Things to Know for the Common Core Algebra 1 Regents Exam

AREA

Square: $A = s^2$ **Rectangle**: $A = LW$ **Triangle**: $A = \frac{1}{2}bh$

Circle: $A = \pi r^2$ **Trapezoid**: $A = \frac{1}{2}h(b_1 + b_2)$

CALCULATOR

Key Strokes on Calculator:

Absolute Value: MATH → NUM abs(

Factorial: MATH → → → PRB !

Fractions: to convert a decimal into a fraction MATH FRAC →

Graphing: many graphs can be seen using ZOOM 6: ZOOMSTD

If not, adjust window using WINDOW

DIRECT VARIATION

If x and y **vary directly**, it means they are in proportion, as in…

$$\frac{x}{y} = \frac{x}{y}$$ (cross-multiply to solve)

EXPONENTIAL GROWTH & DECAY

If something is **growing** at a rate of $r\%$: $C(1 + r)^t$

If something is **decaying** at a rate of $r\%$: $C(1 - r)^t$

where… C = current value

r = % written as decimal (move 2 places LEFT)

t = time

Compound Interest: $A = P(1 + \frac{r}{n})^{nt}$

where… A = Future Value

P = Principal (original value)

n = # of compoundings

r = % written as decimal (move 2 places LEFT)

t = time

FACTORING

Greatest Common Factor: whatever *all* the terms have in common goes in front of parentheses. What is left after dividing goes inside.

Ex) $4a^3 + 6a^8 - 2a^2 = 2a^2(2a + 3a^6 - 1)$

Difference of Two Squares: There must be two terms separated by subtraction and both must be perfect squares (coefficients perfect & exponents even) *Ex)* $25x^6 - 49 = (5x^3 + 7)(5x^3 - 7)$

FACTORING (continued)

Trinomial: Looks like… $x^2 + \square x + \triangle$ find two numbers that Multiply to $\triangle$ and Add to $\square$. *Ex) $x^2-2x-24 = (x-6)(x+4)$*

Perfect Square Trinomials: A trinomial where the number in $\triangle$ is a perfect square and the number in $\square$ is TWICE the square root of that number ex) $x^2 + 10x + 25 = (x+5)^2$ ex) $x^2 - 16x + 64 = (x-8)^2$

Factor COMPLETELY: First factor by greatest common factor then factor again by DOTS or Trinomial. Answer looks like: __( )( )

FRACTIONS

Undefined : Forget about the numerator. Set the denominator equal to zero and solve for x. *Ex)* $\frac{3x-1}{x+5}$ *is undefined when x + 5 = 0 meaning x = -5.*

Adding/Subtracting: Find a common denominator and then multiply original fractions by what each is "missing". Add/Subtract numerators. Leave denominators alone. *Ex)* $\frac{x-2}{3} + \frac{x+1}{4} = \frac{4x-8}{12} + \frac{3x+3}{12} = \boxed{\frac{7x-5}{12}}$

Multiplying: Factor first, then cancel diagonally or up/down. Multiply straight across to get final answer.

Ex) $\frac{x^2-4}{3x+6} \cdot \frac{4}{2x-4} = \frac{(x+2)(x-2)}{3(x+2)} \cdot \frac{4}{2(x-2)} = \boxed{\frac{4}{3}}$

Dividing: Same as multiplying except FLIP the second fraction first.

Simplifying: Any terms that have "+" or "-" between them must be factored first. Then cancel. *Ex)* $\frac{x^2-9x+20}{4x-20} = \frac{(x-4)(x-5)}{4(x-5)} = \boxed{\frac{x-4}{4}}$

FUNCTIONS

To determine if something is a function…

Graphs: must pass the "Vertical Line Test" (no vertical line can ever intersect the graph more than once)

Points: All x-values must be DIFFERENT to be a function.

To evaluate a function…

If f(x) is given and we want to find "f(some number)", just substitute the number in place of x on the right side of the equation. *Ex) If $f(x) = 2x^2-3x+1$, then $f(5) = 2(5)^2-3(5)+1 =$* $\boxed{36}$

Piecewise Functions: functions that are defined differently for different values of x.

ex) If $f(x) = \begin{cases} 2x+3, x < 1 \\ -x+7, x \geq 1 \end{cases}$ find f(2).

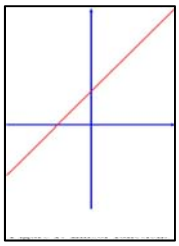
Since "2" is in the domain $x \geq 1$, we would use the function $-x+7$

So $f(2) = -(2)+7 =$ $\boxed{5}$

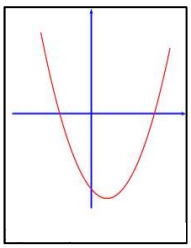
To graph a piecewise function, graph the given equation ONLY for the values of x given. Make sure the graph satisfies the Vertical Line Test.

GRAPHS

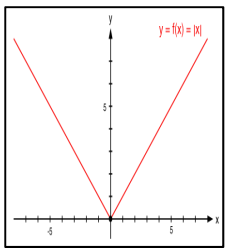
Graphs to Recognize…



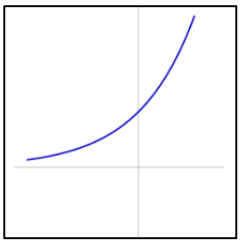
LINEAR (line)



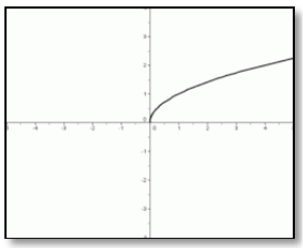
QUADRATIC (u – shaped)



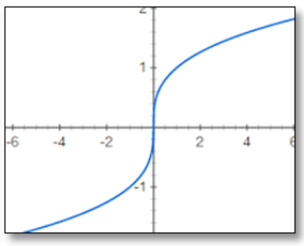
ABS. VALUE (v – shaped)



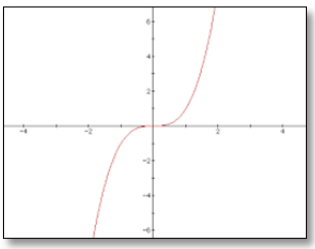
EXPONENTIAL (hockey stick)



SQUARE ROOT $y = \sqrt{x}$



CUBE ROOT $y = \sqrt[3]{x}$



CUBIC $y = x^3$

INEQUALITIES

Number lines: > shade RIGHT w/open circle

REMEMBER: If divide by a negative number, the symbol switches.

< shade LEFT w/open circle

≥ shade RIGHT w/closed circle

≤ shade LEFT w/closed circle

NOTE: These rules are if *x* is before symbol.

Both x and y: These get graphed on xy-plane as lines (dotted or solid) and then a region gets shaded. *(If vertical line, follow above rules)*

> dotted line/shade UP < dotted line/shade DOWN

≥ solid line/shade UP ≤ solid line/shade DOWN

INTERVAL NOTATION

Parentheses: means UNEQUAL (use open circles)

Brackets: means EQUAL (use closed circles)

SHADE in between the 2 numbers on a # Line

Ex) Inequality notation: $-3 < x \leq 5$

in interval notation: $(-3, 5]$

LINES

Equation of a Line: $y = mx + b$ where *m* = slope and *b* = y-intercept

If Vertical line: *x = a number (slope is undefined)*

If Horizontal line: *y = a number (slope is zero)*

Slope of a Line: (using 2 points on the line)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Parallel lines have equal slopes.

Perpendicular Lines have negative reciprocal slopes.

A positive slope looks like…

A negative slope looks like…

LINES
(continued)

To write the equation of a line: Step 1: Find slope (m). Step 2: Find y- intercept (b) by plugging a point in for (x, y) and slope in for "m" into "y = mx + b" to solve for "b".

Ex) Write the equation of a line perpendicular to y = 2x + 7 that passes through the point (-6,4).

Step 1: since the slope of y = 2x + 7 is "2", the slope of a perp. Line would be $m = -\frac{1}{2}$.

Step 2: m = - ½, x = -6, y = 4 → $y = mx + b$, $4 = (-\frac{1}{2})(-6) + b$, $4 = 3 + b$, $1 = b$ → $y = -\frac{1}{2}x + 1$

NUMBERS
& their Properties

Types of Numbers :

1. Integers: a whole number that can be positive, negative, or zero.
2. Rational: any number that can be written as a fraction (when written as a decimal it either ENDS or REPEATS)
3. Irrational: a number that cannot be written as a fractions (the decimal NEVER ends and NEVER repeats)

Properties of Numbers:

1. Commutative: when the numbers/variables change order
   Ex) 3 + 4 = 4 + 3 **or** $a \cdot b = b \cdot a$
2. Associative: when the parentheses change what is inside them
   Ex) 3 + (4 + 5) = (3 + 4) + 5 **or** $a \cdot (b \cdot c) = (a \cdot b) \cdot c$
3. Distributive: the number outside ( ) multiplies each term inside
   Ex) 3(4 + 5) = 3(4) + 3(5)
4. Identity: for Addition, can add "0" and not change the number
   for Multiplication, can mult by "1" and not change number
   Ex) 3 + 0 = 3 **or** *3 · 1 = 3*
5. Inverse: for Addition, can add two numbers to get an answer of 0.
   for Multiplication, can multiply to get an answer of 1.
   Ex) 3 + (-3) = 0 **or** $3 \cdot \frac{1}{3} = 1$
6. Zero Property: anything multiplied by 0 is 0 *Ex) 3 · 0 = 0*

PARABOLAS

Equation of a Parabola: $y = ax^2 + bx + c$

If "a" is positive, graph looks like… 
The Vertex is a MINIMUM point

If "a" is negative, then 
The Vertex is a MAXIMUM point

Axis of Symmetry: (the vertical line that passes through vertex)

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

** This value of x should be in the middle of the table**

Vertex: First find the axis of symmetry using the formula above, then plug that x-value into the parabola's equation to find "y". Vertex = (x, y)

Ex) Find the coordinates of the vertex of the parabola: **$y = x^2 - 6x + 4$**

Axis of Symmetry: *a = 1, b = -6, c* = 4 → $x = \frac{-(-6)}{2(1)} = 3$

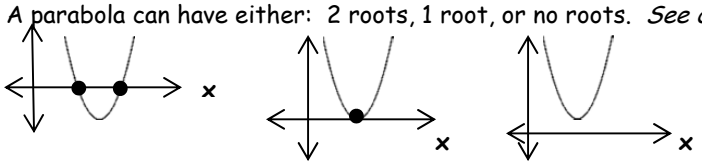
Vertex: $y = (3)^2 - 6(3) + 4$ → y = -5 **VERTEX: (3, -5)**

(*For vertex form of a Parabola – see "Quadratic Equations" on page 7*)

PARABOLAS (continued)

Roots: The values of x where the graph intersects the x-axis (y = 0)

A parabola can have either: 2 roots, 1 root, or no roots. *See diagrams below.*



To find the roots algebraically, set equation equal to zero and FACTOR. Set each factor equal to zero and solve for x.

PERCENTS

Percent Problems: set up this proportion and cross-multiply to solve

$\frac{part}{whole} = \frac{\%}{100}$ or $\frac{is}{of} = \frac{\%}{100}$ In sales tax problems, whole = original and % is 100 + sales tax

Percent Error:

$$\frac{|Measured - Actual|}{Actual} \cdot 100$$

If it says **relative** error, don't multiply by 100

Percent Increase/Decrease: $\frac{|Original - New|}{Original} \cdot 100$

PERIMETER

Square: P = 4s **Rectangle**: P = 2L + 2W **Circle**: C = πd or 2πr

All other shapes: add all the sides

POLYNOMIALS

Exponent Rules: The coefficients always perform the operation in the problem, the exponents never do.

Multiplying Problems:
Coefficients Multiply
Exponents **ADD**
Ex) $6x^6 \cdot 2x^2 = 12x^8$

Dividing Problems:
Coefficients Divide
Exponents SUBTRACT
Ex) $6x^6 \div 2x^2 = 3x^4$

Adding/Subtracting Problems:
Coefficients Add/Subtract
Exponents STAY THE SAME
Ex) $6x^6 + 2x^6 = 8x^6$
Ex) $6x^6 + 2x^2 = 6x^6 + 2x^2$

Zero and Negative Exponents:

$x^0 = 1$

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

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

Notice the Difference: $-3^2 \neq (-3)^2$ because $-3^2 = -9$ yet $(-3)^2 = +9$

Adding/Subtracting Polynomials: Only combine the *"LIKE TERMS"* (same variable and same exponent) *Ex)* $9x^3 + 7y^3 - x^3 - 6x^2 + 4y^3 = 8x^3 + 13y^3 - 6x^2$

"Subtract/From" Problems: The *"from"* expression goes first followed by a subtraction symbol and then the *"subtract"* expression in parentheses

Ex) Subtract $2x^2 + 3x - 1$ *from* $x^2 - 5x - 7$

$= (x^2 - 5x - 7) - (2x^2 + 3x - 1) = x^2 - 5x - 7 - 2x^2 - 3x + 1$

$= \boxed{-x^2 - 8x - 6}$

Multiplying Polynomials: Each term in the first () multiplies each term in the 2nd (). To mult binomial by binomial use FOIL **(first, outer, inner, last)**

Ex) Find the product of $3x - 4$ *and* $x + 5$.

$= (3x - 4)(x + 5) = 3x^2 + 15x - 4x - 20 = \boxed{3x^2 + 11x - 20}$

PROPORTION

Proportion: when two fractions (ratios) are equal to one another

If $\frac{a}{b} = \frac{c}{d}$ $\xrightarrow[\text{multiply}]{\text{cross}}$ $a \cdot d = b \cdot c$

Direct Variation:

If x varies directly as y, then: $\frac{x}{y} = \frac{x}{y}$

Ex) If x varies directly as y and x = 4 when y = 6, find y when x = 10.

$\frac{4}{6} = \frac{10}{y}$ $\quad 4 \cdot y = 6 \cdot 10$

$y = 15$

QUADRATIC EQUATIONS

Quadratic Equation: an equation that has x^2 in it. There are 3 ways to solve a quadratic equation.

TO SOLVE BY FACTORING

Step 1: Get one side equal to ZERO (try to get x^2 to the side where it's positive)
Step 2: FACTOR (by GCF, DOTS, or TRInomial)
Step 3: Set each factor equal to zero and solve for x.

TO SOLVE USING QUADRATIC FORMULA

Step 1: Get one side equal to ZERO
Step 2: Determine "a", "b", "c" then use the formula below

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

TO SOLVE BY **COMPLETING THE SQUARE**:

Step 1: Divide by the number in front of x^2. Step 2: Keep all terms with x on the left and move constant to right side of =. Step 3: Set up a place holder ♡ on each side to fill in with the missing number $\left(\frac{b}{2}\right)^2$. Step 4: Rewrite the left side as $(x + \frac{b}{2})^2$. Step 5: Square root both sides – this will get rid of the "*squared*" on left side. **Include a "$\pm$" on right side**. Step 6: Get x alone and simplify if possible.

Ex) Solve by completing the square: $2x^2 - 6x - 7 = 0$

$x^2 - 3x - \frac{7}{2} = 0$ *(Divide by 2)*

$x^2 - 3x = \frac{7}{2}$ *(Move constant)*

$x^2 - 3x + ♡ = \frac{7}{2} + ♡$ *(place holder)*

$x^2 - 3x + \frac{9}{4} = \frac{7}{2} + \frac{9}{4}$ *($b = -3 \rightarrow \left(\frac{-3}{2}\right)^2 = +\frac{9}{4}$)*

$\left(x - \frac{3}{2}\right)^2 = \frac{7}{2} + \frac{9}{4}$ (*left side is perfect square*)

$\left(x - \frac{3}{2}\right)^2 = \frac{23}{4}$ *(simplify)*

$\sqrt{\left(x - \frac{3}{2}\right)^2} = \pm\sqrt{\frac{23}{4}}$ *(square root- don't forget $\pm$ on right)*

$x - \frac{3}{2} = \pm\sqrt{\frac{23}{4}}$ (drop the squared on left)

$x = \frac{3}{2} \pm \sqrt{\frac{23}{4}} = \boxed{\frac{3}{2} \pm \frac{\sqrt{23}}{2} \text{ or } \frac{3 \pm \sqrt{23}}{2}}$

QUADRATIC EQUATIONS (continued)

Every quadratic equation has <u>two</u> solutions. The graph of a quadratic equation is a parabola and the solutions represent its ROOTS.

Ex) Solve: $x^2 - 2x = 2x^2 + 3x - 6$

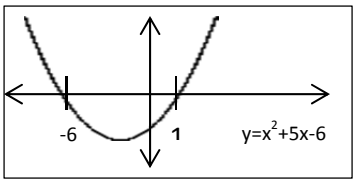
$-x^2 + 2x \quad -x^2 + 2x$

$0 = x^2 + 5x - 6$

$0 = (x + 6)(x - 1)$

$x + 6 = 0 \quad | \quad x - 1 = 0$

$x = -6 \quad | \quad x = 1$



<u>Nature (Type) of Roots</u>: to determine the type of roots a quadratic eqn. has (without actually finding them), use the **<u>Discriminant</u>** = $b^2 - 4ac$

Discriminant $b^2 - 4ac$ is…	Roots would be…
NEGATIVE	Imaginary
ZERO	Equal (Real, Rational, & Equal)
POSITIVE PERFECT SQUARE	Rational & Unequal (Real, Rational, & Unequal)
POSITIVE but NOT a PERFECT SQUARE	Irrational (Real, Irrational, & Unequal)

<u>Vertex Form of a Parabola</u>: $y = a(x - h)^2 + k$

where vertex = (h, k)

NOTE: If equation is NOT in this form, <u>complete the square</u>

RADICALS

<u>Perfect Squares</u>: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169…

<u>Simplifying Radicals</u>: find two numbers that multiply to the number under the radical where one number must be a *perfect square.* (If there is a coefficient, it will multiply) *Ex)* $7\sqrt{54} = 7\sqrt{9}\sqrt{6} = 7 \cdot 3\sqrt{6} = 21\sqrt{6}$

<u>Adding/Subtracting</u>: Two radicals must have the SAME number under the radical. If so, add/subtract coefficients and leave common radical alone. *Ex)* $\sqrt{27} - 5\sqrt{12} = \sqrt{9}\sqrt{3} - 5\sqrt{4}\sqrt{3} = 3\sqrt{3} - 5 \cdot 2\sqrt{3} =$ $-7\sqrt{3}$

<u>Multiplying/Dividing</u>: Any two radicals can mult/divide (do not have to be the same). Mult/divide the coefficients and mult/divide the radicands.

Ex) Multiply and express result in simplest radical form:

$9\sqrt{6} \cdot 7\sqrt{3} = 63\sqrt{18} = 63\sqrt{9}\sqrt{2} = 63 \cdot 3\sqrt{2} =$ $189\sqrt{2}$

Ex) Divide: $\frac{6\sqrt{32}}{2\sqrt{2}} = 3\sqrt{16} = 3 \cdot 4 =$ 12

SETS

$\cup$ = UNION = combine the sets together (put in order, don't repeat)

$\cap$ = INTERSECTION = what both sets have in common (if nothing, write ∅)

$\bar{A}$ = COMPLEMENT of SET A = everything that set A is missing from the Universe "$\mathcal{U}$"

Ex) If $\mathcal{U}$ = {1, 2, 3, 4, 5, 6}

A = {2, 5}

B = {3, 5, 6}

Then A ∪ B = **{2, 3, 5, 6}**

A ∩ B = **{ 5 }**

$\bar{B}$ = **{1, 2, 4}**

SPEED

Formula: d = rt

"r and t" vary inversely

where…

d = **distance** (possible units = *miles*)

r = **rate** (possible units = $\frac{miles}{hour}$)

t = **time** (possible units = *hours*)

STATISTICS

Mean: the average

To find the Mean: add all the numbers that divide by how many ("n").

To find missing data: Use the fact that (Mean) · (n) = SUM

To find the missing number, see what's missing to get this sum.

Ex) 78, 92, 85, 97, __?__ Find ? if mean is 90.

(90)·(5) = 450 = SUM (of all 5 numbers)

78+92+85+97 = 352 (so far, of the 4 known numbers)

450 – 352 = **98**

Median: the middle number (once the data is arranged in order). If there are two numbers in the middle, find the average of them.

Mode: the number that appears MOST often (there can be no mode or even more than 1 mode)

Range: HIGHEST – LOWEST

Outlier: any number that is far away from the rest. When there are outliers, the MEDIAN best represents the data.

Quantitative vs. Qualitative: QUANTITATIVE = data is numbers

QUALITATIVE = data isn't numbers

Univariate vs.Bivariate: UNI = one set of #'s; BI = two sets of #'s

Causal Relationship: where one thing actually causes the other.

Correlation: three types **POSITIVE** – as one increases, so does the other

NEGATIVE – as one increases, the other decreases

NONE – scatter plot does NOT look like a line

Stem and Leaf Plot: the first digit(s) go in front of the line, the last digit goes after the line. DON'T FORGET A KEY!

Ex) If data were: 83, 88, 88, 92, 100 then plot would look like…

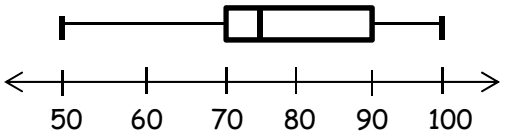
8	**3 8 8**
9	**2**
10	**0**

Key: 9 | 2 = 92

STATISTICS

(continued)

Box and Whiskers Plot: Include an equally spaced number line on Bottom then show **MIN**, **Q1**, **Q2** (same as median), **Q3**, and **MAX**.
(see calculator instructions below)
Ex) If MIN = 50, Q1 = 70, Q2 = 75, Q3 = 90, MAX = 100 plot looks like



Note: between any 2 of these scores 25% of data lie

Mean, Median, Range, & Standard Deviation on Calculator:

Step 1: Enter all data under L_1 and frequencies (if there are any) under L_2 using **STAT** **EDIT**

Step 2: Calculate these measures of central tendency and dispersion by

STAT **CALC** **1 – VAR STATS** L_1 , L_2 (only if frequencies)

Mean: $\bar{X}$

Median: **Med**

Range: **maxX – minX**

Interquartile Range: $Q_3 - Q_1$

Standard Deviation: σ_x (if it is a population)

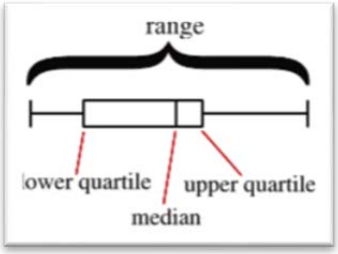
S_x (if it is a sample)

To create a Box and Whiskers Plot on Calculator:

Find the 5 calculations (MIN, Q1, MED, Q3, MAX) using steps 1 and 2 above. To create plot: **2nd** **STATPLOT** **PLOT 1**

Choose: ON

Type: choose the 5th graph, then graph by hittng **ZOOM** **ZOOMSTAT**



Regressions: used to find the equation of the line of "best fit" given data

Step 1: Enter data **STAT** **EDIT**

Step 2: Create the scatterplot **(Make sure x's are in L_1 and y's are in L_2)**

2nd **STATPLOT** **PLOT 1** **Choose:** ON

For type choose 1st graph

Step 3: Graph **ZOOM** **ZOOMSTAT**

Step 4: To write the equation of the line

STAT → **CALC** **LinReg (ax + b)** **ENTER**

Note that "a" is the slope (m) and b is the y-intercept

SYSTEMS
of Equations (=)
or Inequalities (<)

Two Inequalities: Graph lines on xy-plane then shade according to rules listed under "INEQUALITIES". The solution set is the region on the graph that was shaded by both inequalities. Label it "*S*".

Two Equations: Three ways to solve…

Graphically: graph each equation and find the point(s) of intersection
It could be a parabola and a line (if there's x^2) or two lines (if no x^2)

Algebraically using SUBSTITUTION: used when the system is Quadratic/Linear (one equation has x^2) or whenever one equations has either *x* or *y* alone. Substitute whatever it is equal to into the other equation, then solve. Remember to find both x and y.

Algebraically using ELIMINATION: (not used in Quadratic/Linear) Multiply each equation by a number that will get the coefficients of either x or y to be the **same number but with opposite signs**. Then add the two equations and one variable will cancel. Remember to find both x and y.

Ex) The algebraic method that would work best on each example is…

$2x + 3y = 5$	$y = x^2 + 2x - 3$	**7(**$2x + 3y = 5$**)**
$x = 4y + 8$	$3y - 2x = 5$	**-3(**$5x + 7y = 10$**)**
use Substitution since x is alone	**use Substitution since Quadratic**	**use Elimination to get y to cancel**

WORD PROBLEMS

Always start with a "Let" statement that states what *x* represents.

Consecutive Integer Problems:

Consecutive	*Consecutive Even / Odd*
Let x = 1st	**Let x = 1st**
x + 1 = 2nd	**x + 2 = 2nd**
x + 2 = 3rd	**x + 4 = 3rd**

Deciding "who" is x: whenever two quantities are compared to one another, the one at the END OF THE SENTENCE is "x".

Ex) The larger of two numbers is 3 less than twice the smaller. If their sum is 27, find each number.

x = smaller #
2x – 3 = larger #

SUM = 27
$x + (2x - 3) = 27$
$3x - 3 = 27$
$3x = 30$
$x = 10$

10 = smaller #
2(10) – 3 = **17** = larger #

Ex) The width of a rectangle is 4 more than the length. If the perimeter is 36 cm., find the dimensions of the rectangle.

x = length
x + 4 = width

PERIMETER = 36
2L + 2W = 36
2(x) + 2(x + 4) =36
2x + 2x + 8 = 36
4x + 8 = 36
4x = 28
x = 7

7 = length; **11** = width

SEQUENCES

Arithmetic Sequence: when the pattern is ADDING.

d = difference b/w terms
a_1 = first term
n = number of term asked for

To find the n^{th} ARITHMETIC term:

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

Ex) Find the 100^{th} term of: 3, 7, 11, 15, 19, …

Here: n = 100, a_1 = 3, d = 4 ➡ $a_{100} = 3 + (100-1)(4) =$ **399**

Geometric Sequence: when the pattern is MULTIPLYING.

r = ratio b/w terms (if not obvious – divide any term by the previous one)
a_1 = first term
n = number of term asked for

To find the n^{th} GEOMETRIC term:

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

Ex) Find the 7^{th} term of: $6, 4, \frac{8}{3}, \frac{16}{9}, \ldots$

Here: n = 7, a_1 = 6, r = 2/3 ➡ $a_7 = 6\left(\frac{2}{3}\right)^{7-1} = \frac{128}{243}$

Recursive Sequences: a term is found by knowing the term before it

The first term "a_1" will be given along with a formula to find "a_n" given "a_{n-1}"

Ex) If $a_1 = 2$ and $a_n = 5a_{n-1} + 3$, find the first 4 terms.

Need to find a_1, a_2, a_3, and a_4

a_1 = 2

a_2 = plug in n to be 2 = $5a_{2-1} + 3 = 5a_1 + 3 = 5(2) + 3 = 13$

a_3 = plug in n to be 3 = $5a_{3-1} + 3 = 5a_2 + 3 = 5(13) + 3 = 68$

a_4 = plug in n to be 4 = $5a_{4-1} + 3 = 5a_3 + 3 = 5(68) + 3 = 343$

2, 13, 68, 343

ABSOLUTE VALUE

Equations: Separate into 2 equations – one w/the original equation (without absolute value), the other with every term inside the absolute value negated. CHECK all solutions in the original equation. REJECT those that don't work.

Ex) Solve for x $|2x - 3| + x = 3$

$2x - 3 + x = 3$ | $-2x + 3 + x = 3$

$3x = 6$ | $-x = 0$

$x = 2$ | $x = 0$

Answer: {2, 0}

CHECK: x = 2

$|2(2) - 3| + 2 = 3$

$|1| + 2 = 3$

$1 + 2 = 3$ ☑

CHECK: x = 0

$|2(0) - 3| + 0 = 3$

$|-3| + 0 = 3$

$3 + 0 = 3$

☑

Table of Contents
CC Algebra 1 Summary