac{7}{8}$ pound of birdseed, Margery poured $\frac{3}{8}$ of a pound into the bird feeder. How much birdseed is left?

Step 1 ⟶ Subtract the numerators. $7 - 3 = 4$

Step 2 ⟶ Write the answer over the denominator. $\frac{4}{8}$

Step 3 ⟶ Reduce the final answer. $\frac{4}{8}$ **pound** $= \frac{1}{2}$ **pound**

More on Finding Common Denominators

Sometimes you must change more than one denominator to add or subtract. For example, how would you solve this problem:

Sample: $\frac{1}{2} - \frac{1}{3} = ?$

These fractions have different denominators. You cannot subtract them, nor can only one denominator be changed because 2 won't divide into 3 evenly, and 3 won't divide into 2 evenly. Therefore, you must find a common denominator, a number that both 2 and 3 will divide into evenly.

There are three methods for finding a common denominator.

Method 1— Check the largest denominator in the problem to find out whether it can be divided evenly by the other denominator(s) in the problem.

Sample: $\frac{1}{3} - \frac{1}{6} = ?$

6 can be evenly divided by 3, so there's no need to look for another number.

$$\begin{array}{r} \frac{1}{3} = \frac{2}{6} \\ -\frac{1}{6} = \frac{1}{6} \\ \hline \frac{1}{6} \end{array}$$

Method 2—Multiply the denominators together to find a common denominator.

Sample: $\frac{3}{4} - \frac{2}{3} = ?$

Step 1 ⟶ Multiply the denominators. The number 12 is the common denominator. $\frac{3}{4} = \frac{9}{12}$

Step 2 ⟶ Raise each fraction to 12ths. $-\frac{2}{3} = \frac{8}{12}$

Step 3 ⟶ Subtract the new fractions. $\frac{1}{12}$

Method 3—Go through the multiplication table of the largest denominator.

Sample: $\frac{5}{9} - \frac{1}{6} = ?$

Step 1 ⟶ Go through the multiplication table of the largest denominator, 9. $\frac{5}{9} = \frac{10}{18}$

9 x 1 = 9 which cannot be divided evenly by 6. $-\frac{1}{6} = \frac{3}{18}$

9 x 2 = 18 which can be divided evenly by 6 and 9. $\frac{7}{18}$

Step 2 ⟶ Raise each fraction to 18ths.

Step 3 ⟶ Subtract the new fractions.

Facts to Know *(cont.)*

Subtracting Fractions with Different Denominators

When subtracting fractions with different denominators, find a common denominator.

Sample: Lupe walks $\frac{1}{2}$ mile to the train. She stops for coffee at Tom's restaurant, which is $\frac{3}{8}$ mile to the train. How much further does she have to walk after Tom's?

You'll have to subtract $\frac{3}{8}$ from $\frac{1}{2}$, but they don't have common denominators.

Step 1 ⟶ Find the least common denominator. The numbers 2 and 8 both evenly divisible by 8.

Step 2 ⟶ Raise $\frac{1}{2}$ to eighths.

Step 3 ⟶ Subtract the fractions using the least common denominator.

$$\frac{1}{2} = \frac{4}{8}$$
$$-\frac{3}{8} = \frac{3}{8}$$
$$\frac{1}{8} \text{ mile}$$

Subtracting Fractions from a Whole Number

When subtracting fractions from the whole number 1, you must change the number 1 to a fraction with the same numerator and denominator as the denominator in the fraction.

Sample: Ian took one cup of sugar from a bag. He only used $\frac{3}{4}$ cup to make ice tea. How much sugar is left?

Step 1 ⟶ Change 1 to a fraction, using the same number for the numerator and denominator as the denominator of the original fraction (1 cup = $\frac{4}{4}$ cup).

Step 2 ⟶ Subtract the fractions.

$$1 = \frac{4}{4}$$
$$-\frac{3}{4} = \frac{3}{4}$$
$$\frac{1}{4} \text{ cup left}$$

When subtracting a fraction from a whole number larger than 1, you must regroup.

Sample: $3 - \frac{3}{8} = ?$

Step 1 ⟶ Regroup by changing 3 to $2\frac{8}{8}$. (Remeber, $1 = \frac{8}{8}$.)

Step 2 ⟶ Subtract.

$$3 = 2\frac{8}{8}$$
$$-\frac{3}{8} = \frac{3}{8}$$
$$2\frac{5}{8}$$

Subtracting Mixed Numbers

You can subtract mixed numbers provided the fractions have the same denominators.

Sample : $4\frac{1}{3} - 1\frac{3}{4} = ?$

Step 1 ⟶ Find the lowest common denominator.

Step 2 ⟶ Since you can't subtract $\frac{9}{12}$ from $\frac{4}{12}$; regroup 1 as $\frac{12}{12}$ from the 4. Add it to $\frac{4}{12}$.

Step 3 ⟶ Subtract the fractions. Then subtract the whole numbers.

$$4\frac{1}{3} = 4\frac{4}{12} = 3\frac{4}{12} + \frac{12}{12} = 3\frac{16}{12}$$
$$-1\frac{3}{4} = 1\frac{9}{12} = -1\frac{9}{12} = -1\frac{9}{12}$$
$$2\frac{7}{12}$$

2 Practice

Evens → Show all work

Subtracting Fractions

Keys to Subtracting Fractions

- If the denominators in the fractions are not alike, find the lowest common denominator.
- Regroup if a minuend (the number you subtract from) is a whole number or the fraction in a minuend is smaller than the fraction in a subtrahend (the number being subtracted).
- Subtract the fractions first and then subtract the whole numbers.

Directions: Subtract the mixed numbers. Remember, reduce to the lowest term.

1. $9\frac{7}{8} - 6\frac{5}{8}$

2. $15\frac{9}{10} - 7\frac{7}{10}$

3. $14\frac{19}{24} - 8\frac{5}{24}$

4. $11\frac{5}{6} - 5\frac{1}{6}$

5. $6\frac{7}{8} - 3\frac{3}{8}$

6. $5 - 1\frac{4}{7}$

7. $6 - 5\frac{7}{10}$

8. $9 - 2\frac{3}{8}$

9. $7 - 3\frac{4}{11}$

10. $8\frac{4}{13} - 6\frac{5}{13}$

11. $6\frac{1}{4} - 3\frac{1}{3}$

12. $10\frac{3}{5} - 8\frac{3}{4}$

13. $4\frac{2}{9} - 1\frac{1}{2}$

14. $12\frac{1}{4} - 3\frac{5}{6}$

15. $20\frac{5}{12} - 9\frac{2}{3}$

16. $14\frac{2}{5} - 6\frac{8}{15}$

17. $18\frac{1}{3} - 9\frac{1}{2}$

18. $13\frac{3}{8} - 5\frac{7}{10}$

2 Practice • • • • • • • • • • • • • • • Subtracting Fractions

Directions: Subtract the fractions. Remember, to reduce the fractions to lowest terms.

1. $\frac{4}{5} - \frac{2}{5} =$
2. $\frac{9}{10} - \frac{4}{10} =$
3. $\frac{7}{12} - \frac{6}{12} =$
4. $\frac{6}{7} - \frac{2}{7} =$
5. $\frac{17}{23} - \frac{11}{23} =$
6. $\frac{20}{21} - \frac{17}{21} =$
7. $\frac{7}{8} - \frac{3}{8} =$
8. $\frac{7}{15} - \frac{6}{15} =$
9. $\frac{1}{2} - \frac{1}{6} =$
10. $\frac{7}{8} - \frac{1}{4} =$
11. $\frac{7}{10} - \frac{1}{5} =$
12. $\frac{1}{4} - \frac{1}{8} =$
13. $\frac{5}{6} - \frac{5}{18} =$
14. $\frac{19}{20} - \frac{1}{4} =$
15. $\frac{3}{4} - \frac{1}{2} =$
16. $\frac{13}{15} - \frac{7}{30} =$

Directions: Subtract the fraction from the whole number.

17. $5 - \frac{3}{4}$
18. $7 - \frac{1}{16}$
19. $4 - \frac{3}{8}$
20. $10 - \frac{5}{7}$
21. $12 - \frac{12}{25}$
22. $8 - \frac{9}{12}$
23. $5 - \frac{1}{4}$
24. $25 - \frac{14}{17}$
25. $13 - \frac{11}{22}$
26. $5 - \frac{5}{7}$

* Evens Show ALL Work

Fraction Word Problems

Mary needs to order pizza for 18 students. Each student should get ¼ of a pizza. How many pizzas should Mary order? How much pizza will be left over?

Two friends want to share 3 apples so that they each get the same amount. How much would each friend get?

Jared has one pizza that has 12 slices. He wants to share his pizza with his two brothers. How many slices will each boy have if they each have an equal amount?

Frank has 3 bags of birdseed. He wants to put the birdseed into 4 bird feeders equally. How much of the bags will go in each feeder

Two children are sharing ½ of a sandwich. How much will each child get?

Ciara is making a new dance outfit. She needs 2 ½ yards of fabric for the shawl. She needs 1¾ yards of fabric for the dress. If she has 3 yards of fabric, how much more does she need? If each yard of fabric costs $7.98, how much money does Ciara need?

Mario was making cookies. He mixed 2 ½ cups of flour, 1¼ cups of sugar and ½ cup of brown sugar together in a bowl. How many cups did he have altogether?

Becky has 5 candy bars. She wants to share them with 3 friends. How much will each friend get?

Multi-Step Problems

Kim had 4 chocolate chip cookies and 3 sugar cookies. Kim's sister ate two of her chocolate chip cookies. How many cookies are left?

Becky gets $5.00 a week for chores, and helps with chores for 4 weeks. If Becky wants to spend only half of her money, how much will she have left to save?

Becky has 4 quarters. Becky's mom gives her 3 more. Becky spends 2 of them on candy. How many quarters does Becky have left?

Travis has 13 pieces of gum that he wants to share with his 2 friends. If Travis and his friends split the gum equally, how many pieces will they each get?

STORY PROBLEMS WITH INTEGERS

Read carefully and solve.

1. When Steve woke up. His temperature was 102° F. Two hours later it was 3° lower. What was his temperature then?

2. An elevator is on the twentieth floor. It goes down 11 floors and then up 5 floors. What floor is the elevator on now?

3. A deep-sea exploring ship is pulling up a diver at the rate of 25 feet per minute. The diver is 200 feet below sea level. How deep was the diver 10 minutes ago?

4. If it is 5° outside and the temperature will drop 17° in the next six hours, how cold will it get?

5. Josie has $47 left on her checking account. If she writes a check for $55, what will Josie's balance be?

6. Joe is playing a game with a regular die. If the number that turns up is even, he will gain 5 times the number that comes up. If it is odd, he will lose 10 times the number that comes up. He tosses a 3. Express the results as an integer.

7. It will be – 12° tonight. The weatherman predicts it will be 25° warmer by noon tomorrow. What will the temperature be by noon tomorrow?

8. The average temperature at the South Pole is – 45° F. The average temperature on the Equator is 92° F. How much warmer is the average temperature on the Equator than at the South Pole?

9. Felix reported that the coldest day on record for his town was five times colder than yesterday's temperature, –4° C. What was the temperature of the coldest day on record in Felix's town?

10. The elevation of Mt. Everest is 29,028 feet. The elevation of the Dead Sea is –485 feet. What is the difference in the elevation between Mt. Everest and the Dead Sea?