

## Summer Work - After CPA Pre-Calculus

Students who have just completed Pre-Calculus at the CPA-level should be familiar enough with the following material and vocabulary to be held accountable (via assessment) on the first day of school.

This diagnostic is intended to refresh your memory and provide you with an opportunity to take notes that you should keep and use throughout the Honors Calculus course.

Please download this diagnostic, and show your work for all problems. Feel free to use online resources and previous notes, etc., to help you. ☺ (If you're feeling really stuck, you can email me: [chionilosa@newtown.k12.ct.us](mailto:chionilosa@newtown.k12.ct.us) )

### I VOCABULARY

For each word below: a) Define it in your own words  
b) Either indicate what it is, what it's used for, or show an example that demonstrates its use, as appropriate.

Conjugate	Polynomial
Complex conjugate	Domain
Opposite	Domain Restrictions
Reciprocal	Range
Real/Rational/Irrational Numbers	Slope-Intercept Form
Integer	Local maximum/minimum
Quadrantal Angles	Area formulae (eg., circles, rectangles, triangles)

### II SIMPLIFY

Simplify each of the following expressions:

a)  $\frac{x^2 - 2x + 1}{x^3 + x} \cdot \frac{4x^2 + 4}{x^2 + x - 2}$

b)  $\frac{x-3}{x+4} + \frac{x}{x-2}$

c)  $\frac{x}{x-3} - \frac{x+1}{x^2 + 5x - 24}$

d)  $\frac{\frac{x^2}{x^2-4} - 3}{\frac{x-3}{x+2} - 1}$

### III FACTOR Completely

(Some useful techniques: grouping, sum/difference of squares/cubes, GCF)

a)  $9y^2 + 9y - 4$

b)  $y^4 + 17y^3 + 30y^2$

c)  $6x^2 + 8x + 2$

d)  $3 - 27x^2$

e)  $x^6 - 2x^3 + 1$

f)  $8 + 125y^3$

g)  $x^3 - 4x^2 + 2x - 8$

h)  $x^4 - 1$

i) Use Synthetic Division to factor  $2x^3 + 11x^2 - 7x - 6$  completely.**IV SOLVE**

a)  $x = 2(x - 1)^{-2}$

b)  $3x^2 - 5x + 1 = 0$

c)  $4x^3 = x - 2x^2$

d)  $(x^2 - 16)^{\frac{1}{2}} = 9$

e)  $\frac{x+1}{3} + \frac{x+2}{7} = 5$

e) Use the graphing calculator to find the solutions to  $-x^3 - \frac{5}{3}x^2 + \frac{7}{2}x + 2 = 0$ **V TRIGONOMETRY (Best if done without a calculator...)**

a) List the 6 Reciprocal Identities

b) List the 3 Pythagorean Identities

c) Give radian equivalents for all multiples of 30, 45 and 60 degrees on the Unit Circle

d) Write the appropriate ordered pair for each angle (in c above) on the Unit Circle.

e) Graph  $y = 3\sin x + 1$ f) Graph  $y = -\cos 4x$ g) Solve  $\cos \theta = \frac{1}{2}$  for  $0 \leq \theta \leq 2\pi$ h) Solve  $2\sin \theta + \sqrt{3} = 0$  for  $0 \leq \theta \leq 2\pi$ i) Verify  $1 - \frac{\cos^2 x}{1 + \sin x} = \sin x$ j) Verify  $\sin \theta (\cot \theta + \tan \theta) = \sec \theta$ **VI MISCELLANEOUS**

a) Write the equation of the line given the points (8, -6) and (-5, -1).

b) Find  $f(g(x))$  given  $f(x) = 1 - x^2$  and  $g(x) = 4x + 2$ . Then simplify.c) Solve  $|2x - 5| < 3$ . Write your answer using Interval Notation.

d) Expand  $\sum_{k=1}^4 (-1)^{k-1} (2)^k$ . Then evaluate.