

mathSUX²

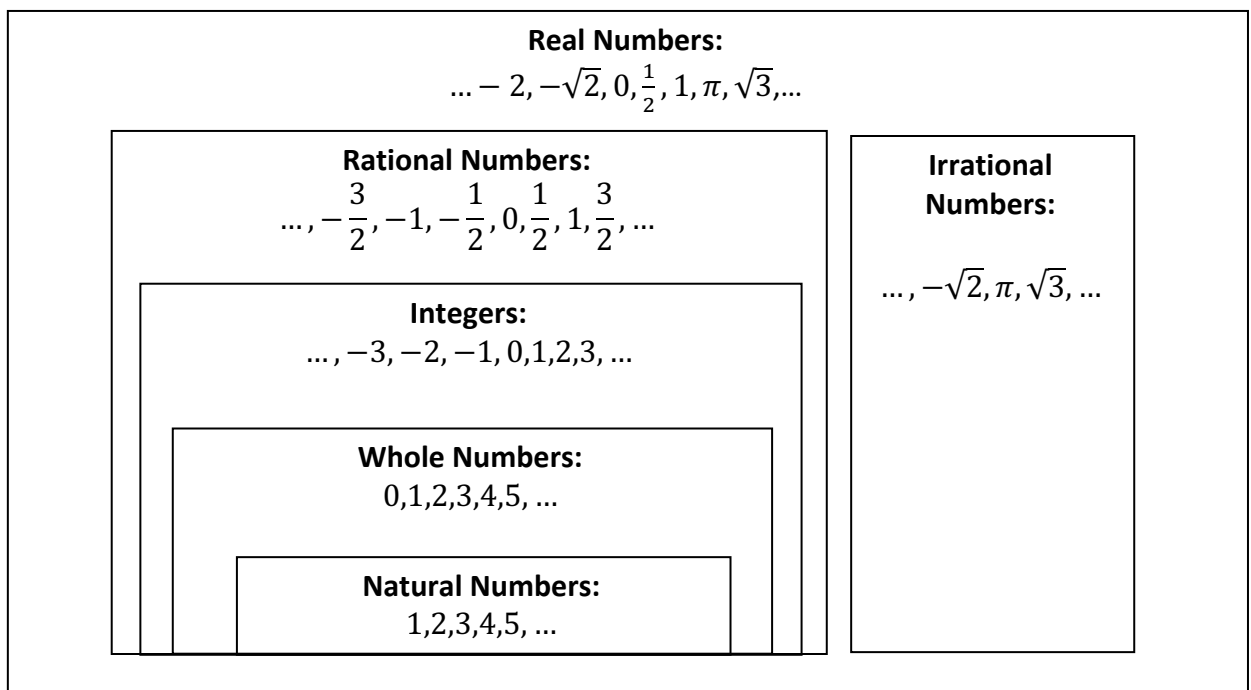
Algebra Cheat Sheet

Order of Operations PEMDAS: Properties of Real Numbers:

P=Parenthesis
E= Exponents
M= Multiplication
D= Division
A= Addition
S= Subtraction

Commutative Property: $a + b = b + a$	$ab = ba$
Associative Property: $(a + b) + c = a + (b + c)$	$(ab)c = a(bc)$
Distributive Property: $a(b + c) = ab + ac$	
Zero Property:	$a \times 0 = 0$
Identity: $a + 0 = a$	$a \times 1 = a$
Inverse: $a + -a = 0$	$a \times \frac{1}{a} = 1$

Real Numbers:



Exponent Rules:

$$x^1 \times x^1 = x^{1+1} = x^2$$

$$\frac{x^1}{x^1} = x^{1-1} = x^0$$

$$(x^3)^2 = x^{3 \times 2} = x^6$$

$$(xy)^2 = x^2y^2$$

Combining Like Terms:

$$x + x = 2x$$

$$3x - x = 2x$$

$$3x^2 + x^2 + 5 = 4x^2 + 5$$

$$5x^2 - 2x^2 + 10x - 5x = 3x^2 + 5x$$

$$10x^2 + 4x - (8x^2 + 2x) =$$

$$10x^2 + 4x - 8x^2 - 2x = 2x^2 + 2x$$

Factoring Methods to Know:

Greatest Common Factor (GCF)

Product/Sum

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Completing the Square

Difference of Two Squares (DOTS)

Functions and their Equations:

Equation of a Line:

$$y = mx + b$$

$m = \text{slope}$

$b = y - \text{intercept}$

Slope Formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{vertical change}}{\text{horizontal change}}$$

Quadratic Equation:

$$ax^2 + bx + c = 0$$

Vertex Formula:

$$x = \frac{-b}{2a}$$

Quadratic Equation in vertex form:

$$y = a(x - h)^2 + k$$

Vertex: (h, k)

Exponential Equation:

$$y = ab^x$$

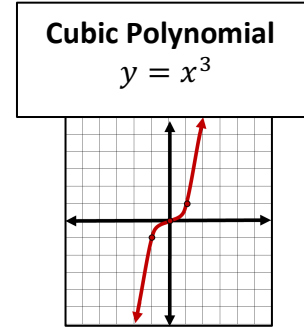
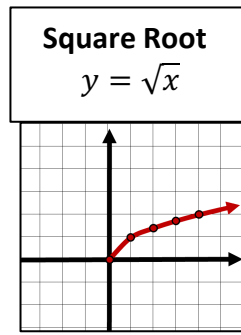
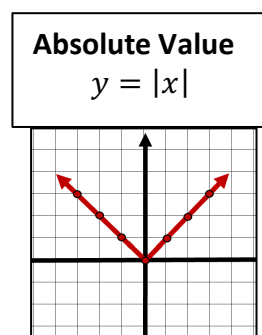
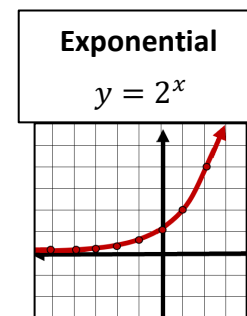
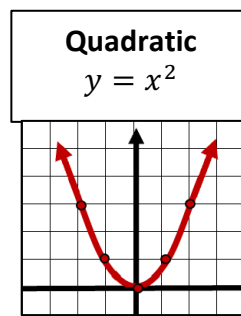
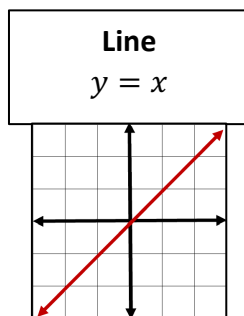
Exponential Growth:

$$b > 1$$

Exponential Decay:

$$0 < b < 1$$

Functions and their Graphs:



Measures of Central Tendency:

Mean: Average

Median: Middle (put numbers in order and find middle)

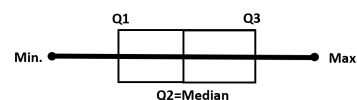
Mode: "Most" (number that appears the most)

Q1: Quartile 1=Median of first half of data

Q2: Quartile 2=Median of all data

Q3: Quartile 3=Median of second half of data

Box and Whisker Plot:



Geometric Sequence Formula:

(Use when a sequence is formed by multiplying or dividing a number)

$$a_n = a_1 r^{n-1}$$

a_n = Term Value

a_1 = First Term

n = Term Number

r = Common Ratio

Arithmetic Sequence Formula:

(Use when a sequence is formed by adding or subtracting a number)

$$a_n = a_1 + (n - 1)d$$

a_n = Term Value

a_1 = First Term

n = Term Number

d = Common Difference

Compound Interest Formula:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

P = Principle

r = Interest rate

n = number of compoundings per year

t = Total number of years

Simplifying Radicals:

$$\sqrt{4} = 2$$

$$\sqrt{40} = \sqrt{4 \cdot 10} = \sqrt{4}\sqrt{10} = 2\sqrt{10}$$

$$\begin{aligned} 2\sqrt{18} + \sqrt{32} &= 2\sqrt{9 \cdot 2} + \sqrt{16 \cdot 2} \\ &= 2\sqrt{9}\sqrt{2} + \sqrt{16}\sqrt{2} \\ &= 2 \cdot 3\sqrt{2} + 4\sqrt{2} \\ &= 6\sqrt{2} + 4\sqrt{2} \end{aligned}$$

Solve for F: $C = \frac{5}{9}(F - 32)$

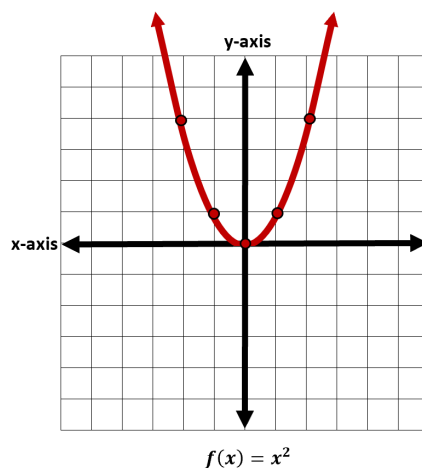
$$C = \frac{5}{9}(F - 32)$$

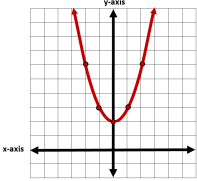
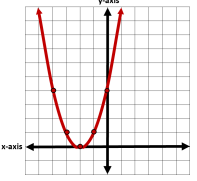
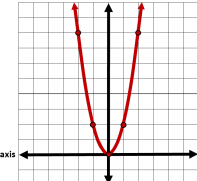
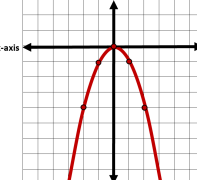
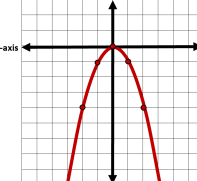
$$\frac{5}{9}C = F - 32$$

$$\frac{5}{9}C + 32 = F$$

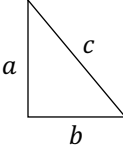

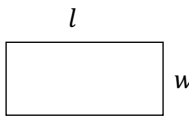
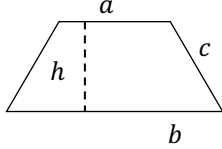
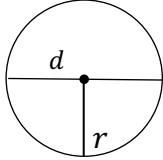
$$\frac{5}{9}C + 32 = F$$

$$\frac{5}{9}C + 32 = F$$

Transformations of a Parabola: $f(x) = x^2$:

Function Transformation	What does it do to the graph?	Graph
$y = f(x) + C$	$C > 0$ moves up $C < 0$ moves down	 $f(x) = x^2 + 2$
$y = f(x + C)$	$C > 0$ moves left $C < 0$ moves right	 $f(x) = (x^2 + 2)$
$y = Cf(x)$	$C > 1$ moves closer to y - axis $0 < C < 1$ moves further from y - axis	 $f(x) = 2x^2$
$y = -f(x)$	Reflection in the x - axis	 $f(x) = -x^2$
$y = f(-x)$	Reflection in the y - axis	 $f(x) = -x^2$

Area and Perimeter:

Shape	Perimeter	Area
Triangle 	$P = a + b + c$	$A = \frac{1}{2}ab$
Square 	$P = 4s$	$A = s^2$
Rectangle 	$P = 2l + 2w$	$A = l \times w$
Trapezoid 	$P = a + b + 2c$	$A = \frac{1}{2}(a + b)h$
Circle 	$C = \pi d$	$A = \pi r^2$

Tips and Tricks!

Circumference: Cherry Pie's Delicious
 $C = \pi d$

Area: Apple Pies Are Two
 $A = \pi r^2$