Nice notes. I added some things to remember.
– TK

chapter 1

interval notation:

( ) when $>$ $<$ $\quad -\infty$ uses (bc they never stop

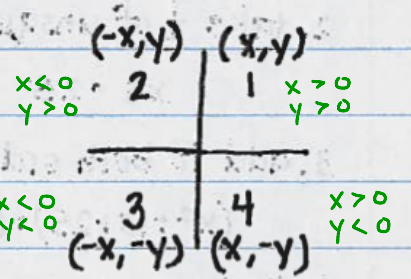
[ ] when $\geq$ $\leq$ $\quad \infty$ uses)

sign chart: ex. $(a+b)(c-d) \geq 0$ $\quad b=c=x$

$a+b=e$ - - - - 0 + + + + + + + + $\quad$ so $x \leq e$ or $x \geq f$.

$c-d=f$ - - - - - - - - - 0 + + + +

$(a+b)(c-d)$: $+$ 0 $-$ 0 $+$ (e, f)



*For the point (x,y)

absolute value properties:

1. $|a| = |-a|$ (= a special case of 3.)
2. $|a| = 0$
3. $|ab| = |a| \cdot |b|$
4. $\left|\frac{a}{b}\right| = |a| \div |b|$
5. $|a+b| \leq |a| + |b| \sim |a \pm b| \neq |a| \pm |b|$

Honestly, we never use 5. in Precalc.

absolute value really means dist. from the origin

Don't forget: $|A| = \begin{cases} A & \text{if } A \geq 0 \\ -A & \text{if } A < 0 \end{cases}$

absolute values & inequalities

$|x| < a$ if $-a < x < a$

$|x| > a$ if $-a > x > a$ (should use "or")

distance formula: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

midpoint formula: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ * this is the average

formula for a circle : $(x-h)^2+(y-k)^2=r^2$

(h,k) = center

r = radius

completing the square: $x^2+y^2+10x-2y+17=0$

1. seperate x's & y's & move constant to other side

$$(x^2+10x)+(y^2-2y)=-17$$

2. take $\frac{1}{2}$ of unsquared term's coefficient & square

x's = 25 y's = 1

3. add to both sides

$$(x^2+10+25)+(y^2-2y+1)=-17+25+1$$

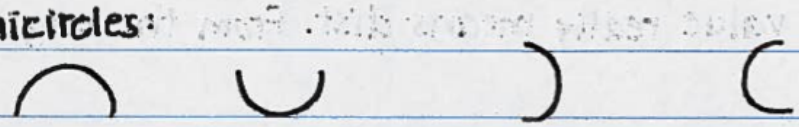
4. factor

$$(x+5)^2+(y-1)^2=9$$

center = $(-5,1)$

radius = 3

semicircles:



$y=\sqrt{r^2-x^2}$ $y=-\sqrt{r^2-x^2}$ $x=\sqrt{r^2-y^2}$ $x=-\sqrt{r^2-y^2}$

(The 4 formulas above are true only in case the center is (0,0).)

intercepts:

x-int ~ set $y=0$

y-int ~ set $x=0$

symmetry: Probably not my wording, but good for you.

y-axis if $-x$ yields same results as x

x-axis if $-y$ yields same results as y

origin if $-x, -y$ yields same results as x, y

factorizations:

$a^3 - b^3 = (a-b)(a^2+ab+b^2)$

$a^3 + b^3 = (a+b)(a^2-ab+b^2)$

Pascal's triangle: & Binomial Theorem:

$(x+y)^n = ?x^n + ?x^{n-1}y + x^{n-2}y^2 \ldots + xy^{n-1} + y^n$

a				1				
$a \pm b$			1	+	1			
$(a \pm b)^2$		1	+	2	+	1		
$(a \pm b)^3$	1	+	3	+	3	+	1	
$(a \pm b)^4$	1	+	4	+	6	+	4	+ 1

So, for example, $(a \pm b)^4 = a^4 \pm 4a^3b + 6a^2b^2 \pm 4ab^3 + b^4$

limits:

$\lim_{x \to 1} \frac{NW}{NW}$ just get whatever makes $x=1$ out & solve

That is, factor $(x-1)$ out of top & bottom, cancel, then let $x=1$.

Chapter 2

domain = all the real x's at which $f(x)$ is defined. = the set of all x-values on ...

range = all the real y's = set of all y-values on ... ...the graph $y = f(x)$

vertical line test: if every vertical line crosses the graph ~~only once~~ 0 or 1 time, the graph is a graph of a function.

Curve fails VLT when some vertical line intersects the graph more than once.

symmetry in functions:

even — y-axis if $f(-x) = f(x)$

odd — origin if $-f(x) = f(-x)$

vertical & horizontal shifts:

$f(x)+c = \uparrow$

$f(x)-c = \downarrow$

$f(x+c) = \leftarrow$

$f(x-c) = \rightarrow$

reflections:

$y = -f(x)$ on x-axis

$y = f(-x)$ on y-axis

vertical stretches & compressions: $cf(x)$

stretched if $c > 1$

compressed if $0 < c < 1$

linear functions:

point-slope form $y - y_1 = m(x - x_1)$

slope-intercept form $y = mx + b$

m = slope

b = y-int

parallel if $m_1 = m_2$

perpendicular if $m_1 = \frac{-1}{m_2}$

quadratic functions:

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

std. form $f(x) = a(x-h)^2 + k$

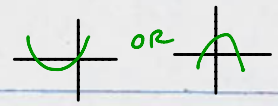
x in vertex $= \frac{-b}{2a}$

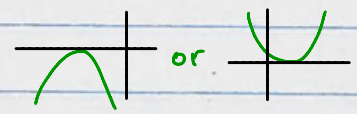
Axis of symmetry is $x = \frac{-b}{2a}$

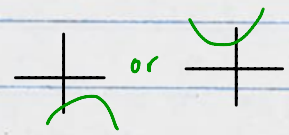
y-coordinate of vertex (=k) is the maximum value of f if $a < 0$, and minimum " " " " $a > 0$

intercepts :

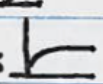
1. $b^2-4ac>0$ then 2 real
2. $b^2-4ac=0$ then 1 double
3. $b^2-4ac<0$ then no real

1: 

2: 

3. 

graphs of $y=x^{m/n}$:

- if n is even it'll be in I & that's all
- if n is odd & m is even it'll be in I & II
- if they are both odd it'll be in I & III
- if $\frac{m}{n}>1$ then I is 
- if $0<\frac{m}{n}<1$ then I is 
- if $\frac{m}{n}<0$ then I is