

Name \_\_\_\_\_

Date \_\_\_\_\_

Advanced Algebra

Unit 2: Family of functions

Assignment #19 Unfamiliar functions #1

1)  $f(x) = 8x^4 + 4x^3 - 3x^2$

- a) Factor this function by dividing out the  $x^2$ .

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

$$x^2 = 0 \quad 8x^2 + 4x - 3 = 0$$

- b) Use your factored equation from above to find the x intercepts of this function. You should be able to use the quadratic formula.  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$\frac{-4 \pm \sqrt{16 - 4(8)(-3)}}{16}$$

$$\frac{-4 \pm \sqrt{112}}{16}$$

$$\frac{-4 \pm 10.6}{16}$$

Final x intercepts

$$0 / .4125 / -.9125$$

- c) Find the y intercept of this function by substituting Zero in for x.

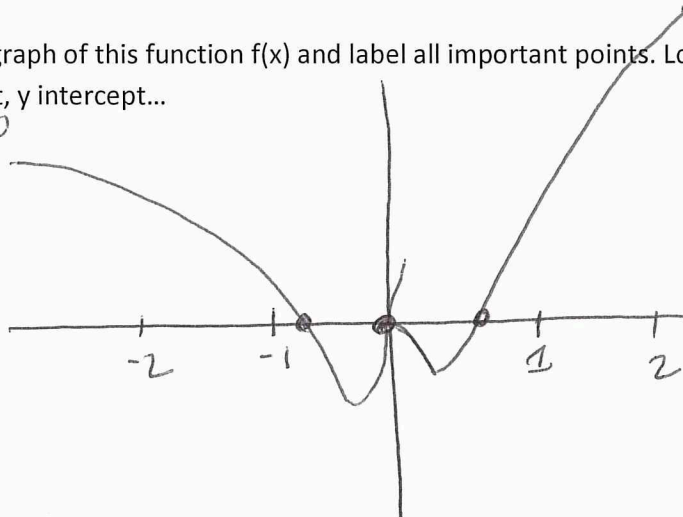
Final y intercept

$$0$$

- d) Make a graph of this function  $f(x)$  and label all important points. Local Max, Local Min, x intercept, y intercept...

$$\text{VARs}(-20) = 1,246,800$$

$$\text{VARs}(20) = 1,310,000$$



2) Given  $f(x) = \frac{(4x-2)(x+6)}{x^3}$

a) What are the x intercepts of this function?

$4x-2=0$        $x+6=0$

X intercept(s)  
 $\frac{1}{2}$  and  $-6$

b) What is the y intercept of this function?

ERROR CAN'T divide by 0

Y intercept  
 none

c) What is the vertical asymptote

Vertical Asymptote  
 $x=0$

d) Sketch this information from a, b and c on a graph below. **Just include the information from above.** (4marks)

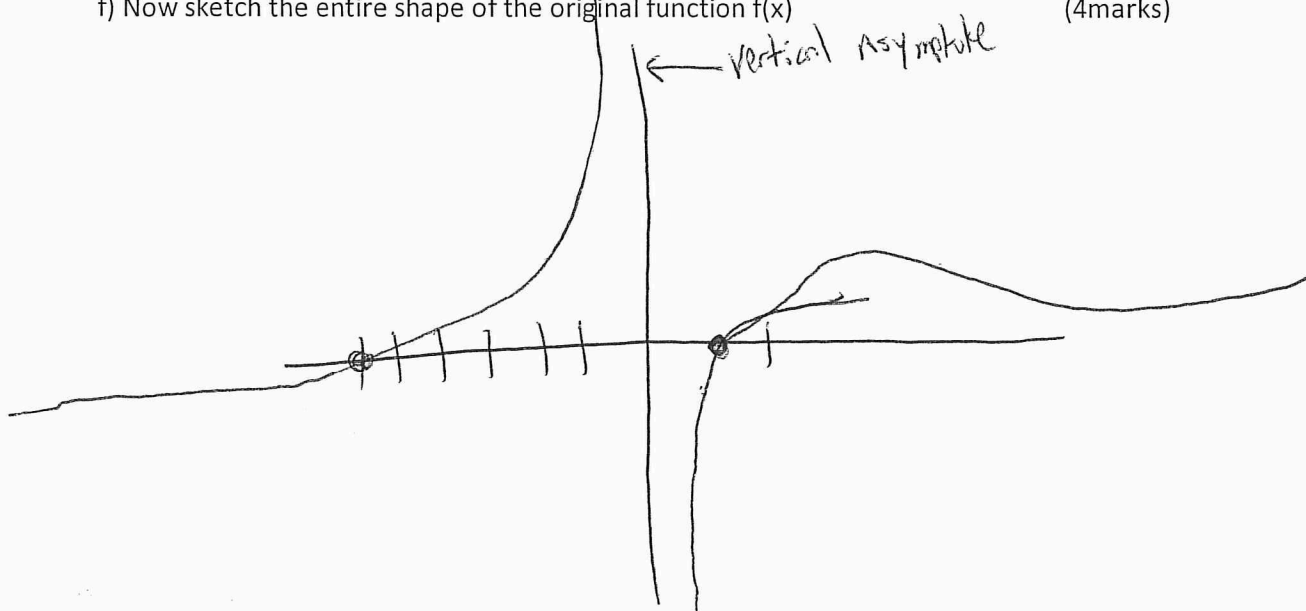
horizontal asymptote  $y=0$

e) Use the vars button to test at least 6 important points. Show what values you tested.

X value test 1  $\text{VARs}(0.2) = -930$   
 X value test 3  $\text{VARs}(20) = .0535$   
 X value test 5  $\text{VARs}(100) = .042188$

(6mark)  
 x value test 2  $\text{VARs}(-.5) = 176$   
 x value test 4 \_\_\_\_\_  
 x value test 6  $\text{VARs}(-6.01) = -.0011$

f) Now sketch the entire shape of the original function  $f(x)$  (4marks)



# 2<sup>nd</sup> High Challenge

3) I can show where the parabola and line intersect by hand

I can find Intersection

Given  $x^2 - 8x - 4$  and the line  $x + 2$

a) Sketch the parabola and the line that intersects this parabola. (2marks)

$\frac{8}{2} = 4$      $\text{VARS } 4 = (4, -20)$

b) Show by using the quadratic formula and by setting the equations equal to each other the intersection of the two graphs. (3marks)

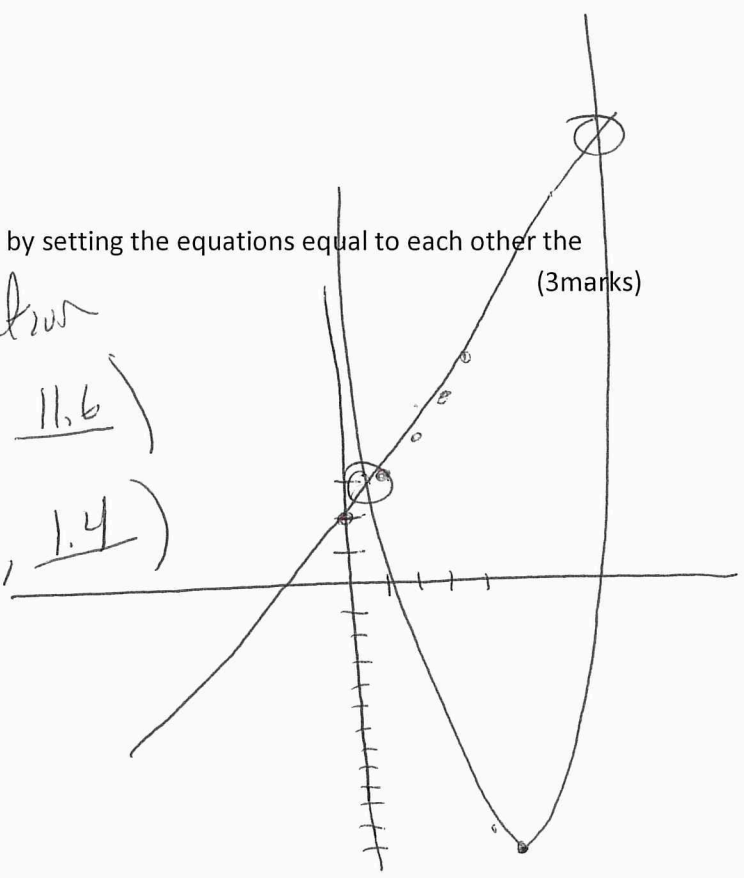
$$x^2 - 8x - 4 = x + 2$$

$$x^2 - 9x - 6 = 0$$

$$x = \frac{9 \pm \sqrt{81 - 4(1)(-6)}}{2}$$

$$\frac{9 \pm 10.2}{2} \begin{cases} 9.6 \\ -1.6 \end{cases}$$

Intersection  
 $(9.6, 11.6)$   
 $(-1.6, 1.4)$



c) Hence, what are the 2 x values where the line intersects the parabola (2marks)