Pre-Algebra Workbook Solutions

Numbers and negative numbers

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NUMBER SETS

■ 1. The number 0 is included in all the number sets except _____ numbers.

Solution:

natural and irrational

■ 2. Positive and negative whole numbers are called _____.

Solution:

integers

■ 3. Fractions and decimals can be considered _____ numbers.

Solution:

real

■ 4. The number set $\{2,4,6,8\}$ shows a set of _____ numbers.

Solution:

even

■ 5. What is the real number that's halfway between 1 and 2?

Solution:

$1\frac{1}{2}$

■ 6. The number sets that include negative numbers are _____, _____, _____, and _____ numbers.

Solution:

real, rational, irrational, integer

IDENTITY NUMBERS

■ 1. Find the sum.

$$4 + 0 =$$

Solution:

4

■ 2. Find the product.

$$15 \cdot 1$$

Solution:

15

■ 3. The identity number for addition is 0 because when we add 0 to a number the value does _____ change.

Solution:

not

■ 4. The _____ number for multiplication is 1 because when we multiply a number by 1, the value does not change.

Solution:

identity

■ 5. Given the problem $10 + 0 = 10$, the 0 is the identity number for _____.

Solution:

addition

■ 6. Given the problem $20 \cdot 1 = 20$, the 1 is the identity number for _____.

Solution:

multiplication

OPPOSITE OF A NUMBER

■ 1. What is the opposite of -15?

Solution:

15

■ 2. What is the opposite of $2/3$?

Solution:

$$-\frac{2}{3}$$

■ 3. Opposites are numbers that are equal distance from _____.

Solution:

0 or the origin

■ 4. What is the only number that is its own opposite?

Solution:

0

■ 5. When looking at a number line, the negative numbers are to the _____ of 0 and the positive numbers are to the _____ of 0.

Solution:

left, right

■ 6. We know 5 and -5 are opposite numbers because they are both _____ units away from 0.

Solution:

5

ABSOLUTE VALUE

■ 1. Simplify the expression.

$$|-4|$$

Solution:

The absolute value bars change a negative value inside them into a positive value, so $|-4|$ becomes 4.

■ 2. Simplify the expression.

$$|75|$$

Solution:

The value inside the absolute value bars is already positive, so $|75|$ becomes 75.

■ 3. Write the numbers from least to greatest.

$$|-4|,\ |1|,\ |0|,\ |-8|,\ |9|$$

Solution:

The absolute value bars change a negative value inside them into a positive value, so $|-4|$ becomes 4, and $|-8|$ becomes 8.

Some values inside the absolute value bars are already positive, so $|1|$ becomes 1, $|9|$ becomes 9, and $|0|$ becomes 0.

Putting these in order from least to greatest, we get

$$|0|,\ |1|,\ |-4|,\ |-8|,\ |9|$$

■ 4. Write the values from greatest to least.

$$|7|,\ |-3|,\ |0|,\ |-9|,\ |5|$$

Solution:

The absolute value bars change a negative value inside them into a positive value, so $|-3|$ becomes 3, and $|-9|$ becomes 9.

Some values inside the absolute value bars are already positive, so $|7|$ becomes 7, $|5|$ becomes 5, and $|0|$ becomes 0.

Putting these in order from greatest to least, we get

$$|-9|,\ |7|,\ |5|,\ |-3|,\ |0|$$

■ 5. Absolute values make positive numbers _____ and negative numbers _____.

Solution:

positive, positive

■ 6. Simplify the expression.

$$|-3|$$

Solution:

The absolute value bars change a negative value inside them into a positive value, so $|-3|$ becomes 3.

ADDING AND SUBTRACTING SIGNED NUMBERS

■ 1. Simplify the expression.

$$-4+2$$

Solution:

Here, the negative number is -4 and the positive number is 2. 4 is larger than 2, so the absolute value of the negative number is larger, which means the answer will be negative. So we subtract 2 from 4 to get 2. The sign needs to be negative, so we get -2.

■ 2. Simplify the expression.

$$-11-8$$

Solution:

Add the numbers as if they were both positive, but make the sign negative.

$$-11-8=-19$$

■ 3. When we add two negative numbers, we'll always get a _____ number.

Solution:

negative

■ 4. Simplify the expression.

$$-19-26$$

Solution:

Add the numbers as if they were both positive, but make the sign negative.

$$-19-26=-45$$

■ 5. Simplify the expression.

$$5-8$$

Solution:

Here, the first number is 5 and the second number is 8. Since 5 is less than 8, the second number is larger so the result is negative.

$$5 - 8 = -3$$

■ 6. Simplify the expression.

$$3 - (-6)$$

Solution:

When we subtract a negative number from a positive number, the result will always be positive, because of the fact that the negative signs will cancel, leaving just the addition of two positive numbers.

$$3 + 6 = 9$$

MULTIPLYING SIGNED NUMBERS

■ 1. Multiplying two negative numbers will always result in a _____ number.

Solution:

positive

■ 2. Multiplying a negative and a positive number will always result in a _____ number.

Solution:

negative

■ 3. Multiplying two positive numbers will always result in a _____ number.

Solution:

positive

■ 4. Simplify the expression.

$$12 \cdot -5$$

Solution:

Multiplying 12 by 5 gives 60. Because we're multiplying one positive number by one negative number, the result must be negative, so

$$12 \cdot -5 = -60$$

■ 5. Simplify the expression.

$$-8 \cdot -6$$

Solution:

Multiplying 8 by 6 gives 48. Because we're multiplying one negative number by another negative number, the result must be positive, so

$$-8 \cdot -6 = 48$$

■ 6. Simplify the expression.

$$25 \cdot 3$$

Solution:

Multiplying 25 by 3 gives 75. Because we're multiplying one positive number by another positive number, the result must be positive, so

$$25 \cdot 3 = 75$$

DIVIDING SIGNED NUMBERS

■ 1. Dividing a negative number by a negative number will always result in a _____ number.

Solution:

positive

■ 2. Dividing a positive number by a negative number will always result in a _____ number.

Solution:

negative

■ 3. Simplify the expression.

$$-12 \div 2$$

Solution:

-6

■ 4. Simplify the expression.

$$0 \div -8$$

Solution:

0

■ 5. Simplify the expression.

$$24 \div -6$$

Solution:

-4

■ 6. Simplify the expression.

$$-144 \div -12$$

Solution:

12

ABSOLUTE VALUE OF AN EXPRESSION

■ 1. Simplify the expression.

$$|-6|+|-5\cdot 2|$$

Solution:

First simplify the multiplication inside the absolute value bars.

$$|-6|+|-10|$$

The absolute value bars change a negative value inside them into a positive value, so $|-6|$ becomes 6 and $|-10|$ becomes 10.

$$6+10$$

$$16$$

■ 2. Simplify the expression.

$$|-6|-|7|$$

Solution:

First simplify each set of absolute value bars separately. The absolute value bars change a negative value inside them into a positive value, so $|-6|$ becomes 6, but 7 is already positive so $|7|$ becomes 7.

$$|-6|-|7|$$

$$6-7$$

Now finish the subtraction.

$$-1$$

■ 3. Simplify the expression.

$$|-5\cdot 4|$$

Solution:

First simplify the multiplication inside the absolute value bars. Multiplying -5 by 4 gives -20, so

$$|-5\cdot 4|$$

$$|-20|$$

The absolute value bars change a negative value inside them into a positive value, so $|-20|$ becomes 20.

■ 4. Simplify the expression.

$$|-5 \cdot -4 \cdot 2|$$

Solution:

First simplify the multiplication inside absolute value bars.

$$|20 \cdot 2|$$

$$|40|$$

The absolute value bars change a negative value inside them into a positive value, so $|40|$ becomes 40.

■ 5. Simplify the expression.

$$|-11+3| \cdot |-9|$$

Solution:

First simplify the addition inside the first set of absolute value bars.

$$|-8| \cdot |-9|$$

Then simplify each set of absolute value bars separately. The absolute value bars change a negative value inside them into a positive value, so $|-8|$ becomes 8, and $|-9|$ becomes 9.

$$8 \cdot 9$$

$$72$$

■ 6. Simplify the expression.

$$|-8-2| \cdot |-4-3|$$

Solution:

First simplify the subtraction inside both sets of absolute value bars.

$$|-10| \cdot |-7|$$

Then simplify each set of absolute value bars separately. The absolute value bars change a negative value inside them into a positive value, so $|-10|$ becomes 10, and $|-7|$ becomes 7.

$$10 \cdot 7$$

$$70$$

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