

MHF 4U Quiz 2.1-2.4

$\frac{20+2}{22} = \frac{22}{22}$

Name \_\_\_\_\_

1. Given  $f(x) = \frac{2x}{5x+3}$  find: [3]

- a) vertical asymptote(s):  $x = -\frac{3}{5}$
- c) hole:  $\emptyset$
- e) y-intercept:  $0$

- b) horizontal asymptote:  $y = \frac{2}{5}$
- d) x-intercept(s):  $0$
- f) oblique asymptote:  $\emptyset$

2. Given  $h(x) = \frac{3x^2-2}{x-1}$  find: [3]

- a) vertical asymptote(s):  $x=1$
- c) hole:  $\emptyset$
- e) y-intercept:  $2$

$$\begin{array}{r} 3 \ 0 \ -2 \\ 3 \ 3 \\ \hline 3 \ 3 \ 1 \end{array}$$

- b) horizontal asymptote:  $\emptyset$
- d) x-intercept(s):  $\pm \sqrt{2/3}$
- f) oblique asymptote:  $y = 3x + 3$

3. Divide the following polynomial [3]  
 $(x^4 - 3x^3 - x^2 + 6x - 2) \div (x^2 - 3x + 1)$

$$\begin{array}{r} x^2 - 2 \\ x^2 - 3x + 1 \overline{) x^4 - 3x^3 - x^2 + 6x - 2} \\ \underline{-(x^4 - 3x^3 + x^2)} \phantom{- 2} \\ -2x^2 + 6x - 2 \\ \underline{-(-2x^2 + 6x - 2)} \\ 0 \end{array}$$

$\therefore x^4 - 3x^3 - x^2 + 6x - 2 = (x^2 - 3x + 1)(x^2 - 2)$

4. Factor fully [3,2]

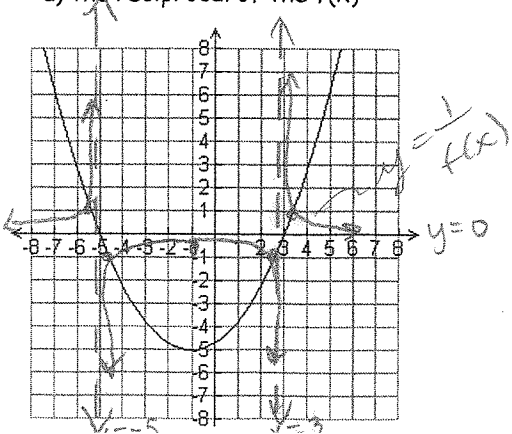
a)  $x^3 + 2x^2 - 5x - 6$   
 $f(-1) = 0$   
 $\therefore (x+1)$  is a factor  
 $= (x+1)(x^2 + x - 6)$   
 $= (x+1)(x+3)(x-2)$

$$\begin{array}{r} 1 \ 2 \ -5 \ -6 \\ -1 \ \underline{1 \ 1 \ -6} \\ 1 \ 1 \ -6 \ 0 \end{array}$$

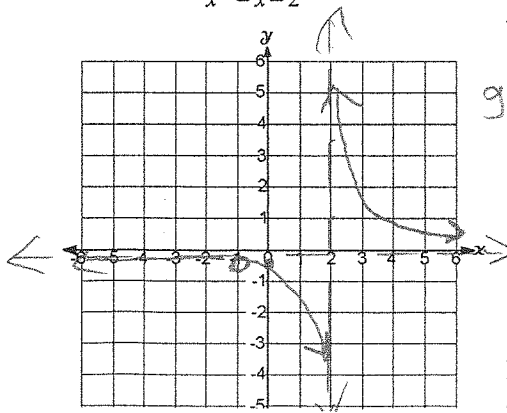
b)  $\frac{8x^3}{125} - 1$   
 $= (\frac{2x}{5} - 1)(\frac{4x^2}{25} + \frac{2x}{5} + 1)$

5. Sketch the graph for the following function. Show all steps for b). [2,4]

a) the reciprocal of the f(x)



b)  $g(x) = \frac{x+1}{x^2-x-2}$



$g(x) = \frac{x+1}{(x+1)(x-2)}$  hole at  $(-1, \frac{1}{3})$   
 $= \frac{1}{x-2}$   
 $g(-1) = \frac{1}{-1-2} = -\frac{1}{3}$   
 VA  $x=2$   
 HA  $y=0$   
 $x$ -int:  $-1$  ← hole  
 $y$ -int:  $-\frac{1}{2}$   
 $x \rightarrow 2^+ \quad x \rightarrow 2^-$   
 $y \rightarrow +\infty \quad y \rightarrow -\infty$