

# BC CALCULUS SUMMER REVIEW PACKET DUE THE FIRST DAY OF SCHOOL

The problems in the packet are designed to help you review topics from Algebra 2 and Precalculus that are important to your success in BC Calculus.

Please attempt the problems on your own without any notes and **SHOW ALL WORK!** In addition, do not use your calculator for these problems. When you come across topics that require a little review, feel free to look at your old notes, search a website or ask a friend for help. If you want to check your work with a calculator, that is fine also.

Bring the finished packet with you to you BC Calculus class on the first day of school. You will be assessed on these skills during the first week of school as part of your 1<sup>st</sup> quarter grade.



Enjoy your summer! ☺ We are looking forward to seeing you in August. If you have any questions, please contact the math Resource Teacher: [Laura\\_D\\_Goetz@mcpsmd.org](mailto:Laura_D_Goetz@mcpsmd.org)

Name: \_\_\_\_\_

1) Simplify.

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

b)  $\frac{x^2-4x-32}{x^2-16}$

c)  $\frac{5-x}{x^2-25}$

2) Simplify each expression. Write answers with positive exponents where applicable:

a)  $\frac{1}{x+h} - \frac{1}{x}$

b)  $\frac{\frac{2}{x^2}}{\frac{10}{x^5}}$

c)  $\frac{12x^{-3}y^2}{18xy^{-1}}$

d)  $\frac{15x^2}{5\sqrt{x}}$

e)  $(5a^3)(4a^2)$

f)  $\left(4a^{\frac{5}{3}}\right)^{\frac{3}{2}}$

g)  $\frac{\frac{1}{2} - \frac{5}{4}}{\frac{3}{8}}$

3) Simplify the following exponents and logarithms.

a)  $\log_2 8$

d)  $27^{\frac{2}{3}}$

b)  $\log \frac{1}{100}$

e)  $\ln 1$

c)  $\ln e^7$

f)  $e^0$

4) Solve for z:

a)  $4x + 10yz - 3 = 0$

b)  $y^2 + 3yz - 8z - 4x = 0$

5) Given  $f(x) = \frac{x}{x+3}$ ,  $g(x) = \sqrt{x-3}$ ,  $h(x) = x^2 + 5$ , find:

a)  $h(g(x))$

b)  $(f \circ h)(-2)$

c)  $f(f(3))$

d)  $h^{-1}(x)$  (inverse!)

6) Using either the slope-intercept or point-slope form of a line to write the equation for the lines described:

a) with slope -2 and containing the point (3,4)

b) containing the points (1,-3) and (-5,2)

c) with slope 0 and containing the point (4,2)

d) parallel to line  $2x - 3y = 7$  and containing the point (5,1)

e) perpendicular to the line  $-3y + 6x = 2$  and containing the point (4,3)

7) Let  $f$  be a linear function where  $f(2) = -5$  and  $f(-3) = 1$ . State the function  $f(x)$ .

8) Find the distance between the points (8,-1) and (-4,-6).

9) Without a calculator, determine the exact value of each expression:

a)  $\sin \frac{\pi}{2}$

e)  $\cos \frac{\pi}{3}$

b)  $\sin \frac{3\pi}{4}$

f)  $\tan \frac{7\pi}{4}$

c)  $\cos \pi$

g)  $\tan \frac{2\pi}{3}$

d)  $\cos \frac{7\pi}{6}$

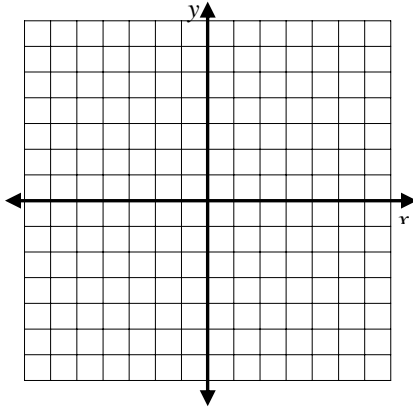
h)  $\tan \frac{\pi}{2}$

10) For each function, make a neat sketch, including a scale or numbering of the axes. Name the domain and range for each as well. (Remember – no calculator!)

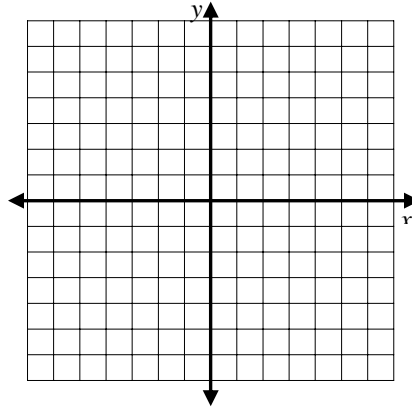
a)  $y = \sqrt{x}$

b)  $y = \sqrt[3]{x}$

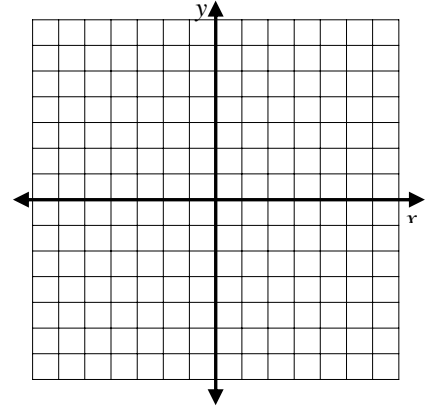
c)  $y = e^x$



D:  
R:



D:  
R:

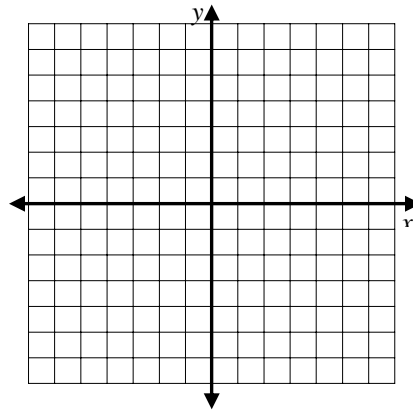


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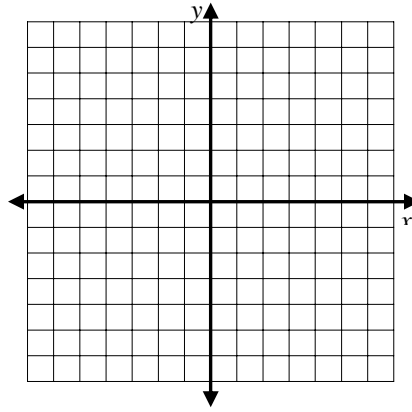
d)  $y = \ln x$

e)  $y = 2^x$

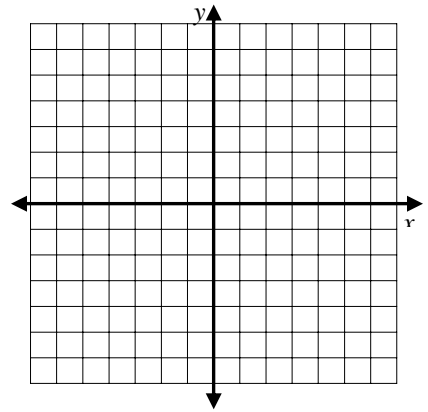
f)  $y = 1/x$



D:  
R:



D:  
R:

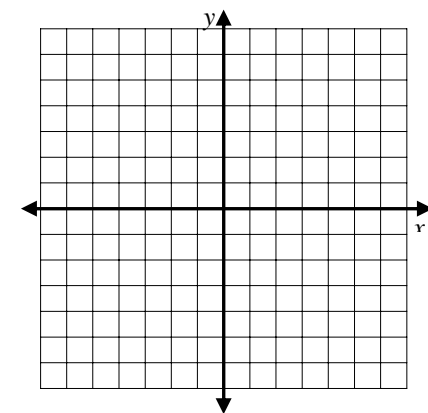
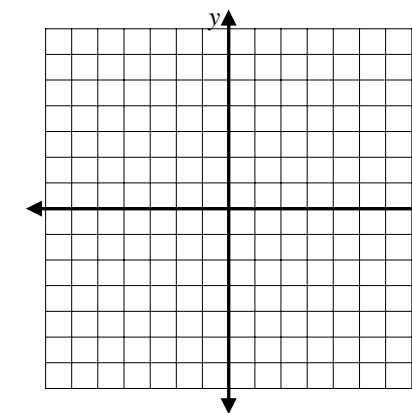
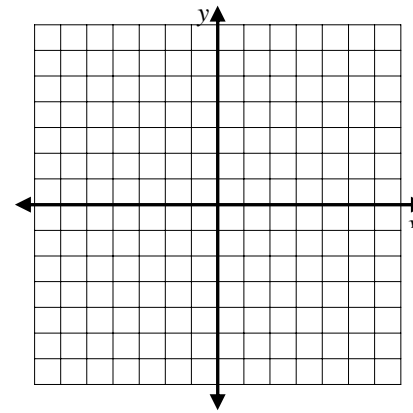


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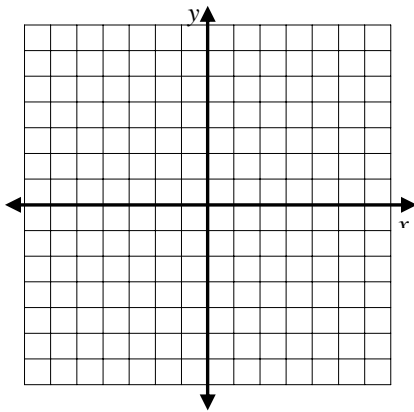
g)  $y = x^2 - 4$

h)  $y = x^2 + 4x + 3$

i)  $y = \sin x$

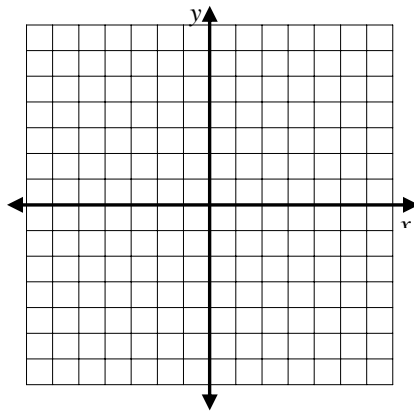


j)  $y = \sqrt{x-2}$



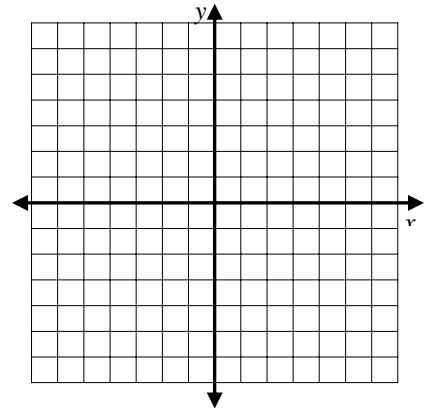
D:  
R:

k)  $y = \sqrt{4-x^2}$



D:  
R:

l)  $y = |x+3| - 2$

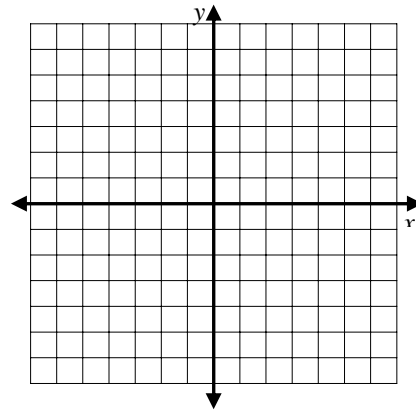


D:  
R:

11) Identify the vertical and horizontal asymptotes in the graph of  $y = \frac{3x^2 + 5}{x^2 - 4}$ .

12) Sketch a graph of the piecewise function:

$$f(x) = \begin{cases} x^2 - 5, & x < -1 \\ 0, & x = -1 \\ 3 - 2x, & x > -1 \end{cases}$$



13) Determine all points of intersection (using algebra):

a) parabola  $y = x^2 + 3x - 4$  and the line  $y = 5x + 11$

b)  $y = \cos x$  and  $y = \sin x$  in the first quadrant

14) Solve for  $x$ , where  $x$  is a real number (remember – no calculator!).

a)  $x^2 + 3x - 4 = 14$

f)  $|x - 3| < 7$

b)  $2x^2 + 5x = 3$

g)  $3\sqrt{x-2} - 8 = 8$

c)  $(x-5)^2 = 9$

h)  $12x^2 = 3x$

d)  $(x+3)(x-3) > 0$

i)  $27^{2x} = 9^{x-3}$

e)  $\log x + \log(x-3) = 1$

j)  $4e^{2x} = 12$

15) Eliminate the parameter and write the rectangular equation for:  $\begin{cases} x = t^2 + 3 \\ y = 2t \end{cases}$

16) Expand and simplify:

a)  $\sum_{n=2}^5 3n - 6$

b)  $\sum_{n=0}^4 \frac{(n+1)^2}{n!}$

17) Given the vectors  $\vec{v} = -2i + 5j$  and  $\vec{w} = 3i + 4j$ , determine:

a)  $\frac{1}{2}\vec{v}$

b)  $\vec{w} - \vec{v}$

c)  $|\vec{w}|$

d) magnitude of  $\vec{v}$

e)  $\vec{w} \cdot \vec{v}$

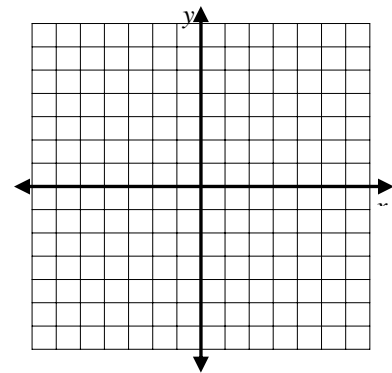
18) Rectangular-Polar conversions:

a) Convert (1,4) to polar coordinates.

b) Convert  $(2, \pi/6)$  to rectangular coordinates.

19) Graph the following parametric equations for  $0 \leq t \leq 3$ :

$$\begin{cases} x = 2t - 1 \\ y = 3t - 5 \end{cases}$$



20) Complete the following identities:

a)  $\sin^2 x + \cos^2 x =$

c)  $\cot^2 x + 1 =$

e)  $\cos 2x =$

b)  $1 + \tan^2 x =$

d)  $\sin 2x =$