PRE-ALGEBRA

ADDING FRACTIONS

1. Make sure the denominators are the same (bottom number)
2. Add the numerators (top number) together
3. Simplify the fraction

¼ + ¼ = 2/4 or ½

1/3 + 1/6 = 2/6+ 1/6 = 3/6 or ½

ORDER OF OPERATION

|  |  |
| --- | --- |
| **P** | Parenthesis |
| **E** | Exponents (power of) |
| **D** | Division |
| **M** | Multiplication |
| **A** | Addition |
| **S** | Subtraction |

ADDITION

* When adding integers with signs that are the same, add the numbers and keep the sign

-8 + (-10) = -18

* When adding integers with different sign, subtract the numbers and keep the sign of the number with the largest value. Always subtract largest – smallest

-9 + 4 = (9 – 5, keep sign of 9) = -5

20 + (-15) = 5

-100 + 50 = -50

30 + (-40) = -10

SUBTRACTION

* Think “keep, change, change”

6 – (-5) = (keep 6 the same sign, change the operation, change the argument)

*6 (keep) + (change) (+5) (change)*

*6 + 5 = 11*

-20 – 10 = -20 + (-10) = -30

MULTIPLICATION & DIVISION

1. If the signs are the same, then the answer is positive

-2(-9) = 18

30/6 = 5

1. If the signs are different, then the answer will be negative

-3(9) = -27

45/-5 = -9

EVALUATING EXPRESSIONS

X^2 – 4y where x=-2 and y=3

-2^2 – 4(3) = 4 – 12 = -8

*Table of values*

|  |  |
| --- | --- |
| X | 2x – 5 |
| -1 | -7 |
| 0 | -5 |
| 2 | -1 |
| 5 | 5 |

WRITING ALGABRAIC EXPRESSIONS

You are selling popcorn for £1.50, and candy for £1. Write an expression to show how much money you can collect by selling *p* popcorn and *c* candy:

1.50p + 1.00c

How much money would you make if you sold 20 boxes of popcorn and 30 candy?

1.50(20) + 1(30) = 60

THE DISTRIBUTIVE PROPERTY

The distributive property is another way to solve expressions:

3(2+4)

* The order of operations way: 3 \* 6 = 18
* The distributive law: (3 \* 2) + (3\* 4) = 18

Distributing a positive number

2(y + 5)

Using order of operations would start with the brackets, but we don’t know what *y* is yet.

2y + 2(5) = 2y + 10

3(2x + 10)

6x + 30

(3x – 2)5

15x – 10

Distributing a negative number

-2(y + 5)

(-2 \* y) + (-2 \* (+5))

-2y + (-10) // a + next to a – is the same as just - // 2y – 10

-3(x + 10) = -3x – 30

-5(3x + 2) = -15x – 10

-3(x – 4) = -3x + 12

-5(x - 2) = -5x + 10

-4(3x – 8) = -12x + 32

SIMPLIFYING EXPRESSIONS

Like terms

Like terms are *terms* that have exactly the same variables

3x + 2x is an example of a like term

3xy + 4x is not a like term

3xy + 4xy is a like term

2x^2 + 2x is not a like term

2x^2yz^2 – 8x^2yz^2 is a like term

Combining like terms

Only like terms can be combined (added or subtracted)

Always remember to take the sign in front of the term when combining like terms

9x – 4y – 1 + 6x – 8 – 3y

9x + 6x – 4y – 3y – 1 – 8

Simplifying expressions using the distributive property

1. Distribute
2. Rewrite like terms
3. Combine like terms

5 – 4(2x + 6)

1. 5 – 8x – 24
2. -8x + 5 – 24 // start expression with variables and then constants
3. -8x – 19

4(4x – 5) + 4 – 3x

1. 16x – 20 + 4 – 3x
2. 16x – 3x – 20 + 4
3. 13x – 16

Simplifying expressions with double distributive property

5(x + 6) – 3(2x – 4)

1. 5x + 30 – 6x + 12
2. 5x – 6x + 30 + 12
3. -x + 42

CHALLENGES

1. 3x + 5(x – 8) (answer = 8x - 40)
2. 5 – 3(2y + 6) (answer = -6y - 13)
3. 6t – 6(2t – 2) + 4 (answer = -12t + 16)
4. 3(2/3x – 6) + 1/3(3x + 9)
   1. Side: multiply fractions with whole numbers

3 x 2/3 – put the whole number over 1

3/1 x 2/3

Multiply numerator 3 \* 2 = 6

Multiply denominator 1 \* 3 = 3

6/3 or 2

(answer = 3x – 15)

1. 0.25(x – 4) + 0.75(8 – 4x) (answer = -2.75x + 5)