

Calculus (1) — First Semester 2014 ~ Homework (1)

Q3 / 12 : a) Func. b) Func.
 c) not fun. d) not fun.

$$\frac{1}{2} [\ln a + \ln b^3 - \ln c^2]$$

$$= \frac{1}{2} [\ln a + 3 \ln b - 2 \ln c]$$

Q9 / 13 : a) Func. = $\frac{1}{x-3}$ → zero of denominator
 $x-3=0$
 $x=3$

$$= \frac{1}{2} [t + 3s - 2t]$$

Domain: $R - \{3\}$

Range: $R - \{0\}$

c) $g(x) = \sqrt{x^2 - 3} \Rightarrow x^2 - 3 = 0$
 $x = \pm \sqrt{3}$

Q14 / 61 : $\frac{1}{2} \log x = 3 \log (\sin 2x) + 2$

$$\log_{10} \sqrt{x} = \log_{10} (\sin 2x)^3 + \log_{10} 10^2$$

Domain: $(-\infty, -\sqrt{3}] \cup [\sqrt{3}, \infty)$

$$\log \left(\frac{\sqrt{x}}{(\sin 2x)^3} \cdot 10^2 \right)$$

Range: $[0, \infty)$

Q18 / 61 : $\ln x^2 = 4$
 $x^2 = e^4$
 $x = \pm \sqrt{e^4} = \pm e^2$

f) $H(x) = \sqrt{\frac{x^2 - 4}{x - 2}}$
 $x^2 - 4 = 0$
 $x = \pm 2$
 Domain: $[-2, 2) \cup (2, \infty)$

Range: $[0, 2] \cup (2, \infty)$

Q22 / 61 : $\ln 4x - 3 \ln x^2 = \ln 2$

$$\ln 4x - \ln x^6 = \ln 2$$

$$\ln \left(\frac{4x}{x^6} \right) = \ln 2$$

$$\frac{4}{x^5} = 2 \Rightarrow x^5 = \frac{4}{2} = 2$$

$$x = \sqrt[5]{2}$$

Q6 / 61 : a) $\log_{10}(0.001) = \log_{10} 10^{-3} = -3$

d) $\ln \sqrt{e} = \frac{1}{2} \ln e = \frac{1}{2}$

Q10 / 61 : a) $\ln \frac{\sqrt[3]{c}}{ab} = \ln \sqrt[3]{c} - \ln ab$

$$= \frac{1}{3} \ln c - [\ln a + \ln b]$$

$$= \frac{1}{3} t - r - s$$

Q2 / 77 : a) ∞

b) ∞

c) ∞

d) undefined

b) $\ln \frac{\sqrt{ab^3}}{c^2} = \frac{1}{2} \ln \left(\frac{ab^3}{c^2} \right)$