

RATIONAL NUMBERS AND OPERATIONS

- A **rational number** is a number that can be made into a fraction. Decimals that repeat or terminate are rational because they can be changed into fractions.
- An **irrational number** is a number that cannot be made into a fraction. Decimals that do not repeat or end are irrational numbers. Pi is an irrational number.
- A square root of a number is a number that when multiplied by itself will result in the original number. The square root of 4 is 2 because $2 \cdot 2 = 4$. A square root does not have to be a whole number. The square root of 1.44 is 1.2.



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- When solving an equation or inequality with rational numbers, inverse operations are used.
- **Factors** are numbers or variables that are multiplied together. The greatest common factor of two numbers or variables is the largest factor for both the numbers. The greatest common factor, or GCF, of 24 and 36 is 12. The GCF of $6x^3$ and $9x^2$ is $3x^2$ because 3 is the GCF of 6 and 9, and x^2 is the GCF of x^3 and x^2 .

How to use rational numbers and operations

Any number is either **rational or irrational**.

- One way to tell if a number is rational or irrational is to change it into a fraction. Any number that can be made into a fraction is rational.
- Another way is to change the number into a decimal. If the decimal repeats or terminates, then it is rational. Otherwise it is irrational. For example, are the numbers, $\sqrt{8}$ and $.12121212$, rational or irrational?

Ex. $\sqrt{8} = 2.828427125\dots$



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Ex.

The correct order, from least to greatest, is $1/2, \sqrt{.5}, \sqrt{(9/16)}, .8$.

- When rational and irrational numbers are used in equations and inequalities, the rules of fractions apply, such as adding and subtracting with common denominators. When solving, inverse operations are used.

- **Factors** are numbers or variables that are multiplied. The greatest common factor or GCF of two numbers or variables is the greatest common factor for both of the numbers or variables. For example, what is the GCF of $16x^4$ and $14x^2$?

**Ex. The factors of $16x^4 = 1, 2, 4, 8, 16$ and $x \cdot x \cdot x \cdot x$
The factors of $14x^2 = 1, 2, 7, 14$ and $x \cdot x$**

The GCF would be $2x^2$ because the number 2 is the GCF of the numbers 16 and 14, and x^2 is the GCF of the variables.

Try This!

1. V



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2. Are the following numbers **rational or irrational**?

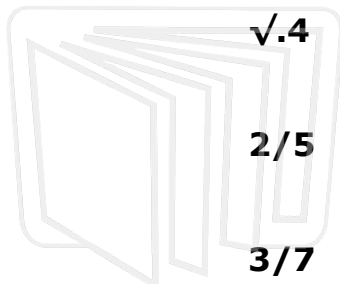
$$\sqrt{3}$$

.123123...

$$\sqrt{225}$$

$33 \frac{1}{3}\%$

3. What is the correct order from least to greatest for the following numbers?



.6

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4. A



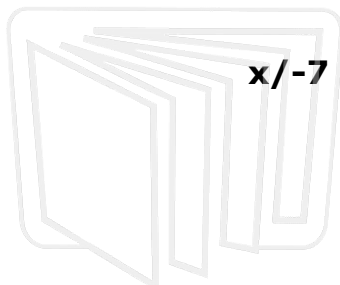
5. S

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6. **Solve** for x in the equation and inequality:

$$\left(\frac{3}{5}\right)x = \frac{9}{25}$$



$$x/-7 > -3$$

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