

Summer Work – Honors Calculus

Students who have just completed Pre-Calculus should be familiar enough with the following material and vocabulary to be held accountable for this on the first day of school.

Please show work on a **separate sheet of paper**.

Feel free to use online resources and previous notes, etc., to help you. (If you're feeling really stuck, you can email me at landerson@bcsk12.org)

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	
Integer	Domain	
Opposite	Domain Restrictions	
Reciprocal	Range	
Real/Rational/Irrational Numbers		Slope-Intercept Form
Local maximum/minimum		Point-Slope Form
Unit Circle		Area formulae (circles, rectangles, triangles, trapezoids)

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

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

F) 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 $\sin \theta (\cot \theta + \tan \theta) = \sec \theta$

VI: LOGARITHMS AND EXPONENTS

Simplify the following.

$$x^5 \cdot x^9$$

$$(6x^2)(4x^2)$$

$$(2^3 x)^2 :$$

$$\frac{a^{12}b^{-3}}{a^5b^5}$$

$$\frac{2 \cdot x^3 y^8}{4 \cdot y^2}$$

Write in log form or exponential form (switch from one to the other).

$$\log_3 81 = 4$$

$$4^{-2} = \frac{1}{16}$$

VII: MISCELLANEOUS

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

b) Find $f(g(x))$ given $f(x) = 1 - x^2$ and $g(x) = 4x + 2$. Then simplify.

c) What are the asymptotes of the function: $(2x) / (x^2 - 4)$? What are the x and y intercepts?