ERASMUS UNIVERSITY ROTTERDAM
Entrance examination Mathematics level 2
for International Bachelor Economics & Business Economics (IBEB)
ANSWERS PRACTICE EXAM

Below, only the final answers and graphs are given. Note that at the actual entrance exam all necessary steps, formulas, figures and substitutions leading to your final answer must also be reported.

Question 1 maximum score: 4 points (2+2)

(a) $x = -4$ and $y = 3$

(b) $x = \frac{1}{3}$ and $y = -\frac{1}{2}$

Question 2 maximum score: 9 points (3+3+3)

(a) $f'(x) = \dfrac{x}{\sqrt{x^2 + 4}}$
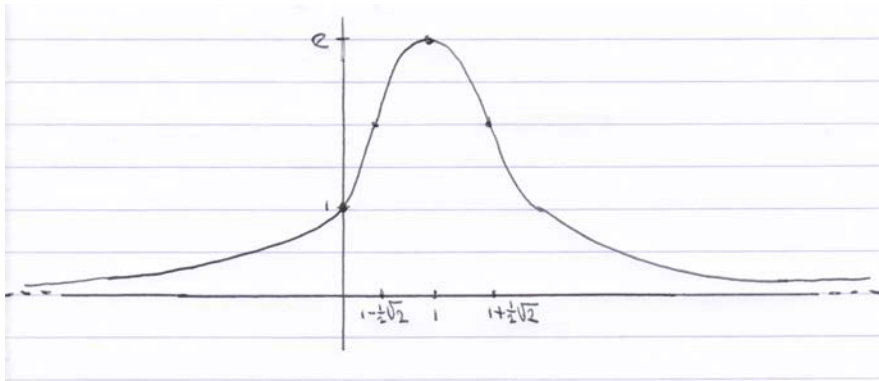
(b) $f'(x) = \dfrac{1}{x - 6}$

(c) $f'(x) = 1$

Question 3 maximum score: 11 points (4+4+3)

(a) $f'(x) = (-2x + 2)e^{-x^2 + 2x} = 0$ when $x = 1$. **Since $f'(0) > 0$ and $f'(2) < 0$, it follows that f has a maximum in $x = 1$**

(b)   **2 inflection points:** $x = 1 \pm \frac{1}{2}\sqrt{2}$

(c)   **Domain of f is equal to $\mathbb{R}$**

Question 4 maximum score: 9 points (3+3+3)
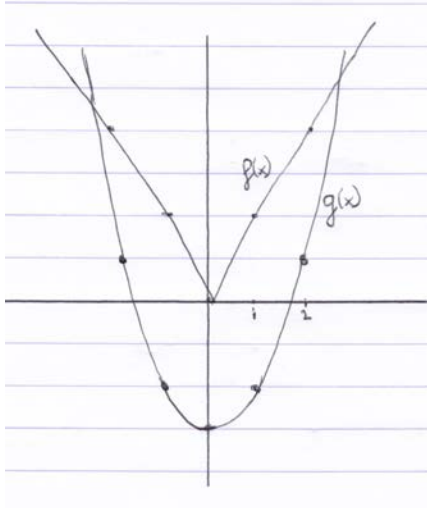
(a) $x = 5$ or $x = -5$

(b) $x = -1$

(c) $x = -1$. Note: the equation can be rewritten as $3^{2x} = 3^{-2(3x+4)}$

Question 5 maximum score: 6 points (3+2+1)

(a)

(b) $x = 3$ or $x = -3$

(c) $x \in (-\infty, -3] \cup [3, \infty)$
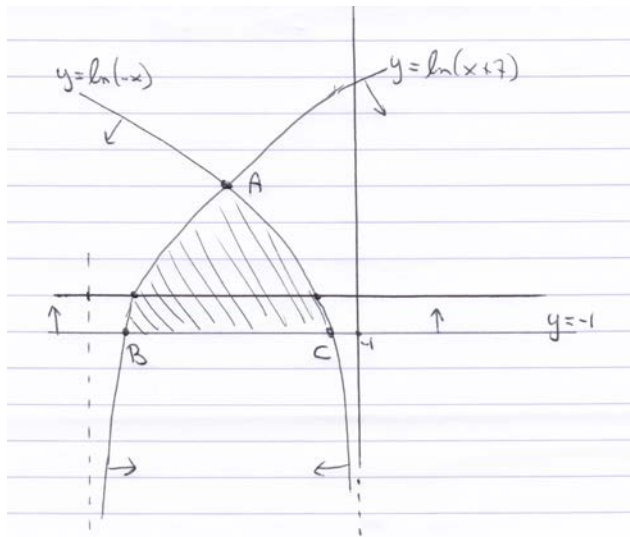
Question 6 maximum score: 6 points (2+2+2)

(a) $y = \frac{2}{5}x - 1$

(b) $y = -\frac{5}{2}x + 28$

(c) $y = 21x - 207$

Question 7 maximum score: 6 points (3+3)

(a)

(b) $A = \left(-\frac{7}{2}, \ln\left(\frac{7}{2}\right)\right)$, $B = \left(\frac{1}{e} - 7, -1\right)$, $C = \left(-\frac{1}{e}, -1\right)$

Question 8 maximum score: 4 points $\left(\frac{1}{2} + \frac{1}{2} + 3\right)$

(a) $x = 2$ or $x = -\frac{2}{3}$

(b) $x = -2$

(c) $p \in (0, 12)$

Question 9 maximum score: 5 points

Second point of inflection: $(0, 40)$.
Note: $a = 2$ **and** $b = 40$

Grade = Score/6