

# Quiz 8

## Solutions

### Problem 1

$$\lim_{x \rightarrow \infty} \frac{2 - x^2 + 3x + 5x^3}{4x^3 + 6x - 3x^2 + 7} = \lim_{x \rightarrow \infty} \frac{5x^3}{4x^3} = \lim_{x \rightarrow \infty} \frac{5}{4} = \boxed{\frac{5}{4}}$$

### Problem 2

$$f(x) = \frac{x^3 + 3x + 7}{x^2 - 3}$$

Horizontal Asymptote: None  $\forall c \lim_{x \rightarrow \pm\infty} \frac{x^3 + 3x + 7}{x^2 - 3} = \pm\infty$

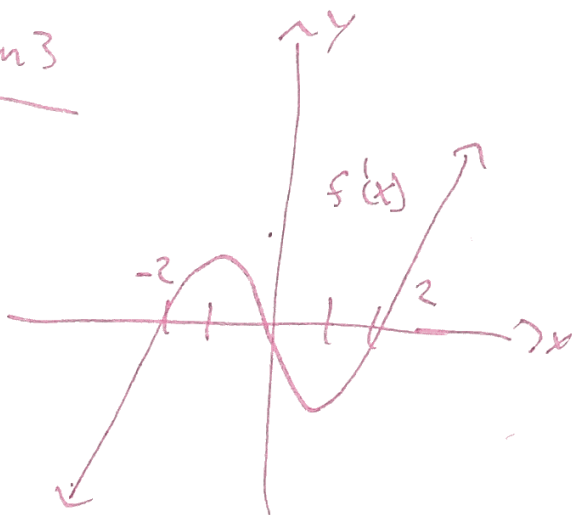
Slant Asymptote:  $y = x$

$$\begin{array}{r} x^2 - 3 \overline{) x^3 + 3x + 7} \quad \leftarrow \text{S.A.} \\ \underline{-(x^3 - 3x)} \phantom{+ 7} \\ 6x + 7 \quad \leftarrow \text{Remainder} \end{array}$$

Quotient

long division stops when the divisor is a lower degree than the quotient

### Problem 3



C.N. of  $f(x)$  are  $x = -2, x = 0, x = 2$

increasing interval  $f'(x) > 0$   
 $(-2, 0) \cup (2, \infty)$

Decreasing interval  
 $(-\infty, 0) \cup (0, 2)$