AP Calculus AB or BC Summer Assigned Work

Textbook Required:
Calculus of a Single Variable, Larson, Seventh Edition
2002, Houghton-Mifflin, 0-618-14916-3

PART 1: Memorization

See the attached list of identities, formulas, factoring patterns, etc… all of which needs to be memorized! Please make and study flashcards of each and be prepared for daily quizzes starting on the first day of class!

PART 2: Assignments from Chapter P

The first chapter of the textbook is chapter P (Pre-requisites) and covers concepts learned in Geometry, (H) Algebra 2, and (H) Pre-Calc. The three assignments below are due on the first day of class and will be worth 50 points. For each assignment there is reading as well as practice exercises. Please do all work on graph paper and remember to **show all work** on problems to get full credit!

Assignment	Read pp:	Exercises:
1	pg 2-7	8/1-21,25-35,59-72
2	pg 10-15	16/1-67 odd
3	pg 19-25	27/2-32E,52,59-62

Blessings on your summer!

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Memorization List for AP Calculus AB/BC

- $\csc\theta = \dfrac{1}{\sin\theta}$
- $\sec\theta = \dfrac{1}{\cos\theta}$
- $\cot\theta = \dfrac{1}{\tan\theta} = \dfrac{\cos\theta}{\sin\theta}$
- $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$
- $\sin^2\theta + \cos^2\theta = 1$
- $1 + \tan^2\theta = \sec^2\theta$
- $1 + \cot^2\theta = \csc^2\theta$
- $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$
- $\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$
- $\tan(\alpha \pm \beta) = \dfrac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}$
- $\sin 2\theta = 2\sin\theta\cos\theta$
- $\cos 2\theta = \cos^2\theta - \sin^2\theta = 1 - 2\sin^2\theta = 2\cos^2\theta - 1$
- $\tan 2\theta = \dfrac{2\tan\theta}{1 - \tan^2\theta}$
- $\sin\dfrac{\theta}{2} = \pm\sqrt{\dfrac{1 - \cos\theta}{2}}$
- $\cos\dfrac{\theta}{2} = \pm\sqrt{\dfrac{1 + \cos\theta}{2}}$
- $\tan\dfrac{\theta}{2} = \dfrac{1 - \cos\theta}{\sin\theta} = \dfrac{\sin\theta}{1 + \cos\theta}$
- $\sin\theta = \dfrac{opp}{hyp}$
- $\cos\theta = \dfrac{adj}{hyp}$
- $\tan\theta = \dfrac{opp}{adj}$
- $\sin\dfrac{\pi}{3} = \dfrac{\sqrt{3}}{2}, \cos\dfrac{\pi}{3} = \dfrac{1}{2}, \tan\dfrac{\pi}{3} = \sqrt{3}$
- $\sin\dfrac{\pi}{6} = \dfrac{1}{2}, \cos\dfrac{\pi}{6} = \dfrac{\sqrt{3}}{2}, \tan\dfrac{\pi}{6} = \dfrac{\sqrt{3}}{3}$

- $\sin\frac{\pi}{4}=\frac{\sqrt{2}}{2}, \cos\frac{\pi}{4}=\frac{\sqrt{2}}{2}, \tan\frac{\pi}{4}=1$
- $\sin\frac{\pi}{2}=1, \cos\frac{\pi}{2}=0, \tan\frac{\pi}{2}=undefined$
- $\sin\pi=0, \cos\pi=-1, \tan\pi=0$
- $\sin\frac{3\pi}{2}=-1, \cos\frac{3\pi}{2}=0, \tan\frac{3\pi}{2}=undefined$
- $\sin 2\pi=0, \cos 2\pi=1, \tan 2\pi=0$
- $a^2-b^2=(a+b)(a-b)$
- $a^3-b^3=(a-b)(a^2+ab+b^2)$
- $a^3+b^3=(a+b)(a^2-ab+b^2)$
- $a^2+2ab+b^2=(a+b)^2$
- $a^2-2ab+b^2=(a-b)^2$
- Quadratic Formula: $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$
- Slope between 2 points: $m=\frac{y_2-y_1}{x_2-x_1}$
- Perpendicular lines: have slopes that are opposite and reciprocal
- Pascal's Triangle: coefficients of $(a\pm b)^n$
- Definition of a Function-a relation in which for each x-value there is only one y-value.
- Domain- the set of all x-values (input)
- Range- the set of all y-values (output)
- Pythagorean Theorem: $a^2+b^2=c^2$
- Area of a Triangle: $A=\frac{1}{2}bh$
- Area/Perimeter of a Rectangle: $A=lw$, $P=2l+2w$
- Area of a Trapezoid: $A=\frac{1}{2}h(b_1+b_2)$
- Area/Circumference of a Circle: $A=\pi r^2$, $C=2\pi r$
- Volume/Surface Area of a Rectangular box: $V=lwh$, $S=2(hl+lw+hw)$
- Volume/Surface Area of a Sphere: $V=\frac{4}{3}\pi r^3$, $S=4\pi r^2$

- Volume/Surface Area of a Right Circular Cylinder: $V = \pi r^2 h$
  $S = 2\pi rh$
- Volume/Surface Area of a Right Circular Cone: $V = \frac{1}{3}\pi r^2 h$
  $S = \pi r\sqrt{r^2 + h^2}$
- Equation of a Circle: $(x-h)^2 + (y-k)^2 = r^2$
  center: (h,k), radius $= r$
- Equation of a Parabola:

$y = a(x-h)^2 + k$	$x = a(y-k)^2 + h$
$vertex\ (h,k)$	$vertex\ (h,k)$
$up:\ a > 0$	$right:\ a > 0$
$down:\ a < 0$	$left:\ a < 0$
$normal:\ \lvert a\rvert = 1$	$normal:\ \lvert a\rvert = 1$
$shrink:\ \lvert a\rvert < 1$	$shrink:\ \lvert a\rvert < 1$
$stretch:\ \lvert a\rvert > 1$	$stretch:\ \lvert a\rvert > 1$

- Equation of a Hyperbola:

$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ (about the x-axis) or $\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$ (about the y-axis)

- Equation of an Ellipse:

$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ (major axis horizontal) or $\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1$ (major axis vertical)

- Equation of a Special Hyperbola: $xy = k$