MA1200 Practice Exercise 5 **Answer**

Exponential and Logarithmic Functions

1

(i) T (iii) T (v) T (vi) T

(ii) F

Consider $a = 100$ and $b = 10$, then $\log_a 10 = \log_{100} 10 = 0.5$, but $\log_b 10 = \log_{10} 10 = 1$

(iv) F

Consider $a = 0.5$ and $x = 2$, then $a^x = 0.25$ but $a^{x-1} = 0.5$

2

(a) $5^y = 25$

(b) $e^x = 100$

(c) $92 = 10^y$

3

(a) $8 = \log_{15} y$

(b) $5 = \log_b y$

(c) $x + 1 = \ln 90$

4

(i) Domain:$\mathbb{R}$, range:$(1,\infty)$

(ii) Domain:$\mathbb{R}$, range:$(-1,\infty)$

(iii) Domain:$\mathbb{R}$, range:$(-\infty,0)$

(iv) Domain:$(-2,\infty)$, range:$\mathbb{R}$

(v) Domain:$(0,\infty)$, range:$\mathbb{R}$

5

(a) Domain:$\mathbb{R}\backslash\{0\}$, range:$\mathbb{R}$

(b) Domain:$(-1,\infty)$, range:$\mathbb{R}$

(c) Domain:$(1,\infty)$, range:$\mathbb{R}$

6

(a) $x = \frac{\ln 3}{\ln 2} \sim 1.585$

(b) $x = \frac{\ln 5}{\ln 7} - 1 \sim -0.173$

(c) $(x-1)\ln 3 = (x+1)\ln 2 \Leftrightarrow x(\ln 3 - \ln 2) = \ln 2 + \ln 3 \Leftrightarrow x = \frac{\ln 2 + \ln 3}{\ln 3 - \ln 2} \sim -4.419$

(d) $x = \frac{\ln 9 + \ln 12}{\ln 12 - \ln 9} \sim 16.275$

(e) $3(x+1) = 18 \Leftrightarrow x = 5$

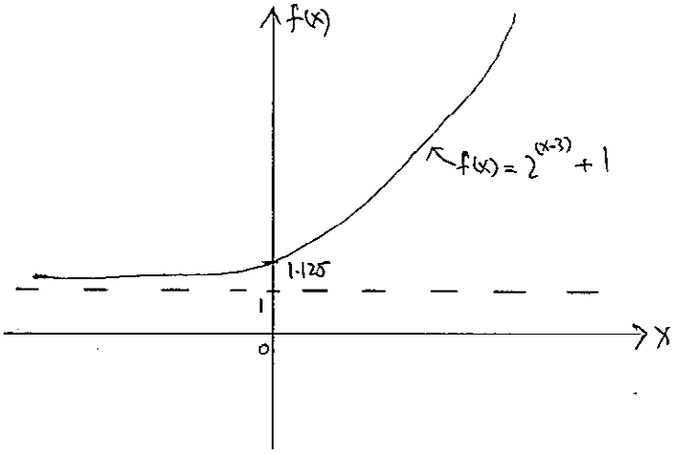
7

(a) $y - 5 = e^{kx+c} \Leftrightarrow y = e^{kx+c} + 5$

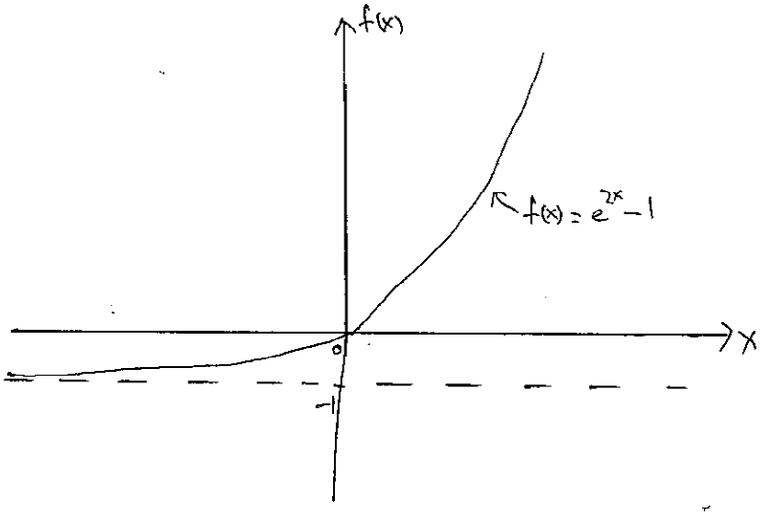
(b) $y = 12 + e^{-kx^2-c}$

(c) $y = -23 + e^{kx^3+c}$

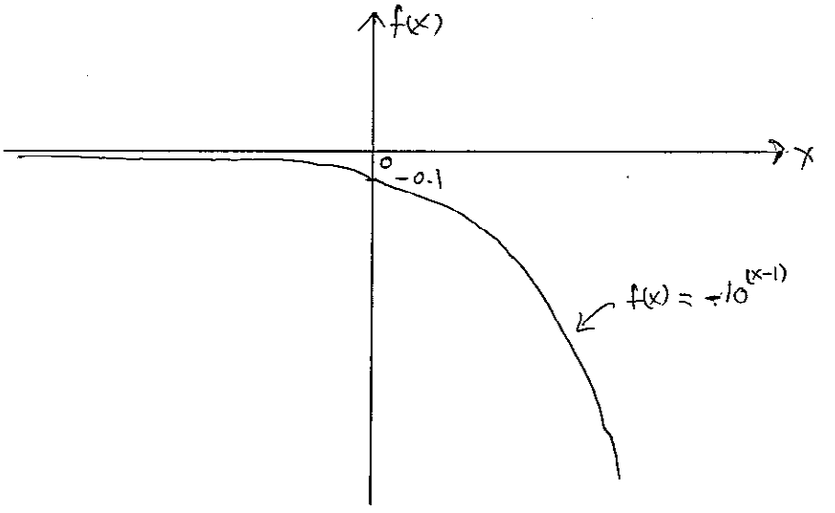
4 (i)



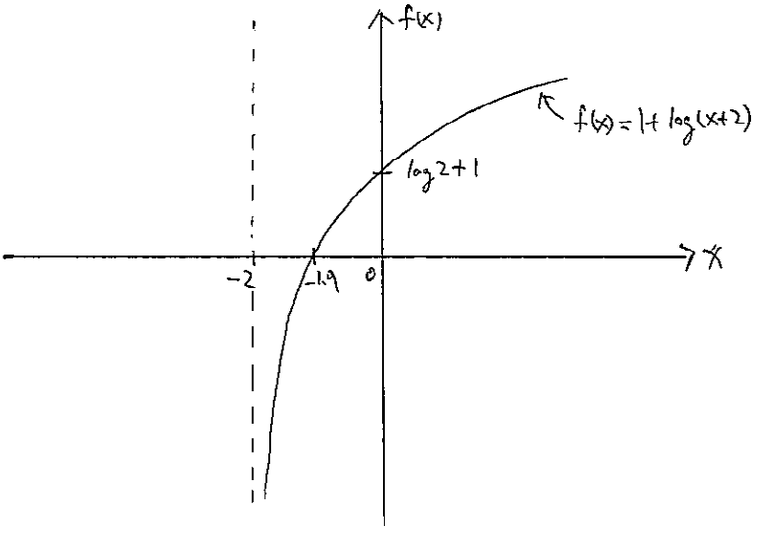
4 (ii)



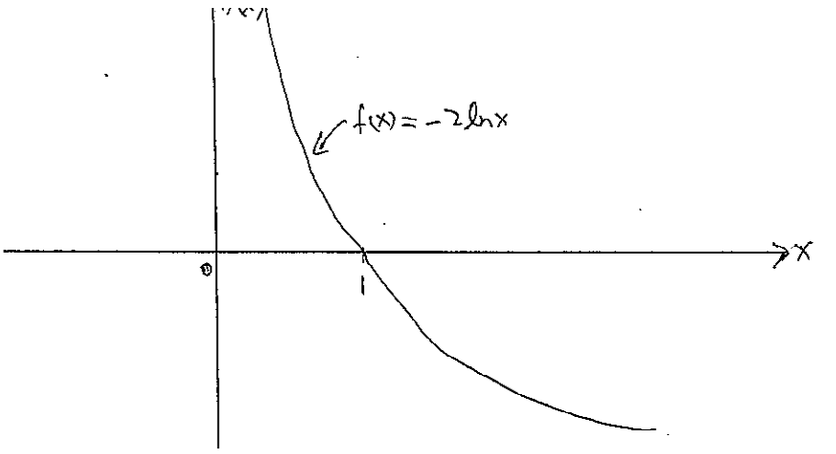
4 (iii)



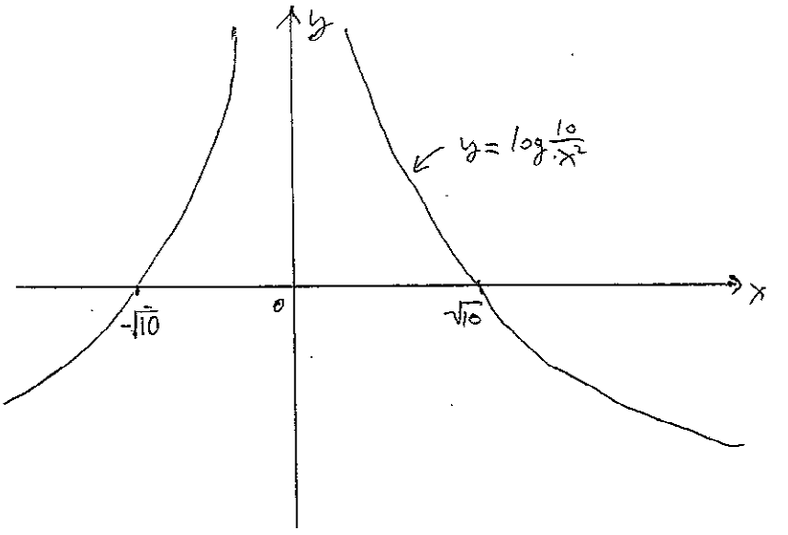
4 (iv)



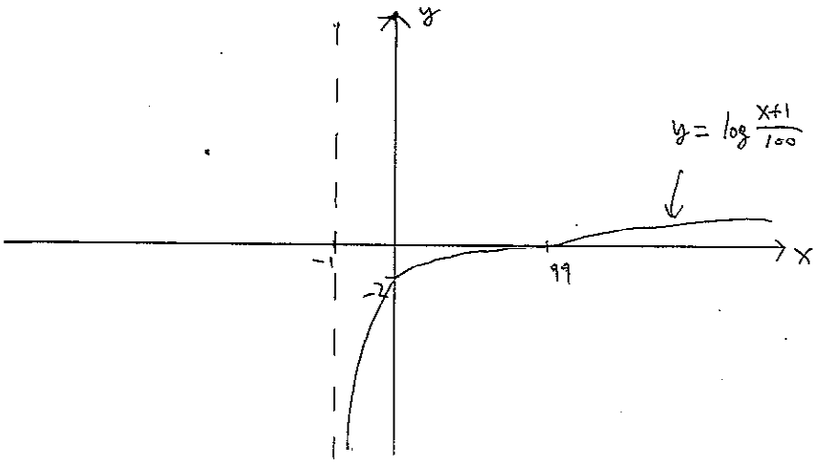
4(v)


f(x) = −2 ln x
0
1
x

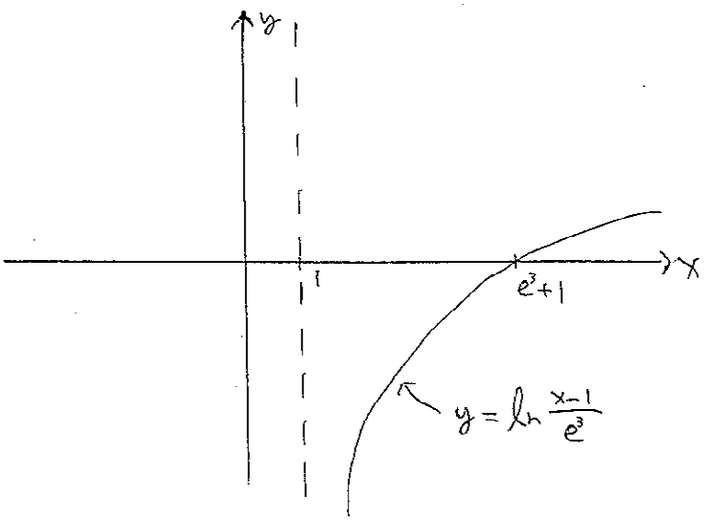
5(a)


y
y = log 10/x²
x
−√10
0
√10

5(b)


y
y = log (x+1)/100
x
−1
99
−2

5(c)


y
x
1
e³+1
y = ln (x−1)/e³