

CALCULUS SUMMER WORKSHEET

NOTE: EVERY CALCULUS STUDENT MUST PROVIDE THEIR OWN TI-83 PLUS OR TI-84 GRAPHING CALCULATOR. This assignment (to be done at your leisure over the summer and due on the first day of class) is designed to help you become comfortable with your graphing calculator. You will need to read your calculator's manual to understand how it works. It is important that you gain these skills over the summer so that when school starts we can spend our time talking about calculus rather than how to use the calculator.

Graph the parent function of each set of equations using your calculator. Draw a quick sketch on paper of each of the additional equations in the family. Check the accuracy of each sketch with the graphing calculator.

1) Parent Function: $y = x^2$

a) $y = x^2 - 5$

b) $y = x^2 + 3$

c) $y = (x - 10)^2$

d) $y = (x + 8)^2$

e) $y = 4x^2$

f) $y = .25x^2$

g) $y = -x^2$

h) $y = -(x + 3)^2 + 6$

i) $y = (x + 4)^2 - 8$

j) $y = -2(x + 1)^2 + 4$

k) $y = 1/3(x - 6)^2 - 6$

l) $y = -3(x + 2)^2 - 2$

2) Parent Function: $y = \sin(x)$ (set mode to RADIANS)

a) $y = \sin(2x)$

b) $y = \sin(x) - 2$

c) $y = 2\sin(x)$

d) $y = 2\sin(2x) + 2$

3) Parent Function: $y = \cos(x)$

a) $y = \cos(3x)$

b) $y = \cos(x/2)$

c) $y = 2\cos(x) + 2$

d) $y = -2\cos(x) - 1$

4) Parent Function: $y = x^3$

a) $y = x^3 + 2$

b) $y = -x^3$

c) $y = x^3 - 5$

d) $y = -x^3 + 3$

e) $y = (x - 4)^3$

f) $y = (x - 1)^3 - 4$

g) $y = -2(x + 2)^3 + 1$

h) $y = x^3 + x$

5) Parent Function: $y = \sqrt[3]{x}$

a) $y = \sqrt[3]{x} - 2$

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

c) $y = \sqrt[3]{x} + 5$

d) $y = \sqrt[3]{6 - x}$

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

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

g) $y = \sqrt[3]{x + 2}$

h) $y = \sqrt[3]{2x - 6}$

i) $y = -2\sqrt[3]{x}$

j) $y = -\sqrt[3]{4 - x}$

6) Parent Function: $y = \ln(x)$

a) $y = \ln(x + 3)$

b) $y = \ln(x) + 3$

c) $y = \ln(x - 2)$

d) $y = \ln(-x)$

e) $y = -\ln(x)$

f) $y = \ln(|x|)$

g) $y = \ln(2x) - 4$

h) $y = -3\ln(x) + 1$

7) Parent Function: $y = e^x$

a) $y = e^{2x}$

b) $y = e^{x-2}$

c) $y = e^{2-x}$

d) $y = e^{2x} + 3$

e) $y = -e^x$

f) $y = e^{-x}$

g) $y = 2 - e^x$

h) $y = e^{0.5x}$

8) Parent Function: $y = a^x$

a) $y = 5^x$

b) $y = 2^x$

c) $y = 3^{-x}$

d) $(1/2)^x$

e) $y = 4^{x-3}$

f) $y = 2^{x-3} + 2$

9) Parent Function: $y = 1/x$

a) $y = 1/(x - 2)$

b) $y = -1/x$

c) $y = 1/(x + 4)$

d) $y = 2/(5 - x)$

10) Parent Function: $y = [x]$

Note: $[x]$ is the IntegerPart of x . On the TI 83/84 it is found in the MATH menu, NUM submenu.

a) $y = [x] + 2$

b) $y = [x - 3]$

c) $y = [3x]$

d) $y = [0.25x]$

e) $y = 3 - [x]$

f) $y = 2[x] - 1$

11) Resize your viewing window to $[0, 1]$ by $[0, 1]$. Graph all of the following functions in the same window. List the functions from the highest graph to the lowest graph. How do they compare for values of $x > 1$?

a) $y = x^2$

b) $y = x^3$

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

d) $y = x^{2/3}$

e) $y = |x|$

f) $y = x^4$

Note: $|x|$ is the absolute value of x . It is found in the MATH menu, NUM submenu.

12) Given: $f(x) = x^4 - 3x^3 + 2x^2 - 7x - 11$
Find all roots to the nearest 0.001

13) Given: $f(x) = 3\sin(2x) - 4x + 1$ from $[-2\pi, 2\pi]$
Find all roots to the nearest 0.001 *Note: all trig functions are done in radian mode.*

14) Given: $f(x) = 0.7x^2 + 3.2x + 1.5$
Find all roots to the nearest 0.001

15) Given: $f(x) = x^4 - 8x^2 + 5$
Find all roots to the nearest 0.001

16) Given: $f(x) = x^3 + 3x^2 - 10x - 1$
Find all roots to the nearest 0.001

17) Given: $f(x) = 100x^3 - 203x^2 + 103x - 1$
Find all roots to the nearest 0.001

18) Given: $f(x) = |x - 3| + |x| - 6$
Find all roots to the nearest 0.001

19) Given: $f(x) = |x| - |x - 6| = 0$

Find all roots to the nearest 0.001
Solve the following inequalities

20) $x^2 - x - 6 > 0$

21) $x^2 - 2x - 5 \geq 3$

22) $x^3 - 4x < 0$

For each of problems 23 - 26

- a) Sketch the graph of $f(x)$
- b) Sketch the graph of $|f(x)|$
- c) Sketch the graph of $f(|x|)$
- d) Sketch the graph of $f(2x)$
- e) Sketch the graph of $2f(x)$

23) $f(x) = 2x + 3$

24) $f(x) = x^2 - 5x - 3$

25) $f(x) = 2\sin(3x)$

26) $f(x) = -x^3 - 2x^2 + 3x - 4$

27) Let $f(x) = \sin(x)$
Let $g(x) = \cos(x)$

- a) Sketch the graph of f^2
- b) Sketch the graph of g^2
- c) Sketch the graph of $f^2 + g^2$

28) Given: $f(x) = 3x + 2$
 $g(x) = -4x - 2$
Find the point of intersection

29) Given: $f(x) = x^2 - 5x + 2$
 $g(x) = 3 - 2x$

Find the coordinates of any points of intersection

30) How many times does the graph of $y = 0.1x$ intersect the graph of $y = \sin(2x)$?

31) Given: $f(x) = x^4 - 7x^3 + 6x^2 + 8x + 9$

a) Determine the x- and y-coordinates of the lowest point on the graph.

b) Size the x-window from $[-10, 10]$. Find the highest and lowest values of $f(x)$ over the interval $-10 \leq x \leq 10$.