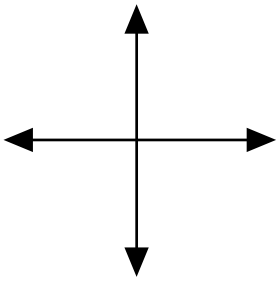
Calculus AB & BC Name _____
Summer Packet (Revised 6/2005)

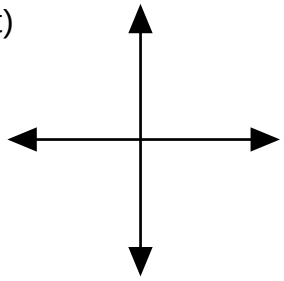
This is due the second day of class in August. It will count as a grade. GIVE EXACT ANSWERS. YOU MUST SHOW WORK. DO NOT SIMPLY GIVE ANSWERS FROM YOUR CALCULATOR. Do all work neatly and completely. You will be graded on your methods as well as answers. x and y represent complex variables unless indicated otherwise.

The following graphs should be memorized. Sketch each on the graphs below.

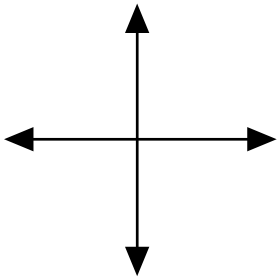
G1: y = x



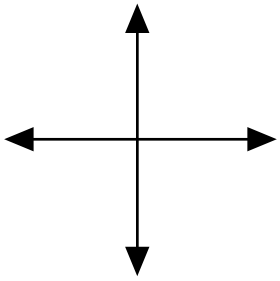
G2: y = c (c is a constant)



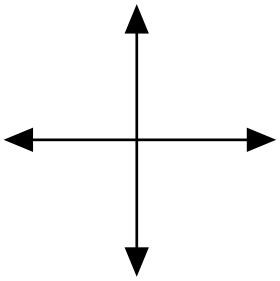
G3: $y = x^2$



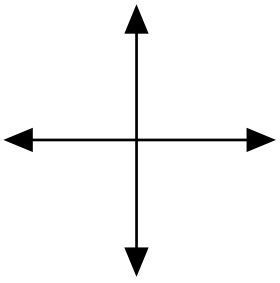
G4: $y = x^3$



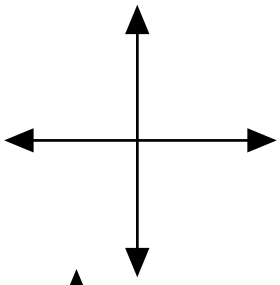
G5: y = |x|



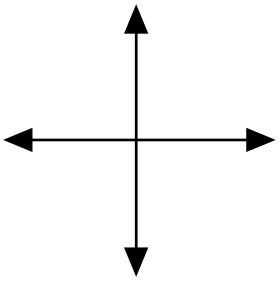
G6: y = [x] (y is the greatest integer ≤ x)



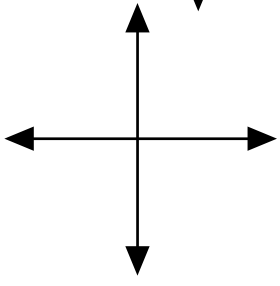
G7: $y = \sqrt{x}$



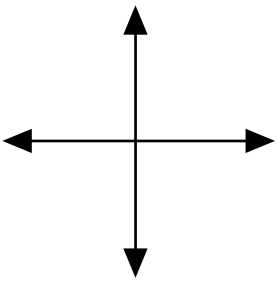
G8: $y = \sqrt[3]{x}$



G9: $y = e^x$



G10: y = ln x



1. Given points S (- 3, 4) and T (6, - 7) Find each

a. the midpoint of $\overline{ST}$

b. the slope of the line through S and T

c. the standard form (Ax + By = C) of the equation of the line through points S and T (A, B, and C are relatively prime integers, A>0)

d. the standard form of the equation of the perpendicular bisector of $\overline{ST}$ (A, B, and C are relatively prime integers; A > 0)

2. Given the line $3x - 5y = 7$,

Find the point-slope form of the equation of a line through $\left(\sqrt{3},\ 1\right)$ that is

a. parallel to the given line

b. perpendicular to the given line

3. $f(x) = 2x + 5$, Find each

a. $f(x + 3)$

b. $f(f(x))$

c. $f(x + 1) - f(x)$

4. Factor completely

a. $(x-5)^2 - y^2$ (HINT difference of squares)

b. $x^3 - 64$ (HINT difference of cubes)

c. $3x^3 - 6x^2 - 45x$

5. Solve for all solutions (real and complex) (you may use results from problem # 4)

a. $(x-5)^2 = 9$

b. $x^3 - 64 = 0$

c. $3x^3 - 6x^2 - 45x = 0$

6. Find the quotient and remainder when $x^3 - 6x^2 - 5x - 7$ is divided by $x - 5$

7. $f(x) = -x^2 + 6x + 7$ Find each

a. The coordinates of the vertex

b. the x and y intercepts

8. Solve each inequality - give your solution in interval notation

a. $x^2 + 2x < 15$

b. $|2x + 3| < 7$

9. Solve each for x

a. $\frac{1}{4} = 8^{x+3}$

b. $27^{x+1} = 9^{2x-4}$

10. Solve for x in each :

a. $\log_3 9 = x$

b. $\log_x 8 = \frac{3}{2}$

c. $\log_a x = 3$

d. $\ln e^x = 4$

11. $y = 2 + \log_3(x - 1)$

a. find domain

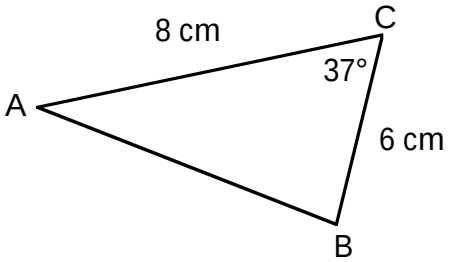
b. find the x intercept

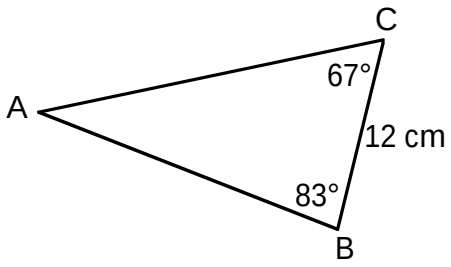
12. Solve each

a. $\log_{(x+2)} 16 = 4$

b. $\log_3 x + \log_3(x - 2) = 1$

13. In each, find the length of segment AB





14. Given the sequence : $2x - 3,\ 7x,\ 11x$; find x if the sequence is

a. arithmetic

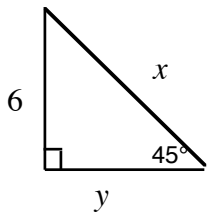
b. geometric ($x \neq 0$)

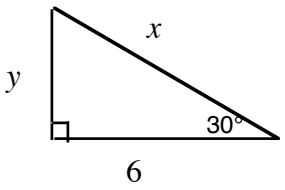
15. Simplify to a single fraction :

a. $\dfrac{\dfrac{1}{x+3} + \dfrac{1}{x}}{x}$

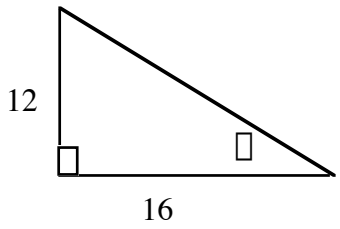
b. $\dfrac{x^2 + 7x + 12}{x^2 - 16}$

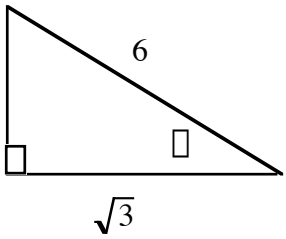
16. Find the missing sides in each





17. Find the indicated trig function and the value of θ (rounded to the nearest degree) in each





sin θ = _____

tan θ = _____

θ = _____

sin θ = _____

cos θ = _____

θ = _____

18. Given $y = \dfrac{x^2 + 7x + 12}{x^2 - 16}$ Find the following

a. x intercepts

b. y intercept

c. equation of vertical asymptote

d. equation of horizontal asymptote

e. location of hole(s) in the graph

f. sketch the graph showing all key points