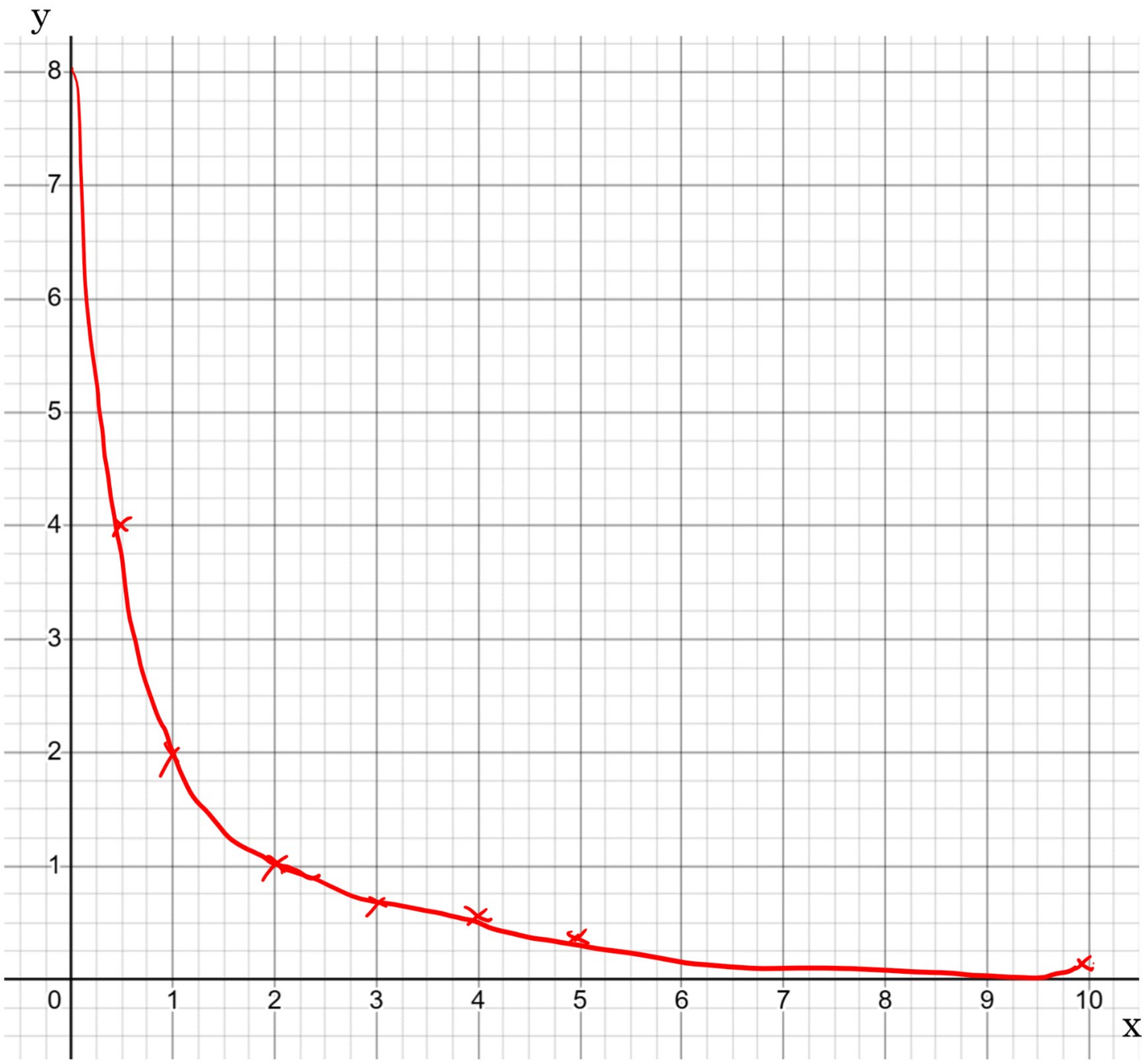
Cubic & Reciprocal Graphs Exam Practice

Q1. a) Complete the table below for $y = \frac{2}{x}$

x	0.5	1	2	3	4	5	10
y	4	2	1	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{1}{5}$

b) Sketch the graph of $y = \frac{2}{x}$ on the axes below:



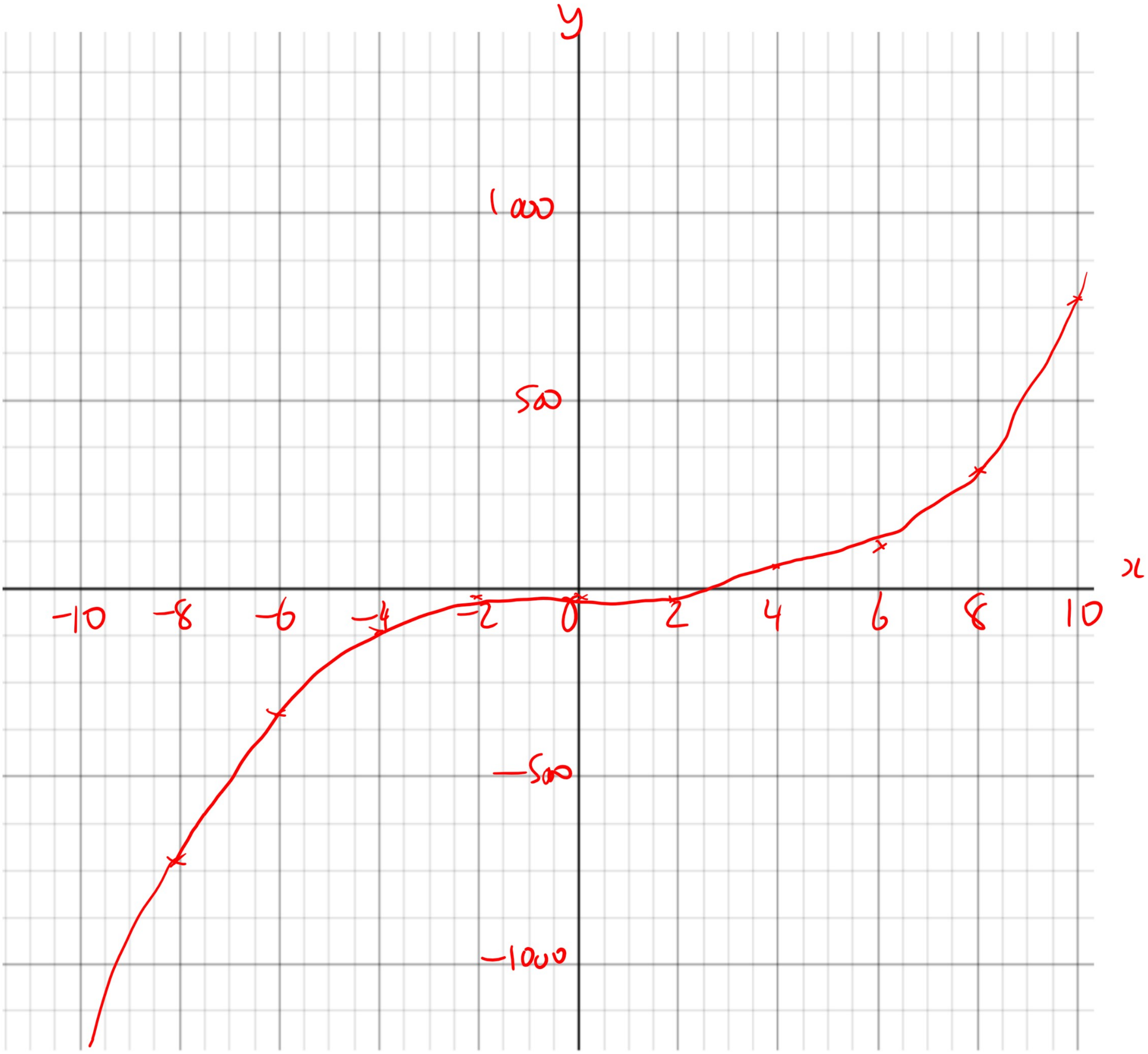
Answer: _____

(4 marks)

Q2. Complete the table for $y = x^3 - 3x^2 + x - 4$

x	-10	-8	-6	-4	-2	0	2	4	6	8	10
y	-1314	-716	-334	-120	-26	-4	-6	16	110	324	706

Sketch the graph of $y = x^3 - 3x^2 + x - 4$ below:



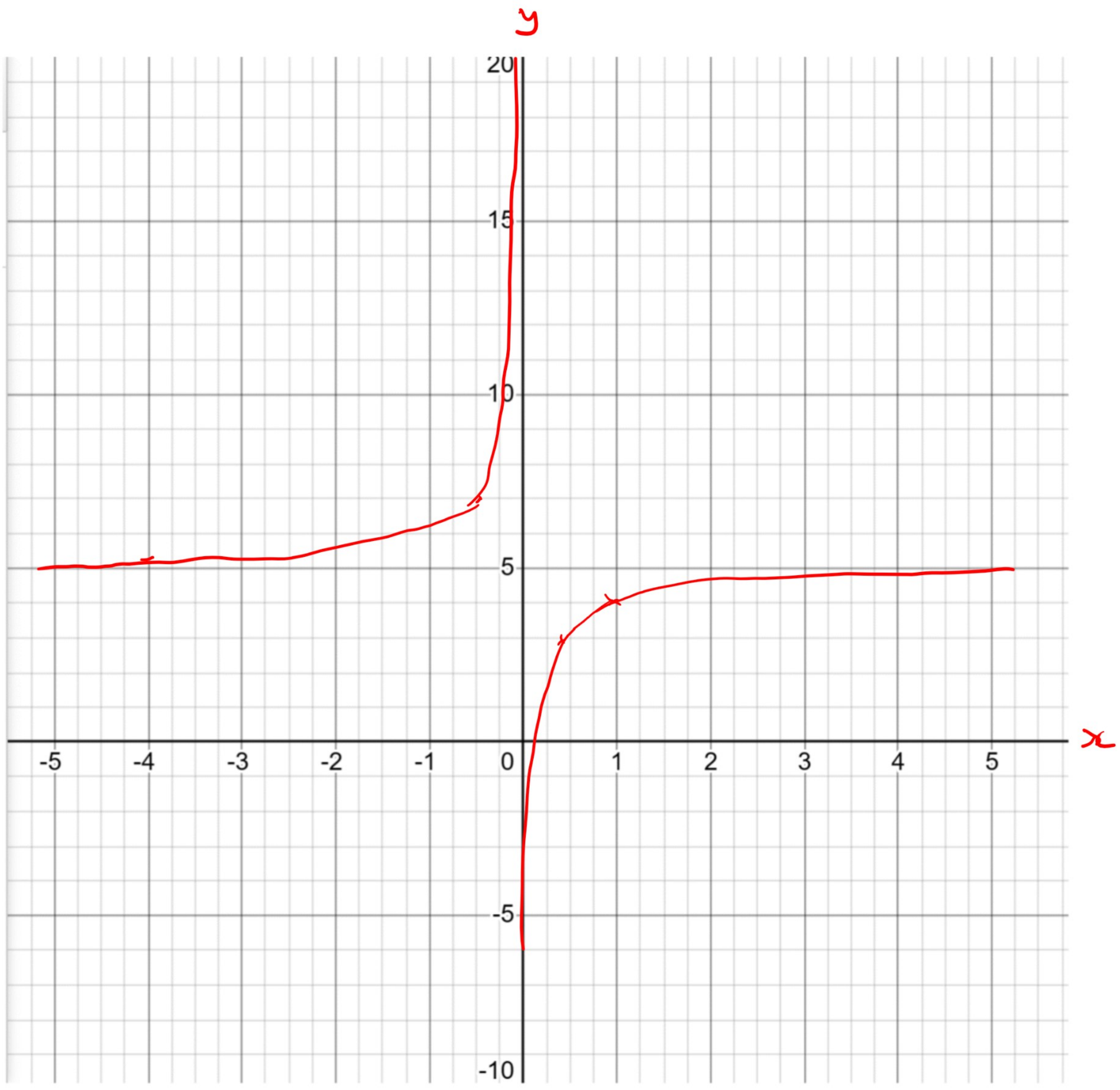
Answer: _____

(4 marks)

Q3. Complete the table below for $y = 5 - \frac{1}{x}$

x	-4	-3	-2	-1	-0.5	0.5	1	2	3	4
y	$5\frac{1}{4}$	$5\frac{1}{3}$	$5\frac{1}{2}$	$5\frac{1}{5}$	7	3	4	$4\frac{1}{2}$	$4\frac{2}{3}$	$4\frac{3}{4}$

Sketch the graph of $y = 5 - \frac{1}{x}$ on the axes below:



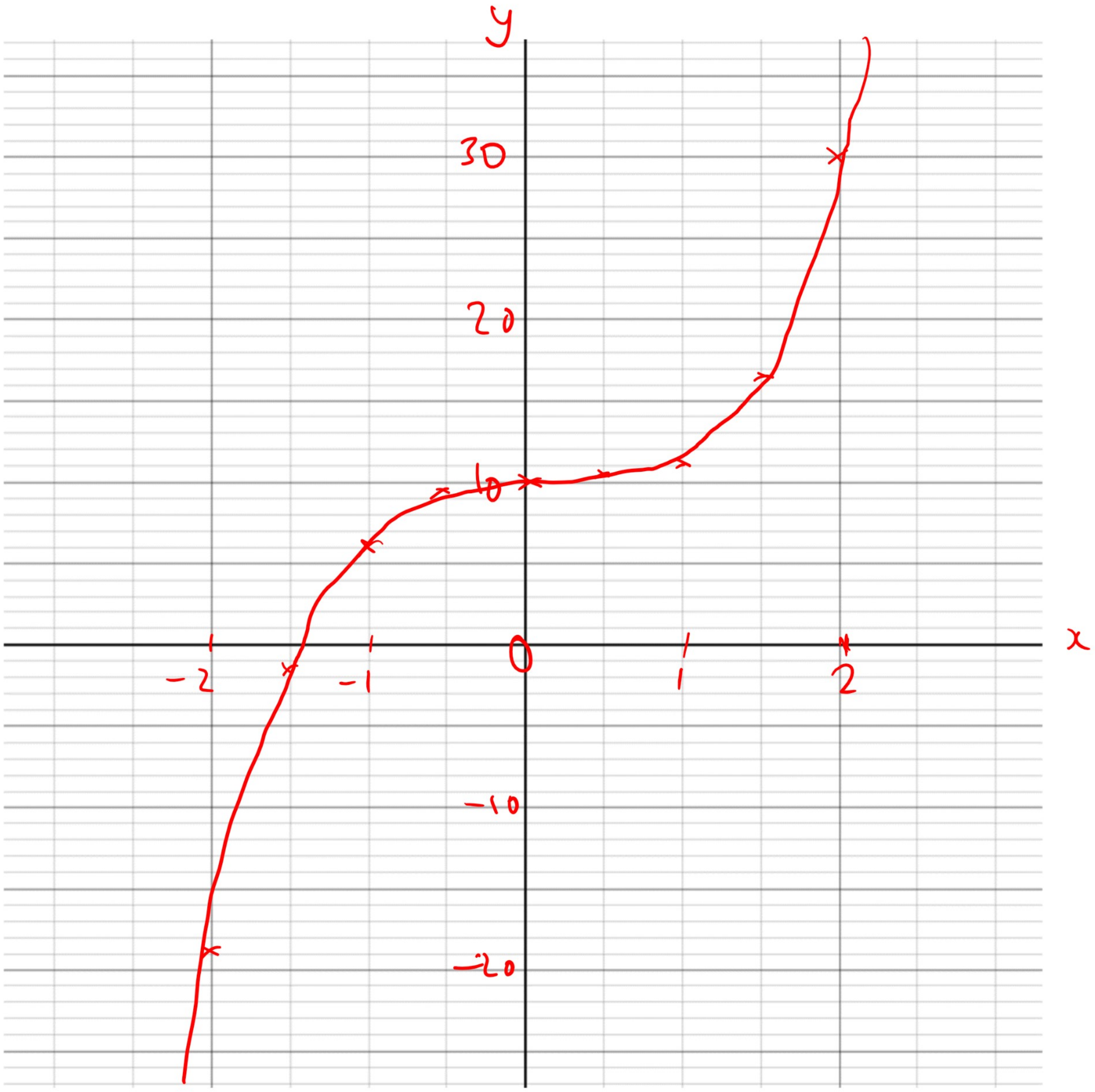
Answer: _____

(4 marks)

Q4. Complete the table for $y = 10 - x^2 + 3x^3$

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y	-18	-2.375	6	9.375	10	10.125	12	17.875	30

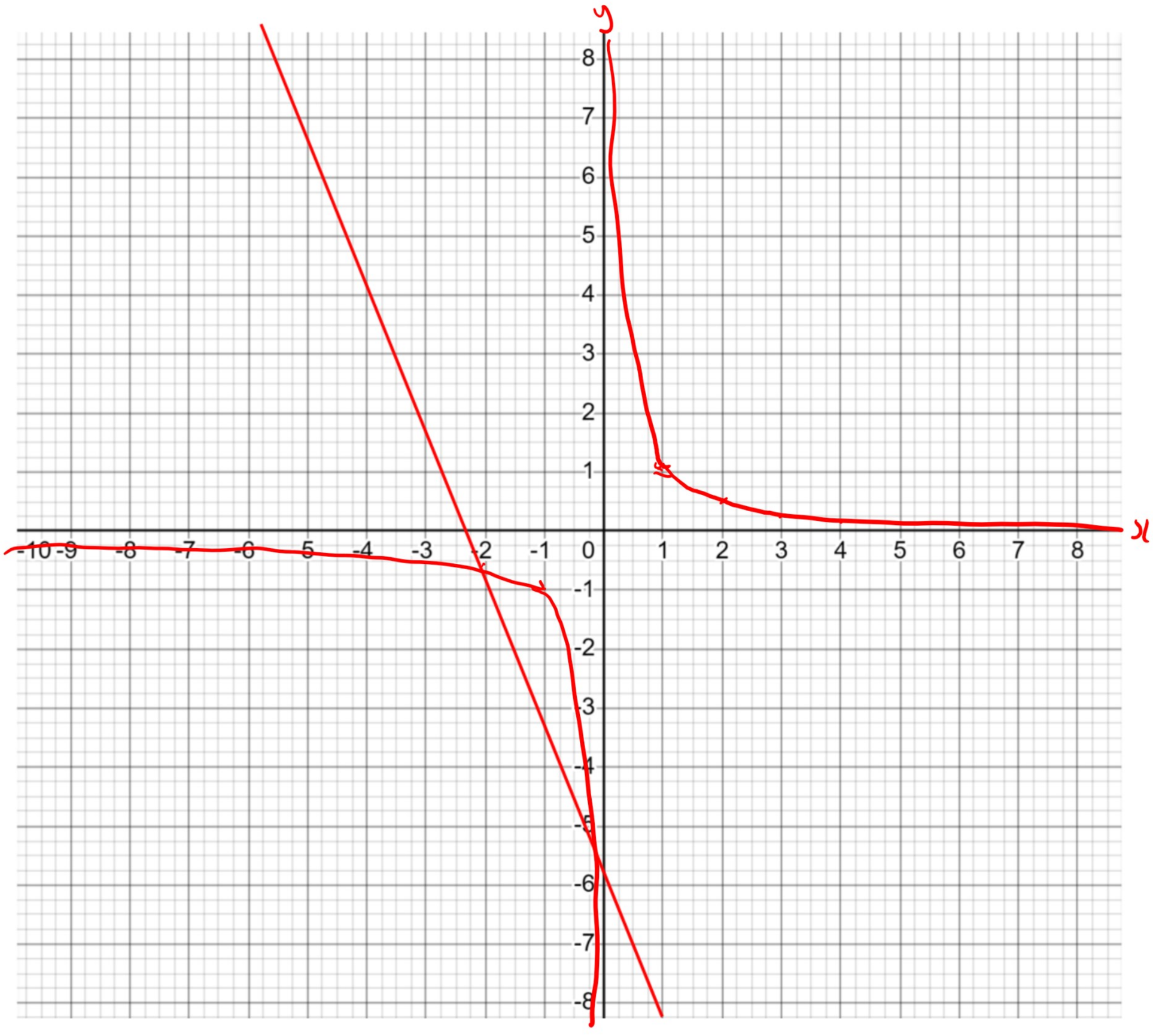
Sketch the graph of $y = 10 - x^2 + 3x^3$ on the axes below:



Answer: _____

(4 marks)

Q5. a) Sketch the graphs of $xy = 1$ and $y = -3x - 7$ on the axes below:



- $xy = 1 \Rightarrow y = \frac{1}{x}$

- $y = -3x - 7$: intercepts $(0, -7)$, $(-\frac{7}{3}, 0)$

Answer: _____

(4 marks)

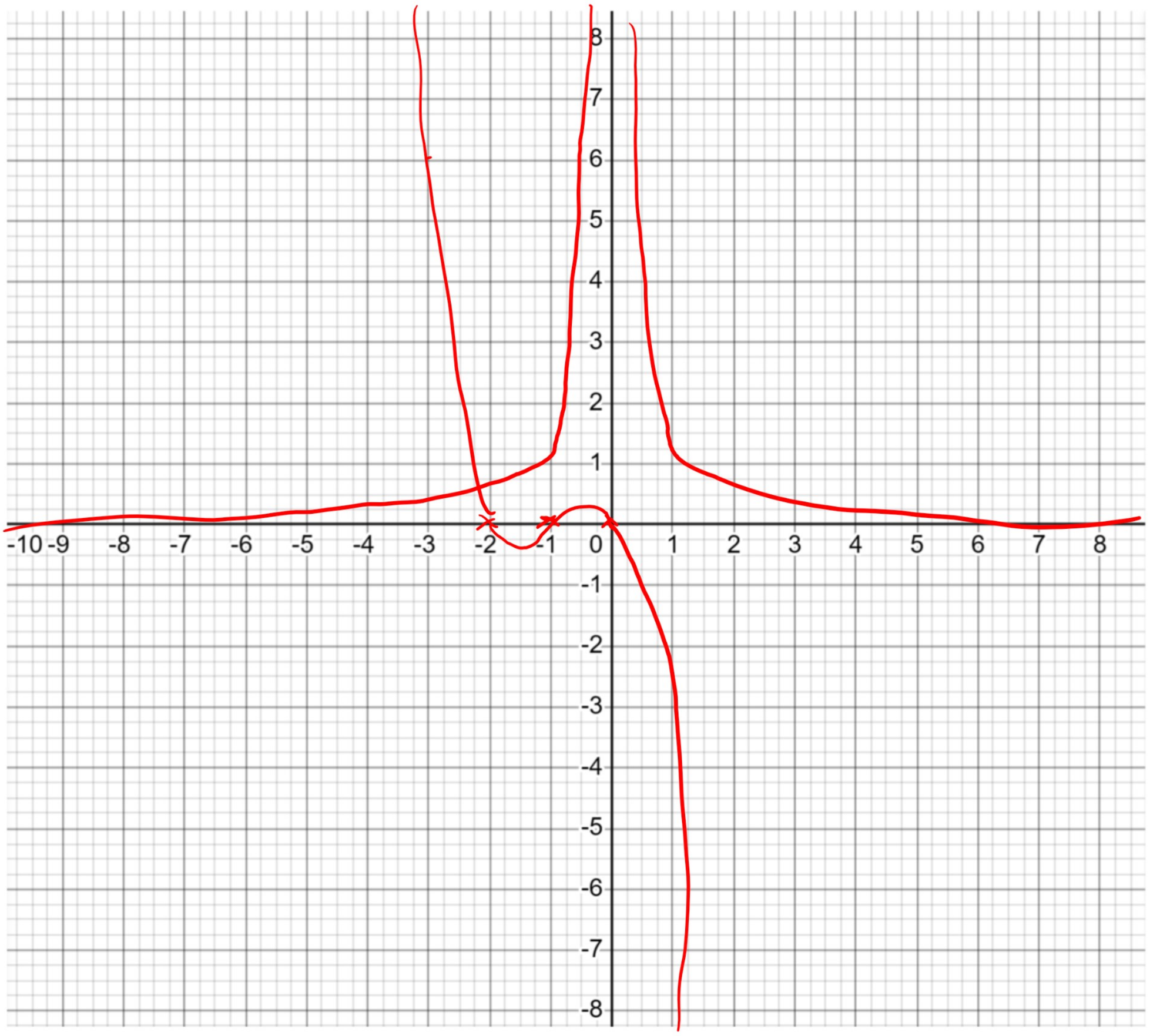
b) Hence state the number of solutions of the equation, $\frac{1}{x} + 3x + 7 = 0$

$\frac{1}{x} = -3x - 7$. The line & curve have 2 points of intersection, $\Rightarrow$ 2 solutions

Answer: 2 solutions

(1 mark)

Q6. a) Sketch the graphs of $y = -x(x+1)(x+2)$ and $y = \frac{1}{x^2}$ on the axes below:



Answer: _____

(4 marks)

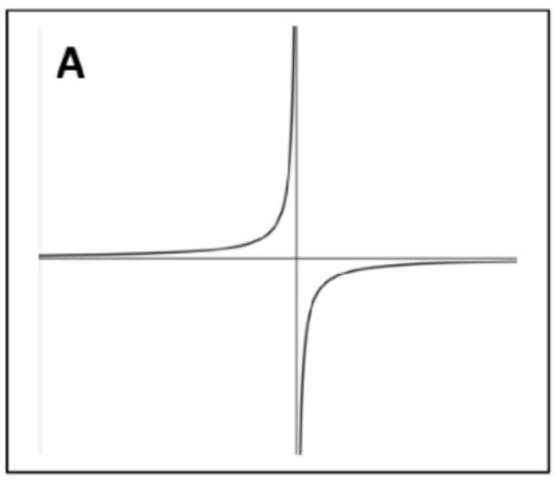
b) Hence state the number of solutions of the equation

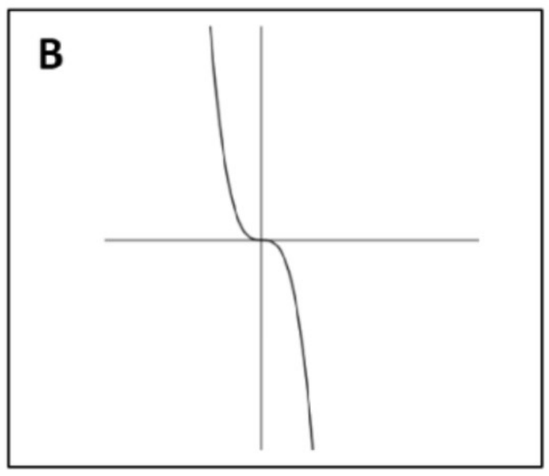
$\frac{1}{x^2} + x(x+1)(x+2) - 10 = 0$ ⇒ $\frac{1}{x^2} = -x(x+1)(x+2) + 10$

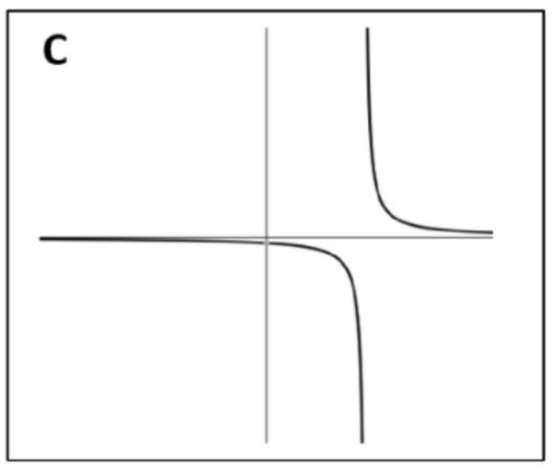
RHS is translation of graph above by $\begin{pmatrix} 0 \\ 10 \end{pmatrix}$, ⇒ 3 points of intersection of the two curves

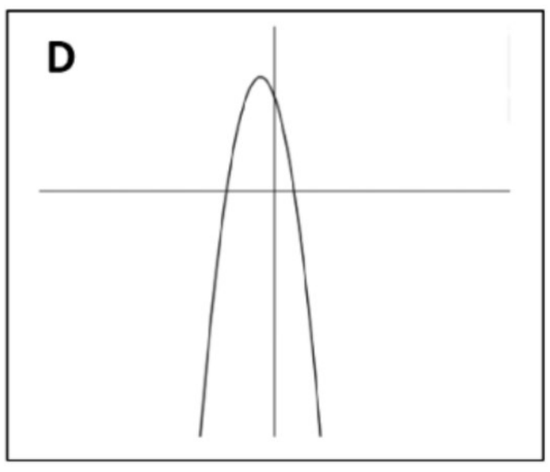
Answer: 3 solutions. (1 mark)

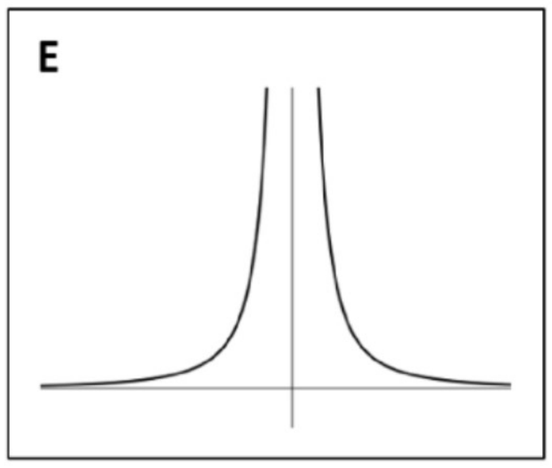
Q7. Write the letter of the graph next to each of the matching equations below:

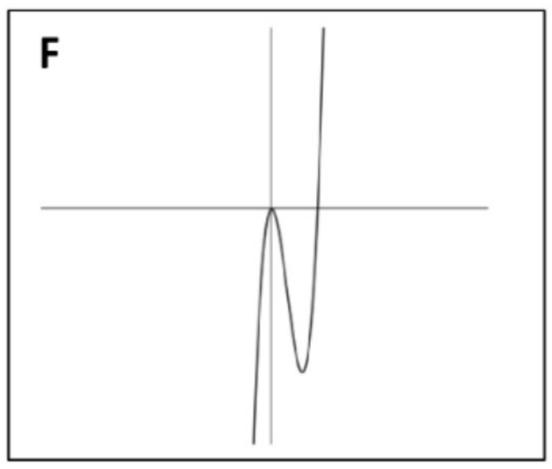


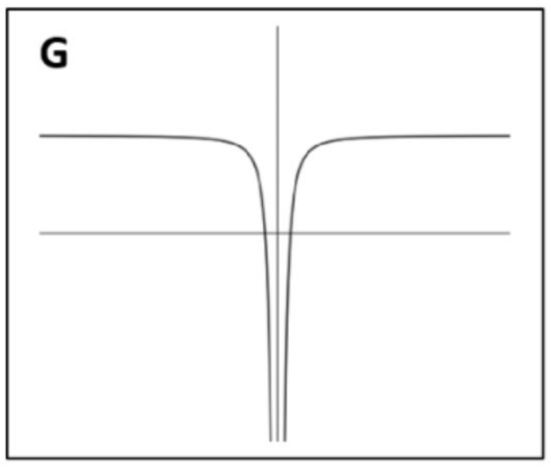


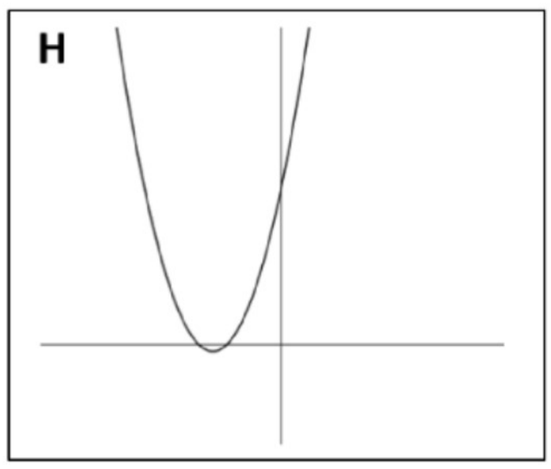












(i) $y = \frac{1}{x^2}$ E

(ii) $y = (x + 2)(x + 3)$ H

(iii) $y = -\frac{1}{x}$ A

(iv) $y = x^3 - 5x^2$ F

(v) $y = (2 - x)(x - 3)$ D

(vi) $y = -x^3$ B

(vii) $y = -\frac{1}{x^2} + 5$ G

(viii) $y = \frac{1}{x-4}$ C

Answer: _____

(4 marks)