Radicals

Dividing Radical Expressions

- → Index #s must be the same
- → State restrictions
- → If radical in denominator, RATIONALIZE:
  convert to whole #

Mixed Radical

$3\sqrt{7}$

* depending on the index #, (2,3,4,6), square, cube, etc. to the coefficient to place it back under the radicand.

Entire Radical

$\sqrt{7}$

* to turn into a mixed radical, find a perfect cube, square (depending on index #), and bring the root of the index # out as the coefficient.

$2\sqrt{5}$

- index number
- → radical
- → radicand
- coefficient

ODD INDEX

→ Radicand can be any real #

Even Index

→ Radicand must be positive + greater than zero.

* entire → mixed w/ variables:
make variables in pairs of the index # and simplify #s by rooting them by index #.
If they cannot be simplified, they must remain under √

+ and − Radical Expressions

→ add coefficients, + add like terms.

→ ex: $4x - 2y - 7y + x = 5x - 9y$

multiplying radicals

- → Index #s must be the same
- → multiply coefficients + radicands
- → simplify

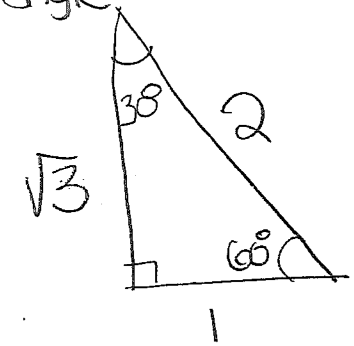
Trigonometry

SOH CAH TOA

Ratios

When you find the cos, tan, or sin of an angle, you must find the inverse to find the angle

Special triangle



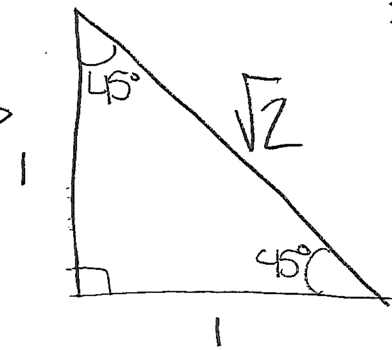
Terminal arm lies on the x-axis

$0° \le \theta < 180°$

→ states which quadrant the angle is in.

S	A
T	C

Special triangle



θ = unknown angle

$a^2+b^2=c^2$

pythagorean theorem

θ_R = Reference Angle

→ Angle measure closest to the x-axis.

Sine Law

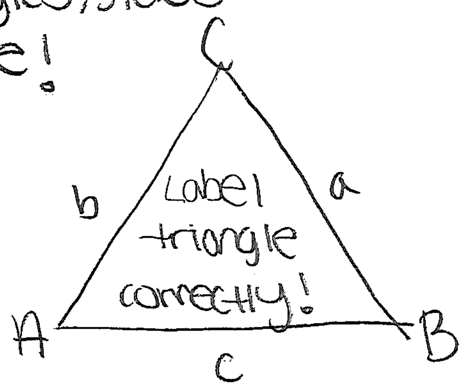
→ (AAS)(SSA) = known angles/sides

* Look for ambiguous case!

→ $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

→ a,b,c = side lengths

→ A,B,C = angles



Cosine Law

→ (SAS)(SSS) = known angles/sides

→ $\cos A = \frac{b^2+c^2-a^2}{2bc}$

→ $\cos B = \frac{a^2+c^2-b^2}{2ac}$

→ $\cos C = \frac{a^2+b^2-c^2}{2ab}$

Absolute Value Equations → can be 2, 1, or 0 solutions!
→ extraneous solutions.

→ solved graphically or algebraically

→ CASE 1 = positive case
CASE 2 = negative case

→ verify by substitution
OR
by calculator.

→ Y= → MATH → NUM → 1 → enter function → graph

Always positive

Invariant Points

→ points that are unchanged when part of the graph is reflected.

$|\ x\ |$ ← **Absolute Values** → can be used to represent the distance of a # from zero on the number line. (distance cannot be negative)

Absolute value symbol.

ex: $|-6| = 6$

An absolute value function includes the absolute value of a variable

X values don't repeat

Piecewise Function

$$y = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$

Refer to x-int's

* If a quadratic expression is involved, you can factor, or use the quadratic formula to solve.

Quadratic Functions

Standard Form

$f(x) = ax^2 + bx + c$

or

$y = ax^2 + bx + c$

opens up/down

position of graph

y-intercept

Domain + Range

(p, q) vertex Form

$f(x) = a(x-p)^2 + q$

Coefficient $\boxed{\text{opens}}$ up or down.

horizontal $\boxed{\text{Shift}}$ left or right (x-coordinate of vertex)

vertical $\boxed{\text{Shift}}$ up or down (y-coordinate of vertex)

* If the a value is +, it opens up. If negative, opens down.

Parabola

U or ∩

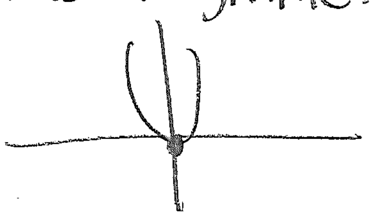
minimum value

maximum value

* x-coordinate can be found by using

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

Axis of Symmetry:

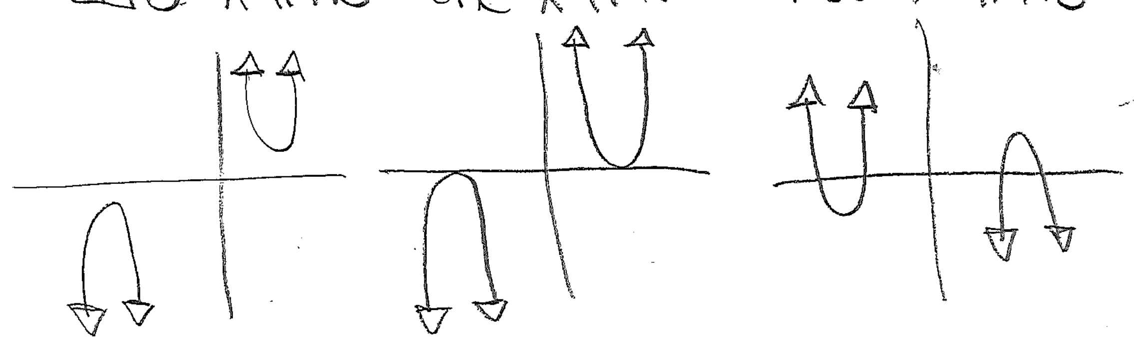


Degree of 2 (highest exponent)

ex: $\boxed{x^2} + 2 + x$

X-intercepts

zero x-ints · one x-int · two x-ints



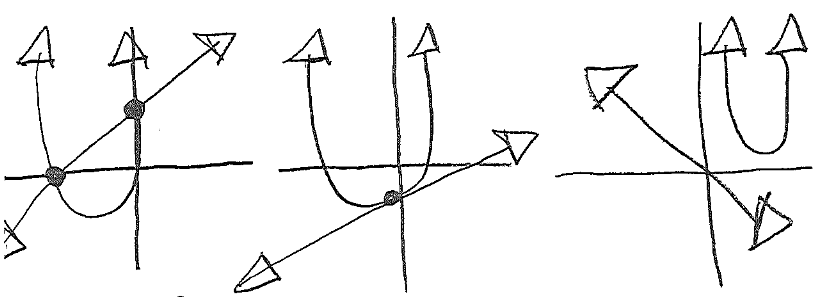
Solving Systems of Equations

Graphically

Linear- Quadratic

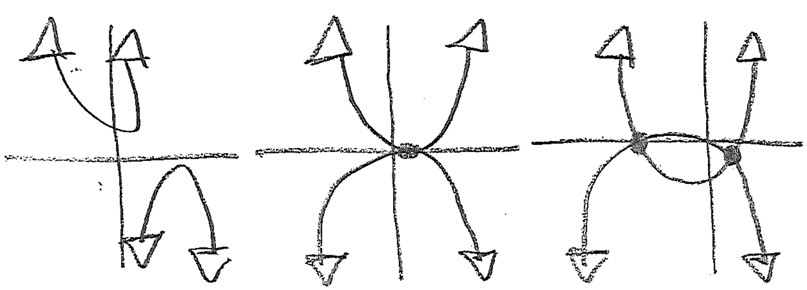
-> Solution is any intersection point that satisfies both equations.
-> Verified by substitution
-> only place a system of equations can have the same ordered pair is at a point of intersection.

2 solutions 1 solution 0 solutions



Quadratic-Quadratic

2 solutions 1 solution 0 solutions



Algebraically

* Substitution or Elimination are used.

Linear - Quadratic

Elimination:

- Eliminate a variable
- Find value of other variable
- sub in

Substitution:

Sub (y= ...) into formula
- determine value of variable
- sub in.