Simplify each. Do NOT use a calculator for these problems.

1. $4 + 2(4^2 - 11)^2$

$4+2(16-11)^2$

$4+2(5)^2$

$4+2(25)$

$4+50$

$=54$

2. $17 - 2[1 + (5 - 2)^2] + 8$

$17-2[1+9]+8$

$17-20+8$

$-3+8$

5

3. $27[5^2 \div (4^2 + 3^2) + 2]$

$27[5^2 \div (16+9)+2]$

$27[5^2 \div 25+2]$

$27[25 \div 25+2]$

$27[1+2]$

$27(3)$ 81

Translate the following phrases into Algebraic Expressions.

4. Three times a number, increased by seventeen.

$3x+17$

5. Triple the product of d and 2.

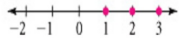
$3(d \cdot 2)$

$3(2d)$

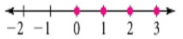
Section 1.3 - Exploring Real Numbers

Each of the graphs below shows a set of numbers on a number line. The number below a point is its coordinate on the number line.

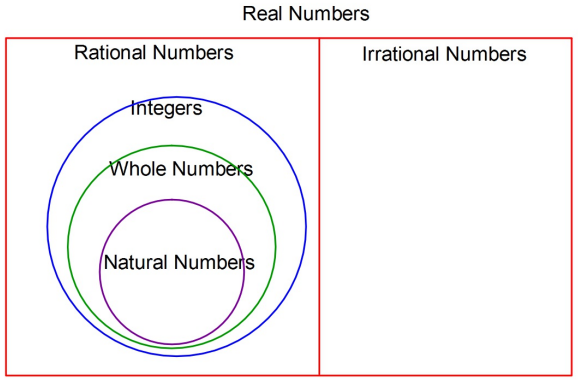
Natural Numbers $1, 2, 3, \ldots$



Whole numbers $0, 1, 2, 3, \ldots$



Integers $\ldots -2, -1, 0, 1, 2, \ldots$



N
R
R
Ir
In
W

Real Numbers

Rational Numbers
- Any number that can be written as a fraction.
- All terminating decimals.
- All repeating decimals.

Irrational Numbers
- Any number that can't be written as a fraction.
- Non-terminating Non-repeating decimals.

Integers ... -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ...

Whole Numbers 0, 1, 2, 3, 4, 5, ...

Natural Numbers 1, 2, 3, 4, 5, ...

List ALL the categories of Real Numbers that each of the following numbers belongs to.

a. 1.73 R

b. $\sqrt{7}$ 2.64575131|... Irr

c. -43 R I

d. $\frac{87}{3}$ 29 R W N I

e. $1.030030003\ldots$

Irr

f. $\sqrt{36}$ 6 R

W
I
N

g. $-\frac{17}{11}$ R

$-1.\overline{54}$

h. $0.22\overline{2}$ R

$0.\overline{2}$

Absolute Value:

Distance from zero on a number line.

Absolute value of a number gives a positive result
because DISTANCE IS ALWAYS A POSITIVE QUANTITY.

Symbol for Absolute Value:

$|x|$

$$|x| = \begin{cases} x \text{ if } x \geq 0 \\ -x \text{ if } x < 0 \end{cases}$$

1. $|-6| =$ 6

2. $|13| =$ 13

3. $5 + |-3 + 7| =$ 9

5 + 4

4. $4 - |-2|$ 2

4 − 2

Absolute Value is a grouping symbol
like parentheses. You must simplify
inside before doing the absolute value.

Absolute Value is also a math operation

Evaluate each expression for E = -4 F = 6 G = -2

1. -G + |E| - |F|

$2+4-6=0$

2. $-3|G| + E^2$

$-3|2|+E^2$

$-6+(-4)^2$ $-6+16$ 10

3. |FG| - |E+G|

$|6\times2|-|4+2|$

$12-6=6$

4. |E| - 5|F|

-26

$|-4|-5|6|$ 10

$4-30$

Conjecture: A guess based on many observations.

(an educated guess)

Every morning I've come to work there has been
a puddle on the sidewalk.

My conjecture: It has rained every night

Every morning I've come to work there has been a puddle on the sidewalk.

My conjecture: It has rained every night

Is my conjecture true?

You can prove a conjecture is false if you can find just one example that shows there is a time when it is false: this is called a COUNTEREXAMPLE

x = 3 2x = 6

x = 5 2x = 10

x = 10 2x = 20

$x=-4$ $2(-4)$ -8

My conjecture is: any number multiplied by 2 produces a larger number than what you started with.

Algebraically my conjecture would be stated: $2x > x$

Is this conjecture true? If not, give a counterexample

False.

Is this conjecture true? If not, give a counterexample.

$x^2 > x$

False.

$0^2 > 0$ $1^2 > 1$

$0 > 0$ X $1 > 1$

$(-1)^2 > -1$ $(-3)^2 > -3$

$1 > -1$ $9 > -3$

Is this conjecture true? If not, give a counterexample.

$\frac{x}{2} < x$

False.

$\frac{0}{2}$ $\frac{-4}{2} < -4$

$0 < 0$ $-2 < -4$

$\frac{-1}{2} < -1$ $\frac{-6}{2} < -6$

Hwk #5 -

pages 20-22

problems 1-3, 6, 9, 10, 22, 59, 60, 62, 73

IXL #2 - A.8 & I.7 due Friday at 6pm!