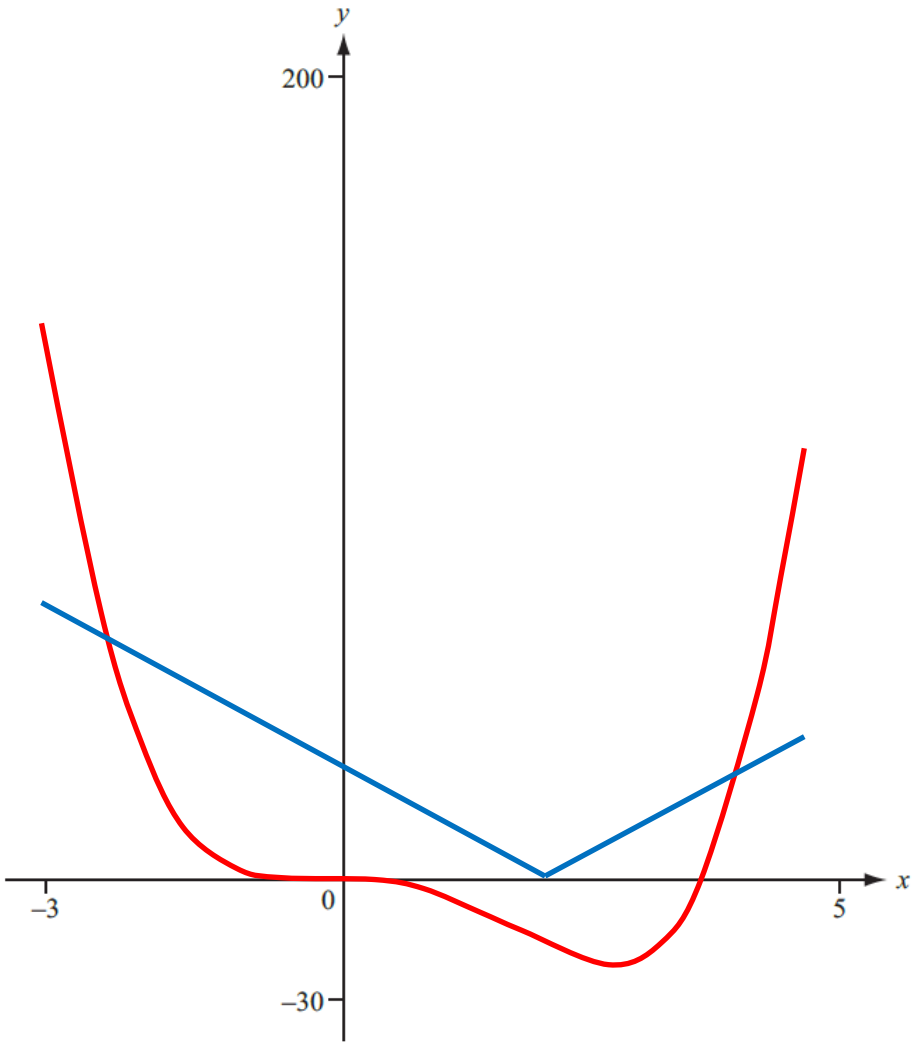
AA2.32 – Sketching graphs of functions

Student name: _____ Score: _____

1.



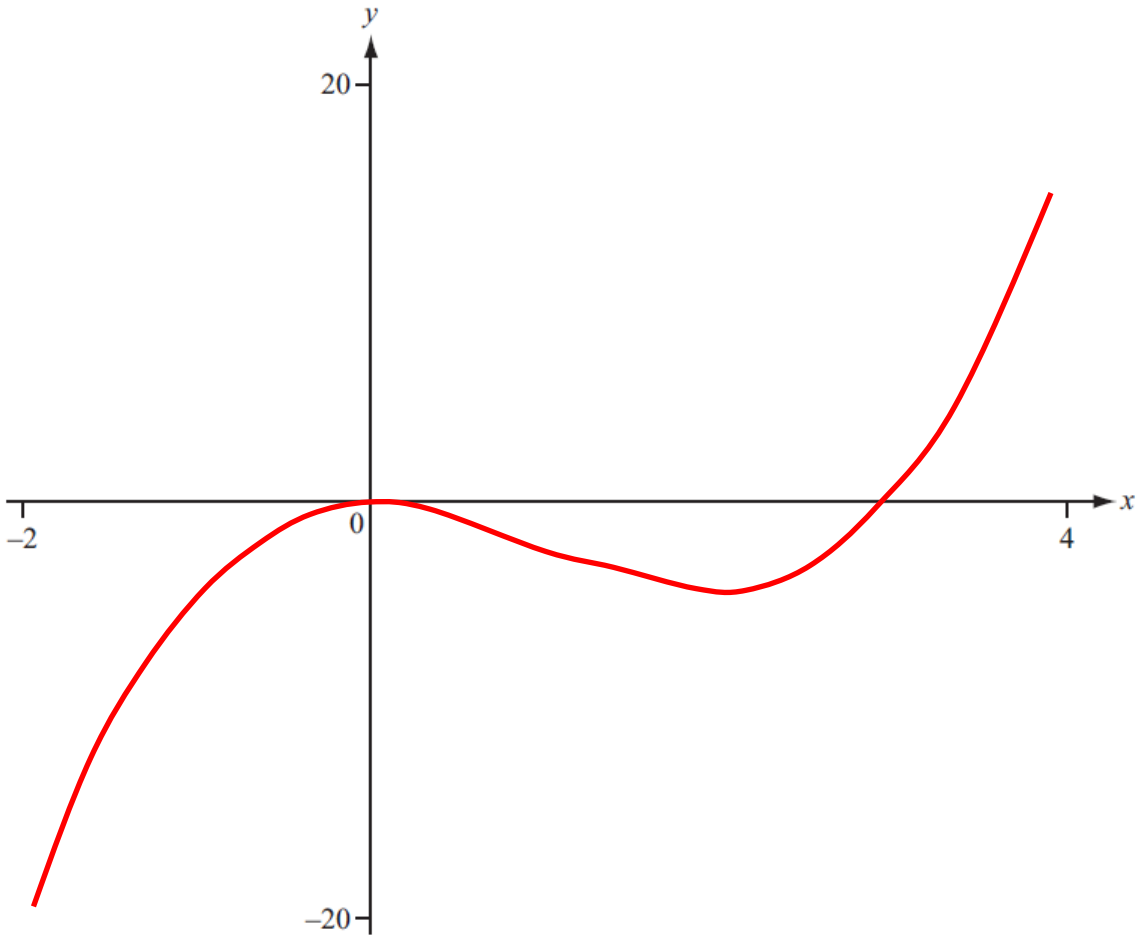
(a) For $-3 \le x \le 5$, sketch the following graph on the diagram above.

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

(b) Find the coordinates of the local minimum point on the graph of $f(x) = x^4 - 4x^3$

Answer (b) (3, –27)

2.



(a) On the axes, sketch the graph of $f(x) = x^3 - 3x^2$

(b) Write down the zeros of $f(x) = x^4 - 4x^3$

Answer (b) $x =$ ..0....., $x =$ ...3.....

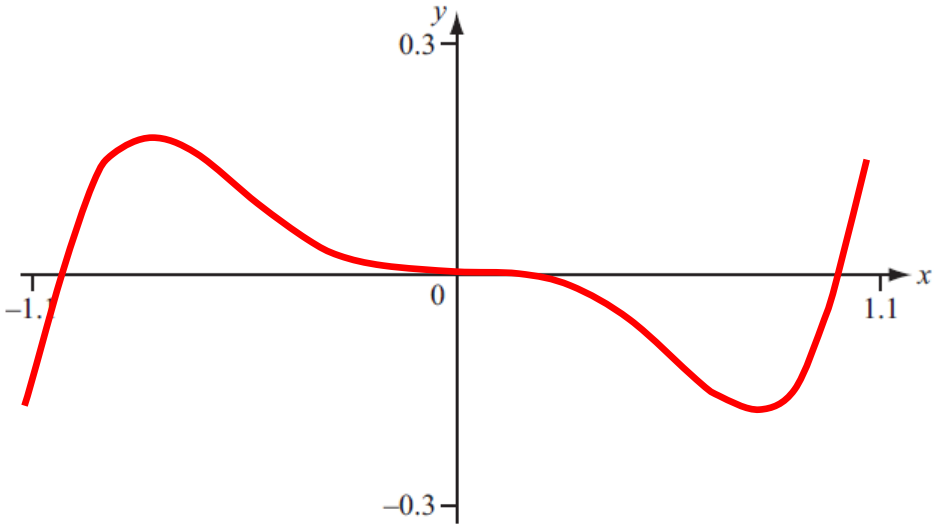
(c) Write down the coordinates of any local maximum or local minimum points.

Answer (c) (0, 0) or (2, -4)

3.

$$g(x) = x^5 - x^3$$

(a) Sketch the graph of $y = g(x)$ for $-1.1 \leq x \leq 1.1$



(b) Write down the zeros of $g(x)$.

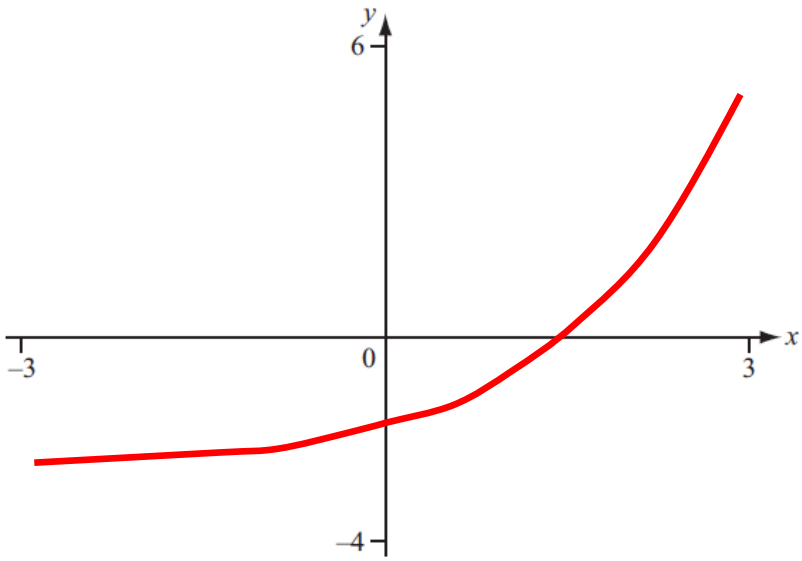
Answer (b) $x =$ ……-1……, $x =$ ……0……, $x =$ ……0……,

(c) Find the coordinates of the local minimum point.

Answer (c) (……0.775……, ……-0.186……)

4. $h(x) = 2^x - 3$

(a) Sketch the graph of $y = h(x)$ for $-3 \leq x \leq 3$.



(b) Write down the equation of the asymptote of the graph $y = h(x)$.

Answer (b) ……y = -3……

(c) Write down the range of $h(x)$ for

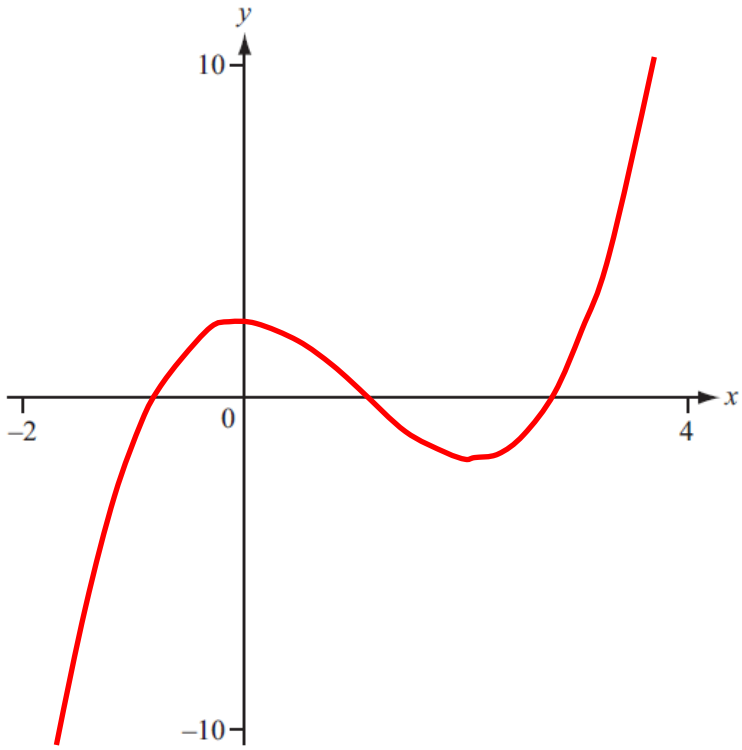
(i) $-2 \leq x \leq 2$,

Answer (c) (i) ……-2.75 ≤ f(x) ≤ 1……

(ii) $x \in \mathbb{R}$.

Answer (c) (ii) ……f(x) > -3……

5.



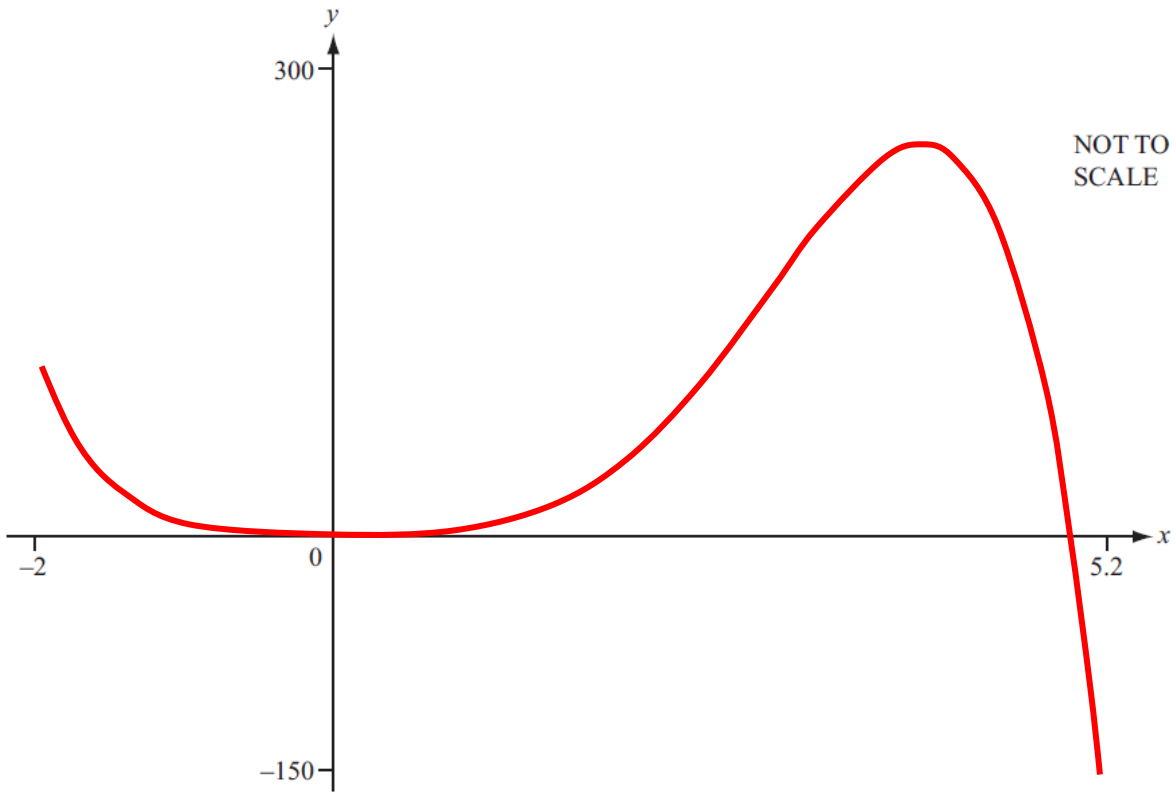
(a) On the diagram, sketch the graph of $f(x) = x^3 - 3x^2 + 2$ for $-2 \leq x \leq 4$.

(b) Find the coordinates of the local maximum and local minimum points.

Answer (b): Local maximum (0 ……., 2 ……..)

Local minimum (2 ……., -2 ……..)

6.



$f(x) = 5x^4 - x^5 + 2$ for $-2 \leq x \leq 5.2$

(a) On the diagram, sketch the graph of $y = f(x)$.

(b) Find the zeros of $f(x)$.

Answer (b) 0 and 5

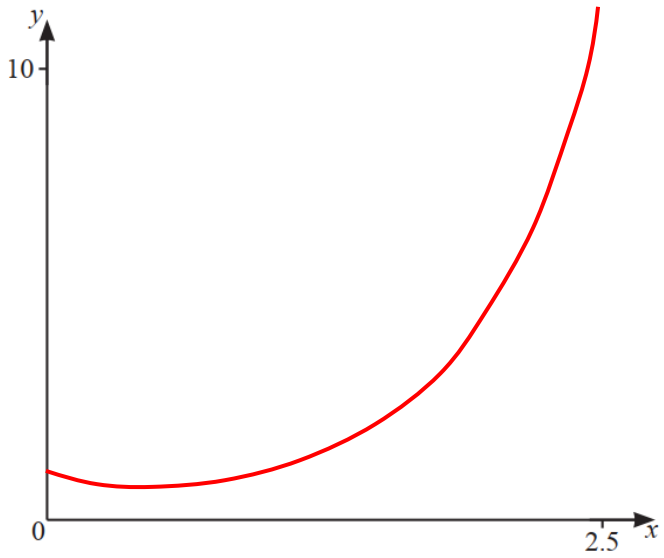
(c) Find the coordinates of the local maximum point.

Answer (c) (4 , 256)

(d) Find the range of $f(x)$.

Answer (d) $-146 \leq f(x) \leq 256$

7.



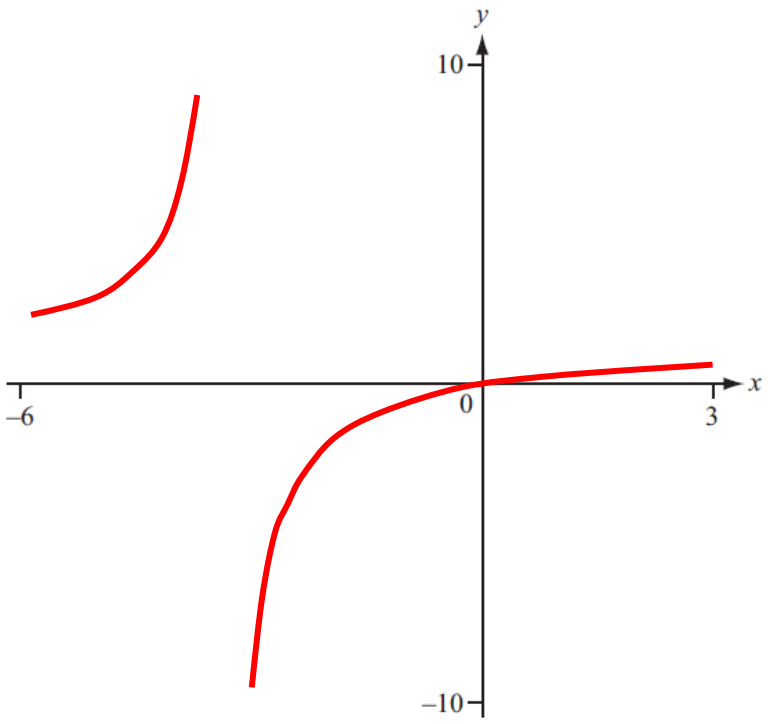
$f(x) = x^x, x > 0$

(a) On the diagram, sketch the graph of $y = f(x)$ for $0 < x \leqslant 2.5$.

(b) Find the coordinates of the local minimum point.

(0.368 , 0.692)

8.



(a) On the diagram, sketch the graph of $y = f(x)$, where

$$f(x) = \frac{(x-1)}{(x+3)} \quad \text{between } x = -6 \text{ and } x = 3.$$

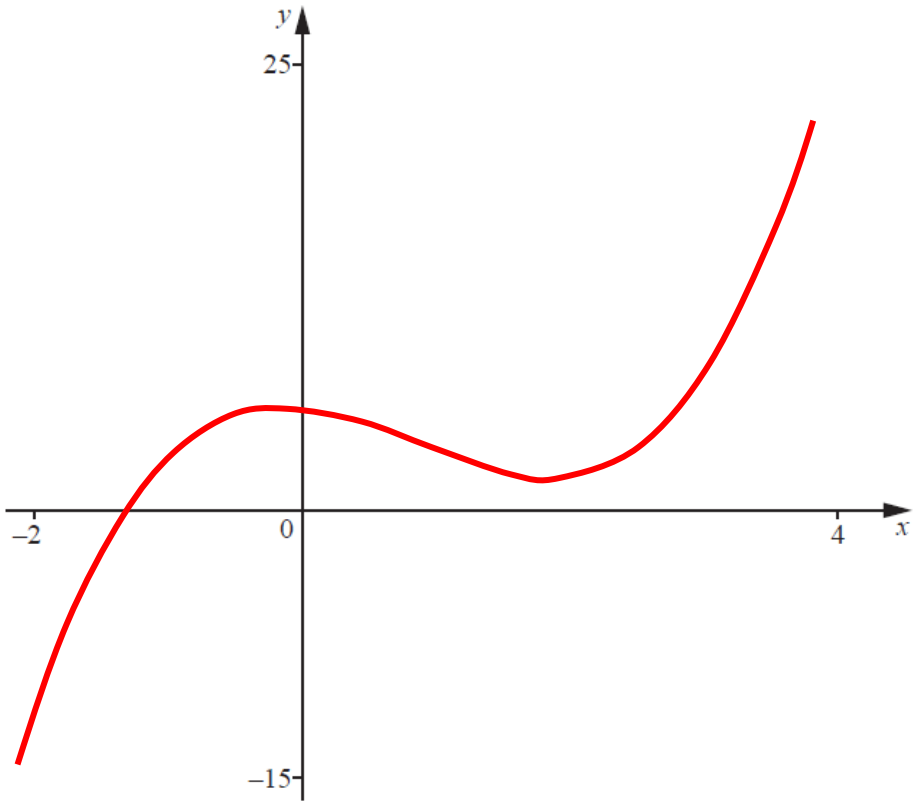
(b) Find the co-ordinates of the point where the graph crosses the x-axis.

Answer(b) (1 , 0)

(c) Find the equations of the asymptotes of $y = f(x)$.

Answer(c) $x = -3$ and $y = 1$

9.



$f(x) = x^3 - 3x^2 + 6$

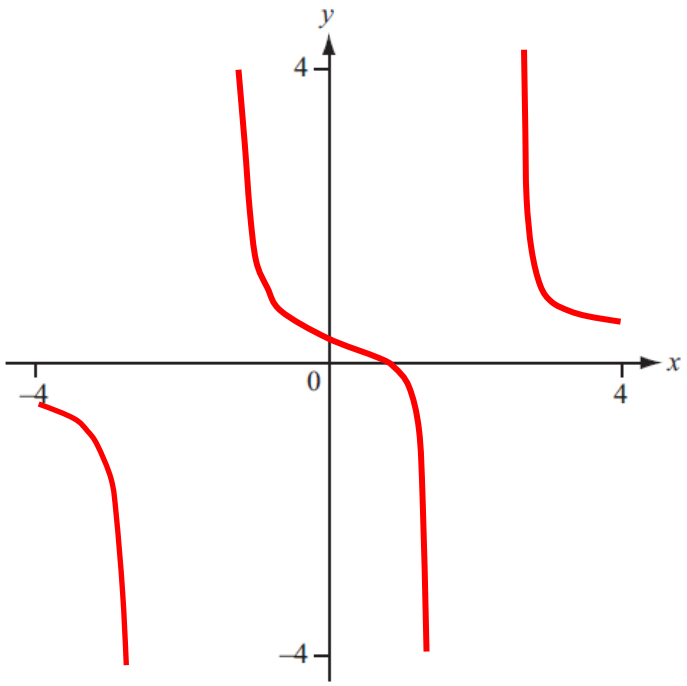
(a) On the diagram, sketch the graph of $y = f(x)$ for $-2 \leqslant x \leqslant 4$.

(b) Find the co-ordinates of the local maximum point and the local minimum point.

Answer(b) Maximum (0 , 6)

Minimum (2 , 2)

10.



(a) On the diagram, sketch the graph of $y = f(x)$, where

$$f(x) = \frac{(x-1)}{(x^2-4)} \quad \text{between } x = -4 \text{ and } x = 4 .$$

(b) Write down the equations of the three asymptotes.

Answer(b) $x = -2$

$x = 2$

$y = 0$