PreCalc 11 - Chp 5 Review/Ref Sheet

Note Title 2015-09-24

Make sure you also have notes on the quadratic formula, completing the square, and the discriminant.

General: $y = ax^2 + bx + c$ Standard: $y = a(x-p)^2 + q$

Factored: $y = a(x-d)(x-e)$

Expression: $ax^2 + bx + c$ Equation: $ax^2 + bx + c = 0$

x-ints for exp: zeroes x-ints for equ: roots

Quadratics must have axis of symmetry (A.o.S: $x = p$), vertex (p, q), min or max value (q), y-int ($y = c$, or subst $x = 0$), domain ($x \in \mathbb{R}$), range ($y \geq q$ if $a > 0$; $y \leq q$ if $a < 0$), concavity ($a > 0$ - up; $a < 0$ - down)

Quadratics can have 0, 1, or 2 real roots - check discriminant.

Calculator: to find roots or zeroes, you are looking for x-intercepts. To find vertex, you are looking for a min or max. Practice adjusting the window to see all the features. As a starting point, use $\pm b$ as an estimate for domain, and $\pm c$ for the range.

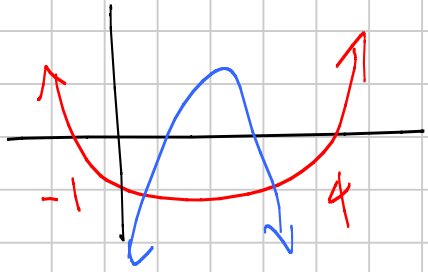
Strict:	$<$	$>$	} ineq
Not Strict:	$\leq$	$\geq$	
$ax^2 + bx + c$	ineq	0	

Find domain; specifically, inner, outer, all, none.

Check if above/below x-axis

Definition: Critical Points are the zeroes of the quadratics. We can use test points around the critical points to determine the domain or intervals.

Think about characteristics: concavity and roots.



concave up: only outer interval can be positive

concave down: only inner interval can be positive.

y ineq line/parabola Draw dotted (strict), solid (not strict); shade above (>), below (<)

Test Points will tell you which part to shade. If expression is true, shade half with test point, otherwise shade half without. A convenient test point is the origin: (0, 0).

Solving systems: $y_1 = y_2$ solve intersections

$y_1 - y_2 = 0$ solve x-intercepts: zeroes or roots

Use substitution to create one equation with one variable. Then move all to one side and factor. If factoring is not possible, then use the quadratic formula to answer using radicals. Do not solve to decimals when it is asking for algebraic!

In general, to check if something is a solution - substitute given values and check if results match. Fastest way with calculator is to trace and enter the x-values.